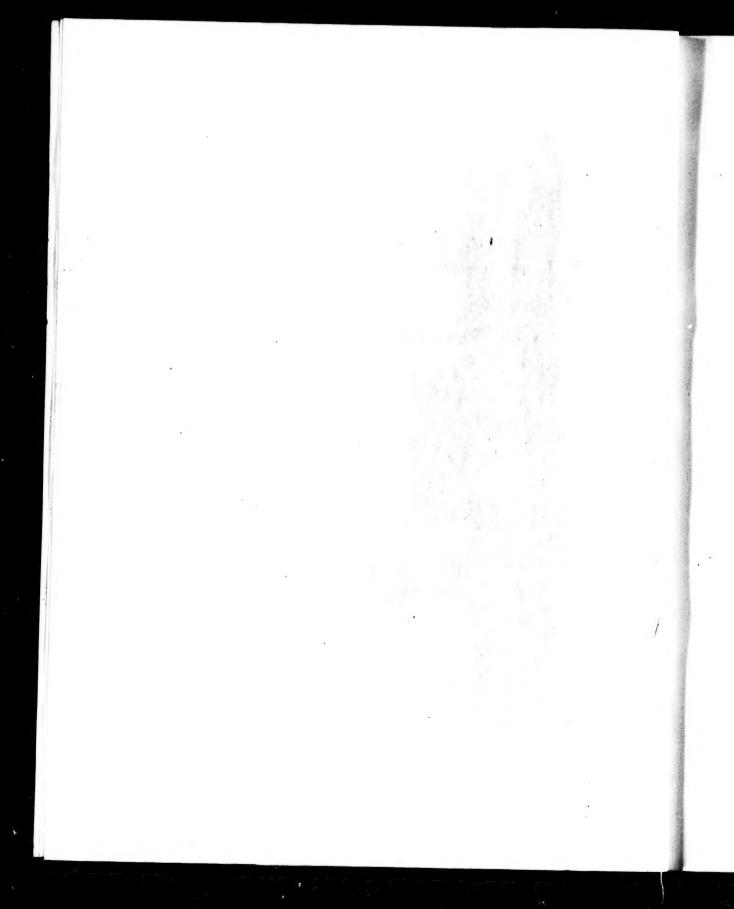


FRONT VIEW OF MAIN BUILDING, UNITED STATES SIGNAL STATION.
POINT BARROW ALASKA.



Potest Bell, M. D.

## REPORT

OF THE

# INTERNATIONAL POLAR EXPEDITION

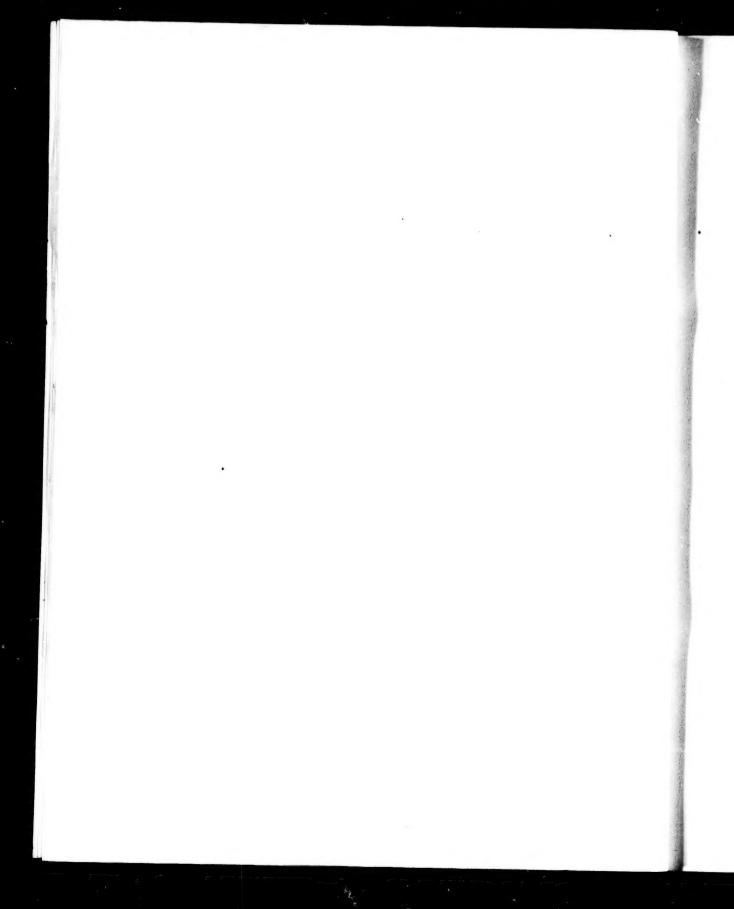
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# POINT BARROW, ALASKA,

IN RESPONSE TO

THE RESOLUTION OF THE HOUSE OF REPRESENTATIVES OF DECEMBER 11, 1884.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.



### EXPEDITION TO POINT BARROW, ALASKA.

### LETTER

FROM

# THE SECRETARY OF WAR,

TRANSMITTING,

In response to a resolution of the House, the report of the International Polar Expedition to Point Barrow, Alaska.

DECEMBER 16, 1884.—Referred to the Committee on Naval Affairs and ordered to be printed.

### LETTERS OF TRANSMITTAL.

WAR DEPARTMENT, Washington City, December 15, 1884.

The Secretary of War has the honor to transmit to the House of Representatives the report of the International Polar Expedition to Point Barrow, Alaska, together with the letter of the Chief Signal Officer of the Army, of this date, submitting the report to this Department, the same being furnished in response to the resolution of the House of Representatives of December 11, 1884, as follows:

"Resolved, That the Secretary of War be requested to transmit to the House of Representatives, if not inconsistent with the public service, the report of the International Polar Expedition to Point Barrow, Alaska, by Lieut. P. H. Ray, U. S. Army, for the years 1881, 1882, and 1883."

ROBERT T. LINCOLN,

Secretary of War,

The Speaker of the House of Representatives.

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington City, December 15, 1884.

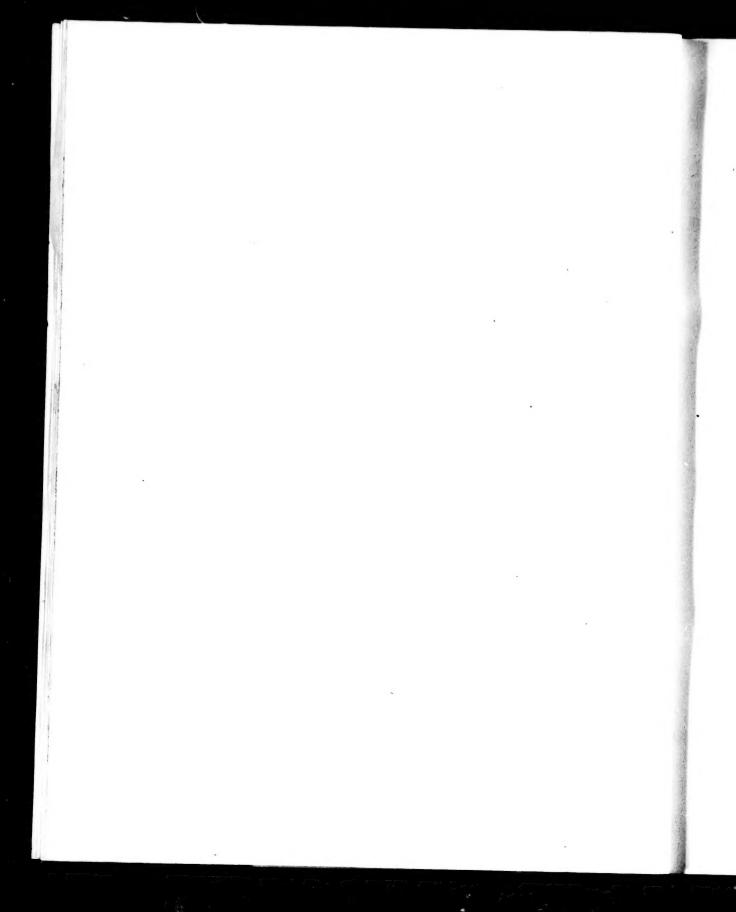
SIR: I have the honor to transmit herewith the report of the International Polar Expedition to Point Barrow, Alaska, called for by resolution of House et Representatives of December 12, 1884.

I am, very respectfully, your obedient servant,

W. B. HAZEN,

Brigadier and Brevet Major General, Chief Signal Officer, U. S. Army.

The Hon. Secretary of War, Washington, D. C.



### LETTER OF TRANSMITTAL.

WASHINGTON, D. C., November 1, 1884.

SIR: I have the honor to transmit herewith a full report of the operations of the International Polar Expedition to Point Barrow, Alaska, under my command, for the years 1881, 1882, and 1883.

The work in meteorology and magnetism is as complete as it was possible to make it with the means placed at my disposal.

The work of geographical exploration, having been made of secondary importance, was confined to such short expeditions as I was able to make from the home station, without suspending of interfering with the regular work; but enough was done to demonstrate that the work of exploration in the Arctic can be carried on, at any season of the year, with the assistance of the natives, with comparative safety and but very little suffering, and I trust that our experience will tend to remove some of the prejudices now existing in the public mind against Arctic exploration.

I regret exceedingly that I was not given more time to prepare myself for this undertaking, as my previous training had not been of such a character as to fit me for it, except in the matter of command and equipment.

I cannot speak too highly of the faithfulness and devotion of the members of the expedition to their duty. To their cheerful assistance and ready obedience is due all credit for the success attending the expedition.

In preparing this report I have been placed under many obligations to Prof. Spencer F. Baird, Director of the United States National Museum, and to Prof. J. E. Hilgard, Superintendent United States Coast and Geodetic Survey, for advice, as well as valuable assistance in their departments; also to Mr. Charles A. Schott, assistant. United States Coast and Geodetic Survey, for the reduction and discussion of the magnetic observations; to Mr. R. S. Avery, United States Coast and Geodetic Survey, for the reduction and discussions of tides; to Private A. L. McRae, Signal Corps, U. S. Army, for the reduction and discussion of the ground currents; and to Sergt. John Murdoch, Signal Corps, U. S. Army, naturalist of the expedition, for his able and valuable assistance throughout the whole expedition, and in preparing this report.

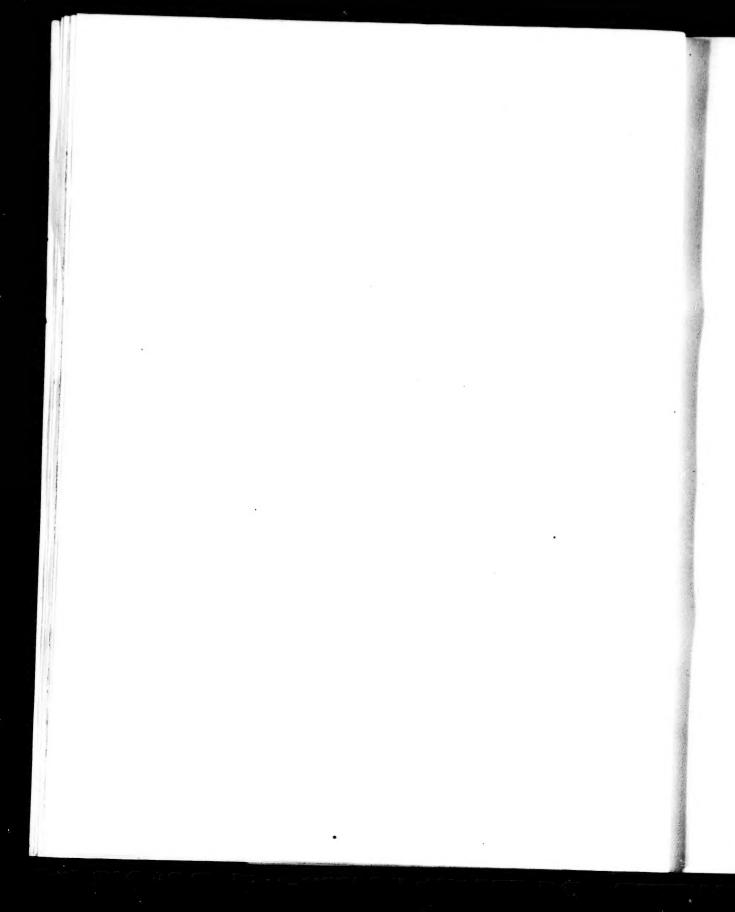
I am, very respectfully, your obedient servant,

P. H. RAY.

First Lieutenant Eighth U. S. Infantry, A. S. O., Commanding Expedition.

CHIEF SIGNAL OFFICER, UNITED STATES ARMY,

Washington, D. C.



## CONTENTS.

PART I .- ORDERS AND INSTRUCTIONS.

PART II.-NARRATIVE.

PART III.—ETHNOGRAPHICAL SKETCH OF THE NATIVES OF POINT PARROW (INCLUDING VOCABULARY AND LUTY CO

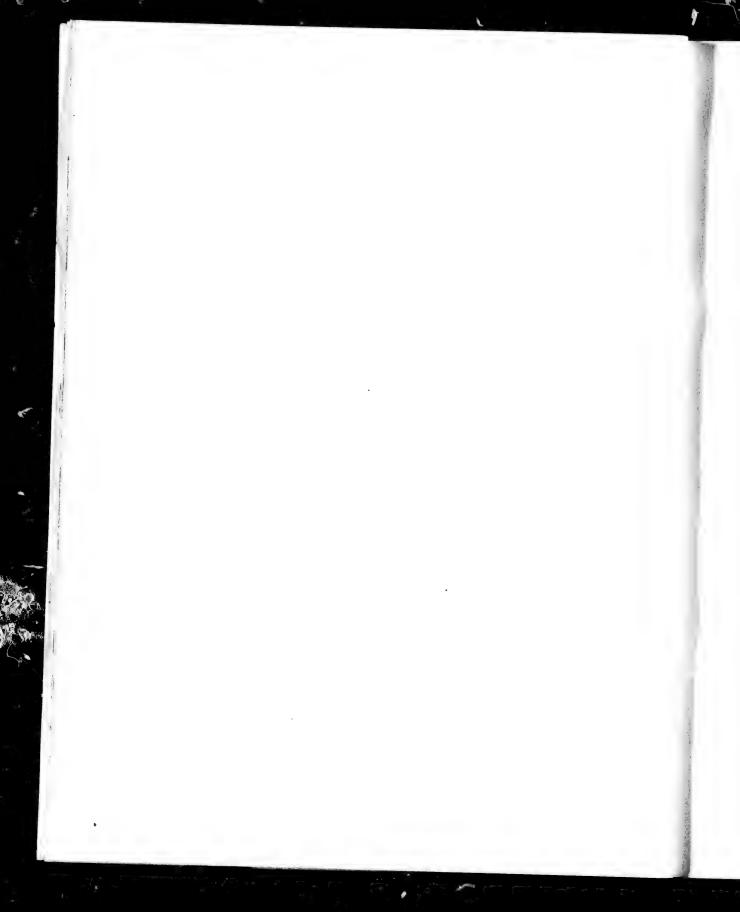
PART IV .- NATURAL HISTORY.

PART  $V_* \leftarrow METEOROLOGY$  (INCLUDING AURORA).

PART VI.- MAGNETISM.

PART VII.-TIDES.

PART VIII.-MISCELLANEOUS OBSERVATIONS (EARTH CURRENTS, ETC.).



#### PART I.

## ORDERS AND INSTRUCTIONS.

[Special Orders No. 102.]

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL OFFICER, Washington, D. C., June 24, 1881.

[Extract.]

IV. By direction of the Secretary of War, the following-named officers, civilians, and enlisted men are assigned to duty as the expeditionary force to Point Barrow, Alaska Territory, viz: First Lieut. P. Henry Ray, Eighth Infantry, Acting Signal Officer; Acting Assistant Surgeon, George Scott Oldmixon, U. S. Army,; Sergt. James Cassidy, Signal Corps, U. S. Army, observer; Sergt. John Murdoch, Signal Corps, U. S. Army (A. M., Harvard), naturalist and observer; Sergt. Middleton Smith, Signal Corps, U. S. Army, naturalist and observer; Capt. E. P. Herendeen, interpreter, storekeeper, &c.; Mr. A. C. Dark, astronomer and magnetic observer (Coast Survey); one carpenter; one cook; one laborer.

V. First Lieut, P. H. Ray, Eighth Infantry, Acting Signal Officer, is hereby assigned to the command of the expedition, and is charged with the execution of the orders and instructions given below. He will forward all reports and observations to the Chief Signal Officer, who is charged

with the control and supervision of the expedition.

VI. As soon as practicable, Licutenant Ray will sail with his party from San Francisco for Point Barrow, latitude 71° 27′ north, longitude 156° 15′ West (Beechey), and establish there a permanent station of observation, to be occupied until the summer of 1884, when he will return here, unless other orders reach him. On the way out and back, a stoppage of a few days only will be made at Plover Bay (latitude 64° 22′ 0″ north, longitude 173° 21′ 32″ west), for the purpose of determining the error and sea rate of his chronometers. The vessel conveying him to his destination will not be detained at the permanent station longer than is necessary to unload the stores.

W. B. HAZEN,

Brigadics and Brevet Major-General, Chief Signal Officer, U. S. Army.

Official:

LOUIS V. CAZIARC.

First Lieutenant, Second Artillery, Acting Signal Officer.

[Instructions No. 76.]

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL OFFICER, Washington, D. C., June 24, 1881.

The following general and detailed instructions will govern in the establishment and management of the expedition organized under Special Orders No. 102, War Department, Office of the Chief Signal Officer, Washington, D. C., dated June 24, 1881.

The permanent station will be established at the most suitable point in the vicinity, and, if practicable, at or in the immediate neighborhood of Point Barrow, Alaska Territory, (latitude 71° 27' north; longitude 156° 15' west, as determined by Beechey).

The chronometers will be rated at San Francisco, and will have their sea rates determined by an observation of time at the United States Coast and Geodetic Survey station at Plover Bay (latitude 64° 22′ 6″ north; longitude 173° 21′ 32″ west).

The vessel should, on arrival at the permanent station, discharge her eargo with the utmost dispatch, and at once be ordered to return to San Francisco, Cal. Before permitting the vessel to leave, a careful examination of the vicinity will be made and the exact site chosen for the permanent station will be located in latitude and longitude, chronometrically, both by Lieutenant Ray and by the navigator of the vessel independently, and a report in writing will be sent by the returning vessel. By the same means will be sent a transcript of all meteorological and other observations made during the voyage, and also a list of apparatus and stores known to be broken, missing and needed, to be supplied next year.

After the departure of the vessel, the energies of the party should first be devoted to the erection of the houses required for dwellings, stores, and observatories.

Special instructions regarding the meteorological, magnetic, tidal, pendulum, and such other observations as were recommended by the Hamburg International Polar Conference, are transmitted herewith.

Careful attention will be given to the collection of specimens of the animal, mineral, and vegetable kingdoms. These collections are to be made as complete as possible, and are to be considered the property of the Government of the United States, and are to be at its disposal. The collections in natural history and ethnology are made for, and will be transferred to, the National Museum.

It is contemplated that the *permanent* station will be visited in 1882, 1883, and 1884 by a steam or sailing vessel, by which supplies for, and such additions to, the present party as are deemed needful will be sent. Lists of stores required to be sent by the next season's vessel will be forwarded by each returning boat.

The subject of fuel and native food supply, its procurement and preservation, will receive full and careful attention, as soon after the establishment of the post as practicable. Full reports upon this subject will be expected.

A special copy of all reports will be made each day, which will be sent home each year by the returning vessel.

The full narrative of the several branches will be prepared with accuracy, leaving the least possible amount of work afterwards to prepare them for publication.

In case of any fatal accident or permanent disability happening to Lie tenant Ray, the command will devolve on the officer next in seniority, who will be governed by these instructions.

W. B. HAZEN,

Brigadier and Brevet Major-General, Chief Signal Officer, U. S. Army.

Official:

LOUIS V. CAZIARC,

First Lieutenant, Second Artillery, Acting Signal Officer.

INSTRUCTIONS FOR THE COMMANDING OFFICERS OF THE INTERNATIONAL POLAR STATIONS OCCUPIED BY THE SIGNAL SERVICE.

#### I. General.

 Regular meteorological and other observations will be maintained uninterruptedly, both at sea and at the permanent station, in accordance with instructions issued to Signal Service observers and those contained in the accompanying extract from the proceedings of the Hamburg conference, to which special notes are appended where needed.

2. The original record of these observations will be kept in the blank books supplied for this purpose, and a fair copy of the corrected and reduced results will be made upon Signal Service and special forms, as supplied in bound volumes.

ed by 3. At sea a daily record will be kept, by dead reckoning and astronomical observations, of r Bay the latitude and longitude of the vessel, by which the positions at the times of meteorological observations will be deduced, and on arriving at the permanent station the local time and longitude itmost will be immediately determined, whence the Washington and Göttingen times will be found by vessel applying the correction for longitude.

4. All meteorological and tidal observations will be made at exact hours of Washington civil time. (The longitude of Washington Observatory is 5<sup>h</sup> 8<sup>m</sup> 12<sup>k</sup>,09 west of Greenwich.) The regular magnetic observations will be made at even hours and minutes of Göttingen mean time. (Göttingen is 0h 39m 46°, 24 east of Greenwich, or 5h 47m 58°, 33 east of Washington; whence 12 noon Washington time is simultaneous with 5h 47m 58s.33 p. m. Göttingen time, or 6h 12m 1s.67 a. m. Washington time is simultaneous with 12 noon at Göttingen.)

If hourly meteorological observations of all these phenomena cannot be taken, then, if possible, take bi-hourly observations at the hours 1, 3, 5, 7, 9, 11 a, m. and p. m., or at least six observations at 3, 7, and 11 a. m. and p. m. On no account will the meteorological observation at 7 a. m., Washington time, be omitted.

5. Upon arrival at the permanent station the local time and longitude will be determined at once, without waiting for the erection of permanent shelters which will be built for the meteorological, magnetic, and astronomical instruments, according to the plans and material as specified.

The meteorological and astronomical observatories will be located conveniently near to the dwelling of the observers, but that of the magnetic observatory will be determined by the consideration that these instruments must be removed from all danger of being affected by the presence of steel or iron, including galvanized and tinned iron. If needed to keep off intruders, a guard or fence should surround the magnetic observatory.

6. The observation of tides will be made as complete as possible in summer by a gauge on the shore, and in winter through an opening in the ice, according to the instructions furnished by the Superintendent of the United States Coast and Geodetic Survey. The necessity for observing the tides will suggest that the dwelling-house should be located as near the sea as is safe and convenient.

7. In addition to the ship's log and the official journal of the party, to be kept by the commanding officer, and the official record of observations, to be kept by the meteorological, magnetic, tidal, and astronomical observers, each member of the party will be furnished with a diary, in which he will record all such incidents as specially interest him. This diary will not be open to inspection until delivered to the Chief Signal Officer for his sole use in compiling the full record of the expedition.

8. Accurate representations, either by the photographic process or sketching, will be made of all phenomena of an unusual character, or of whatever is characteristic of the country.

9. Carefully prepared topographical maps will be made of as much of the surrounding country as is practicable.

11. Detailed instructions concerning observations, instruments, and time, by the INTERNATIONAL POLAR CONFERENCE, HAMBURG, 1879, OCTOBER 1 TO 5.

[Translated at the office of the Chief Signal Officer, with added notes in brackets.]

1. OBLIGATORY OBSERVATIONS IN THE DOMAIN OF METEOROLOGY

No. 17. Temperature of the air.—The mercurial thermometers should be graduated to twotenths degrees Centigrade, and the alcohol thermometers to whole degrees, and both verified at a central meteorological station to within one-tenth degree Centigrade.

The thermometers furnished are graduated to Fahrenheit; they have been compared with the Signal Service standard, and are provided with correction cards.

No. 18. The instruments should be placed at an altitude of between 1.5 and 2.0 meters (5 to 6 feet), and it is recommended that they be exposed in a double shelter of lattice work, according to

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this and Wild's method. The outer shelter to be of wood, the inner of metal. The observations of minimum thermometers can be made under various conditions.

|The shelters furnished consist of an outer wooden lonvre work and an inner galvanized iron shelter, both framed so as to be easily set up. The minimum temperatures at various altitudes above ground will be observed, and under such various conditions as circumstances suggest.

No. 19. The alcohol thermometers ought to be compared at the station of observation with the standard mercurial thermometer at the lowest possible temperatures.\*

No. 20. Sea temperatures should be observed, whenever possible, at the surface and at each 10 meters (about 33 feet) of depth; as instruments, proper for this observation, the following may be specified: deep-sea thermometers, as manufactured or invented by Ekmann; Negretti & Zambra; Miller-Casella; Jamsen.

|While at sea the temperature of the surface water will be observed hourly, with the Signal Service water thermometer, by the ordinary methods, and the temperature at each 33 feet of depth, whenever practicable; for greater depths, one of the above deep-sea instruments will be used.

No. 21. The point 0° Centigrade (32° Fahrenheit), for all the thermometers should be determined from time to time.

[The testing of thermometers will be made quarterly, according to the usual Signal Service rules.]

No. 22. Pressure of the air.—At each station there must be at least two well-compared mercurial barometers, a reserve barometer, and an aneroid.

No. 23. The standard barometer ought to be compared or read once each day.

[Several mercurial and ancroid barometers are furnished, and all regular observations will be made from a mercurial barometer, selected from among them, which will be compared, once each day, with the standard barometer. All barometers will be fully compared with the standard once each month; such comparative readings will be entered on the regular Signal Service forms for this purpose.]

No. 24. Humidity.—The psychrometers (i. c., dry and wet bulb) and hair hygrometer will be used with Regnault's dew-point apparatus as a check, according to Wild's instructions.

[Comparative readings, with these instruments, will be frequently made and carefully preserved for future study.]

No. 25. The wind.—The wind-vane and Robinson's anemometer are to be read from within the house (see the method of construction of the apparatus of the Swedish station at Spitzbergen), at the same time; the force of the wind will be estimated according to the Beaufort scale and the wind-direction to sixteen compass points, referred to the true meridian.

[The points of the compass on the wind-dial will be adjusted to the true meridian as is ordered for all Signal Service stations; self-registering instruments of the Signal Service pattern for the velocity and direction of the wind to eight points will be used. A record of wind-force on the Beaufort scale (0 to 12), and wind-direction to sixteen points will also be kept and will be entered in the special column.]

No. 26. To aid in deciding the question whether the Robinson's anemometer, with large or with small cups, should be used for determining the force of storms in the Polar zone, it is recommended that both such be subjected to preliminary experiments.

[Anemometers of the Signal Service pattern, having small cups and short arms, are the only ones that it is convenient to furnish. For comparative purposes keep two of these in permanent daily use, exposing them in different but good localities. The extra anemometers should be compared with these during twenty-four hours on the first Monday of each month, and a full record be kept of such comparisons.]

No. 27. The clouds.—The amount of cloudiness and the direction of the movement of all clouds should be observed to sixteen compass points.

[In addition, the kinds of clouds will be noted, and the record kept in the usual Signal Service form.]

<sup>\*</sup>For notes on special thermometers, prepared for the Signal Service stations, see Section III of these instructions

ions of No. 28. Precipitation.—The commencement and duration of rain, snow, hail, &c., and, when possible, the amount of precipitation, is to be observed. As to the amount, however, this is not obligatory in winter.

[There will be recorded regularly, and, if practicable, hourly, the amount of precipitation.]

measured if possible, otherwise estimated.

No. 29. The weather.—Storms, thunder-storms, hail, fog, frost, dew, &c., and the optical phenomena of the atmosphere ought to be recorded.

2. obligatory observations in the domain of terrestrial magnetism.

No. 30. Absolute determinations.—For declination and inclination it is necessary to attain an accuracy of 1.0 minute, for horizontal intensity of 0.001. The proper instruments are, for example, the portable theodolite of Lamont and the ordinary dip-needles.

No. 31. The absolute observations must be executed in close connection and synchronous with the readings of the variations instruments, in order to be able to reduce the data given by the latter to an absolute normal value, and to determine the zero point of the scales. The determinations must be made so frequently that the changes in the absolute value of the zero point of the scales of the variations apparatus can be accurately checked thereby.

No. 32. Observations of variations.—These ought to include the three elements and be made by means of instruments, with small needles, in contrast to the apparatus of Gauss. In order to obtain an uninterrupted reciprocal control, two complete sets of variations instruments are desirable, and recommended, in order to avoid any interruption of the observations, by reason of breakage, derangement, &c.

[One set of these instruments is now provided, but a second set may be sent in 1882.]

No. 33. The horizontal intensity in one, at least, of these systems should be observed with the unifilar apparatus. Because of the magnitude of the perturbations to be observed, the scales of the variations instruments must have at least a range of ten degrees, and the arrangements are to be so made that the greatest possible simultaneity of the readings may be achieved.

No. 34. During the entire period of occupancy of the station the variations instruments will be read hourly. It is desirable that two readings be made; for instance, just before and after the full hour, with an interval of a few minutes between.

No. 35. Weyprecht presented the following separate note on this point:

"Since it appears to me that in these regions of almost perpetual disturbances, hourly readings, made at moments not well defined, are insufficient to establish mean values accurately expressing the local perturbations for a given epoch (which data ought to serve as a means of comparison with other localities), and in consideration of the slight increase of labor which will be caused by taking readings at precise moments, I cannot agree with the views of the majority of the Conference."

"I state that at least the expedition conducted by myself will take readings hourly of all three variations instruments at 58<sup>m</sup> 0\*, 59<sup>m</sup> 0\*; 60<sup>m</sup> 0\*; 61<sup>m</sup> 0\*; 62<sup>m</sup> 0\*; Göttingen mean time."

"WEYPRECHT."

[Observations will be taken as specified by Weyprecht.]

No. 36. As term days, the first and fifteenth day of each month will be observed from midnight to midnight, Göttingen time. The readings will be taken at intervals of five minutes, always on the full minutes, and the three elements are to be read with all possible rapidity, one after the other, in the following order: 1. Horizontal intensity; 2. Declination; 3. Vertical intensity.

No. 37. For these term days, the plan of magnetic work should comprehend continuous readings, for instance, readings every twenty seconds—throughout one whole hour—even though only one magnetic element be observed. It is the opinion of the Conference that the observations should begin so that one of the hours of observation shall agree with the first hour of the 1st of January, and that during the entire period of magnetic work the hours devoted to this continuous observation should be changed on each successive semi-monthly term day.

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<sup>\*</sup>For special instructions in magnetic work, furnished by the Superintendent of the United States Coast and Geodetic Survey, see Section IV of these instructions.

No. 38. The accuracy of the magnetic observations should be such as to give the declination to the nearest minute and the horizontal and vertical intensity in units of the fourth decimal place.

No. 39. On the term days, observations of auroras are also to be made continuously. Moreover, auroras are also to be observed from hour to hour throughout the period of magnetic observations, and especially in reference to their form and momentary position in altitude and true azimuth. The intensity of the light is to be estimated on a scale of 1, 2, 3, 4.

No. 40, Isolated auroral phenomena must be made the subject of thorough observations in connection with which the various phases are to be noted simultaneously with readings of the magnetic variations instruments.

[Those of the party not engaged at the magnetic instruments will observe and record auroral phenomena.]

No. 41. Since the greatest possible simultaneity in the readings is a point of the highest importance, the determinations of the location and of the time are to be made with instruments having firm foundations (such as the universal instrument or astronomical theodolite, the vertical circle, zenith telescope, astronomical transit, &c.); this, however, does not exclude the use of reflecting instruments of a superior class. By all means, therefore, must efforts be made to determine the geographical position, and especially the longitude of the station, as soon as possible after it has been occupied.

[The first approximate longitude of the station, as determined by chronometers, will be checked as frequently as possible by lunar distances, occultations, &c., and the value adopted in the daily work of the station will be revised as often as necessary, preferably at the end of each quarter. The details of the magnetic observations will be regulated according to the instructions published by the Superintendent of the United States Coast and Geodetic Survey.]

#### 3. ELECTIVE OBSERVATIONS.

No. 42. The Conference recommends the following observations and investigations most earnestly to the consideration of all those to whom is intrusted the preparation of instructions for an expedition or who themselves are assigned to such work.

No. 43. Meteorological.—The diminution of temperature with altitude, the temperature of the earth, of the snow, and of the ice at the different depths should be determined.

[The forms of the snow-crystals should be recorded by careful drawings; the amount of hoar-frost accumulated on some well-exposed object should be measured by the use of the scales furnished by the medical department. Apparatus is ordered to be provided for the preservation of air and of air-dust for future analysis.]

No. 44. Observations of insolation (or solar radiation) are to be made, as well as observations on spontaneous evaporation, which latter can be made during the winter by weighing cubes of ice, and during the summer by the evaporimeters.

[A shallow circular vessel of water, whether fluid or frozen, exposed to the open air and sunshine, should have its loss of weight determined, daily or oftener, by delicate scales.]

No. 45, Magnetical.—From time to time absolute simultaneous readings of all three elements of terrestrial magnetism must be made in order to accurately determine the ratio between the simultaneous changes of the horizontal and those of vertical intensity.

No. 46. Galvanic carth currents.—Observations are desired of earth currents in intimate connection with magnetic observations and the auroral phenomena.

[Telegraph lines of well-insulated wire, extending a short distance north and south and also east and west, and furnished with resistance coils and deflection needles, are supplied, and every effort should be made to carry out these observations.]

No. 47. Hydrographic incretigations.—Observations of the direction and strength of the ocean currents and the movements of the ice.

No. 48. Deep sea soundings and observations upon the physical properties of the sea water, for instance, determination of the temperature, specific density, gaseous contents, &c., and these objects should be especially kept in view in the selection of a vessel for the expedition. Observations on tides, when possible, should be made with the self-registering apparatus.

[With regard to tidal observations, the instructions published by the United States Coast and Geodetic Survey are to be followed. Glass-stoppered bottles are provided for preserving specimens of sea water to be brought back for examination.]

No. 49. Parallax of the aurora.—Determination should be made of the altitude of the aurora by means of measurements made for example with the meteorograph, which must be made by small detached parties of observation, having also, if possible, one party observing simultaneously the variations of magnetic declination.

[Particular attention will be paid to determining the apparent position in altitude and azimuth of bright meteors and shooting stars and of definite portions of the aurora borealis, and to drawings of the appearances presented by the phenomena, as seen by observers situated as far apart (say one-half to five miles) as possible; in these drawings the auroral phenomena should appear in their proper positions relatively to the horizon, meridian, fixed stars, &c., and to that end each member of the party, without exception, will learn the names and configurations of the stars shown upon the map of stars furnished you. A supply of these maps is furnished, sufficient to allow of using them as base charts upon which to enter the observed phenomena in special cases. Attention is called to the points of inquiry suggested in the Annual Report of the Chief Signal Officer, 1876, pp. 301–335.]

No. 50. Observations of, 1, atmospheric electricity; 2, astronomical and terrestrial refractions; 3, length of the simple second's pendulum; 4, observations on the formation and growth of floating ice and glaciers.

[Attention is called to the observations on the formation of ice made by Nares and other explorers. The pendulum observations will be made in accordance with special Coast Survey instructions.]

No. 51. Observations and collections in the realms of zoology, botany, geology, &c.

[The instructions given by Prof. Spencer F. Baird to the naturalist will be followed by him.] No. 52. There will also be made special observations relating to the whole polar problem, such as the flight of birds, presence of drift-wood, and from what direction it came, and other matters as may suggest themselves from time to time and be found practicable.

#### III. SPECIAL INSTRUCTIONS RELATIVE TO CARE AND USE OF SPECIAL THERMOMETERS.

[See paragraph 19, page 10.]

The construction of the minimum standard thermometers designed for the Arctic stations having been intrusted to the Thermometric Bureau of the Winchester Observatory of Yale College, the astronomer in charge of that institution furnishes the following special instructions, which will be earefully followed:

"NEW HAVEN, May 30, 1881.

"GENERAL REMARKS AND DIRECTIONS CONCERNING THE SIGNAL SERVICE MINIMUM STAND-ARDS, NOS. 1 TO 12 INCLUSIVE, CONSTRUCTED BY THE WINCHESTER OBSERVATORY OF YALE COLLEGE.—J. AND H. J. GREEN, MECHANICIANS.

"Materials.—The alcohol, carbon di-sulphide, and ethyl oxide used are as pure as the chemical processes will admit. For thermometric purposes they may be assumed chemically pure. There is no more air above the liquid columns than is accidentally admitted in the process of scaling the tubes. In this respect these standards are different from the ordinary spirit thermometers. It is probable that the great parity of the alcohol will render it nearly as valuable for temperatures below—80° Fahrenheit—as the carbon and ether thermometers.

"Directions for carriage.—It is highly desirable that these thermometers should be kept, as nearly as possible, in the same condition as on leaving the observatory. For this purpose they have been carefully packed in a vertical position, and care must be taken to see that they are so repacked, with the bulb down. Owing to the low boiling points of the other and carbon disulphide they are not (probably) accurate at temperatures above + 60° Fahrenheit, but they will remain clear and limpid at temperatures below zero, at which the alcohol thermometers may (but

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iter, for d-these bservahardly probably) show viscidity. It is desirable, therefore, that preference be given to these standards over any other standards for extremely low temperatures, and in establishing the meteorological observatory at which the greatest cold is expected, special attention should be given to the other and carbon disalphide thermometers.

"Suggestions in their use.—Before mounting these thermometers in their stations, they should be carefully swung or jarred so that no spirit can be detected (with a magnifying glass) adhering to their upper ends. They should be inclined (with the bulb end nearest the ground) as far as it is safe, and have the index stand in its place, by its own friction against the side of the tube, so

that the draininge may be as perfect as possible.\*

"All readings should be recorded in millimeters, and it should be remembered that the accompanying tabular corrections (see the correction cards) are meant to give only approximate temperatures. A careful comparison of all the thermometers from 1 to 12 has been made between 0 and 90° and Nos. 1, 5, and 9 have been kept by the observatory for experiments at temperatures below 0° F.

"These are probably the best thermometers ever sent into the Arctic regions, and special care should be taken to insure the safe return of the records, and, though less important, the instruments."

IV. SPECIAL INSTRUCTIONS PREPARED BY THE UNITED STATES COAST AND GEODETIC SURVEY FOR OBSERVATIONS IN TERRESTRIAL MAGNETISM AT POINT BARROW AND LADY FRANKLIN BAY.

[These instructions will be applied, when suitable, to the observations ordered in preceding pages, but they will also furnish a guide to the minimum number of observations to be taken in case of accidents occurring to prevent full compliance with the plan proposed by the International Polar Commission.]

As soon as the quarters of the expedition have been fixed upon, a magnetic house will be erected, in which the regular magnetic observations, as described below, will be made; other observations will be made when on boat or sledge trips.

Instruments.—For use at the magnetic observatory, there will be provided a magnetometer, for absolute and differential declination and for horizontal magnetic intensity, to be permanently mounted on a stone pier. In connection with this instrument a meridian or azimuth mark will be established a short distance off the observatory, and visible from it through an opening in the wall. The astronomical bearing of this mark will be carefully determined by means of an altazimuth instrument and solar or stellar observations.

In the same house, but on a separate pier, will be mounted a Kew dip circle, and in the case of Point Barrow, a third instrument, a bifilar magnetometer, will also be permanently mounted on its pier. At Point Barrow the magnetometer (or uniflar) and the bifilar instruments will be mounted in the magnetic meridian and at a distance of not less than twelve feet, and the dip circle will be mounted equidistant from these instruments, forming an equilateral triangle. At Lady Franklin Bay the two instruments will be mounted in the plane of the magnetic prime vertical, and not less than twelve feet apart. No iron is to be used in the construction of these buildings, and they should be not nearer than fifty yards to any other building, or double that distance to any large mass of iron. Special reading-lamps (of copper) must be provided for use with the instruments, and they must be tested to make sure that they do not affect the position of the magnets. The use of candles stuck into wooden blocks is preferable to using lamps.

When on boat or sledge journeys the party will carry a chronometer, a small alt-azimuth instrument with circles of about three inches diameter (as constructed by Fauth & Co., of Washington, or by Casella, of London), provided with a magnetic needle or compass mounted over its vertical axis, and a dip circle.

Observations at the permanent station.—Hourly observations will be made, for declination and diurnal variation, with the magnetometer on three consecutive days about the middle of each

<sup>\*</sup> This method conforms to that followed at all signal stations with minimum thermometers, except as to degree of inclination, wherein these suggestions should be most carefully followed.

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ion and of each to degree month; besides these observations, extending over seventy-two hours, there will be made at any convenient intermediate time each day (of the three) one set of deflections, followed immediately by a set of oscillations for the determination of the horizontal intensity. At Point Barrow the bifilar will be read immediately after the unifilar. There will also be made at any intermediate time each day (of the three) a set of dip observations. In connection with the declination, the mark will be read once each day (unless the instrument should accidently be disturbed), but it suffices to determine the magnetic axis of the declination magnet on one of the three days. The instrumental constants of the magnetometer will be determined before leaving Washington, and the observers will use the Coast and Geodetic Survey magnetic blank forms for their records, or, in case no special forms are provided, they will use small (octavo) note books; they will also compute, as soon as the observations are completed, each month, the magnetic mean declination, diurnal range, and turning hours, also the horizontal force in absolute measure (English units) and the ip, tabulating the results for each day.

Extra observations on other than the three days about the middle of each month will be made during all occurrences of auroral displays, but as they are likely to be very numerous at Point Barrow, observers there may confine their extra observations to the more conspicuous displays only. On these occasions the declinometer (and the bifilar at Point Barrow) will be read, say, every ten minutes, or at shorter or longer intervals, as the state of the needle may appear to demand, the object being to establish a connection between the appearances of the aurora and the motion of the magnetic needle.

When landing on a boat journey, or during a sledge journey at suitable stations (not less than ten or fifteen miles apart), the time, latitude, and azimuth will be determined by the alt-azimuth instrument, and the declination by the same instrument (the hour and minute of the observation is to be noted, in order that the diurnal variation may be allowed for); the dip will also be observed, and in case time is pressing, reversal of circle, reversal of face of needle, and reversal of polarity may be dispensed with, but the needed correction to the result, from the single position of the instrument, must be ascertained at the permanent station. Observations of deflections (with magnetic needle and with weights) will be made with the dip circle, as arranged for relative and absolute total force, the data for the latter to be supplied at the permanent station.

It is highly desirable, especially in the case of the Lady Franklin Bay party, that all stations within reach and formally occupied by other parties for magnetic purposes be revisited, in order to furnish material from which to deduce the secular change during the interval; besides, all opportunities should be taken when landing on the way up to secure observations for declination, dip, and intensity—the latter best poscillations of the intensity magnet. The winter quarters of the late English expedition show the connected magnetically with the present quarters.

[All magnetic observations will be made on Göttingen time, as provided for by the Hamburg Conference.]

All magnetic records will be kept strictly in conformity with "Notes on Measurements of Terrestrial Magnetism," United States Coast Survey, Washington, 1877, and other records in connection therewith should be equally clear and complete, and all computations should be made by the observer in separate books. Duplicates of all records will be made, compared with the original, and the latter returned, annually, if practicable, to the Chief Signal Officer for the Superintendent of the Coast and Geodetic Survey, Washington, D. C. The observers should also provide themselves with copies of the "Admiralty Manual of Scientific Enquiry," the "Arctic Manual and Instructions," 1875, and "Aurore, their characters and spectra," by J. R. Capron, 1880, also with "Terrestrial and Cosmical Magnetism," by E. Walker, 1866, and any other work they may require for their information.

#### V. ADDITIONAL SPECIAL INSTRUCTIONS.

The rules prescribed in "Instructions for the Expedition toward the North Pole," as published (in pamphlet) by authority of the Hon. George M. Robeson, Secretary of the Navy, and those contained in "Suggestions Relative to Objects of Scientifle Investigation in Russian America," both of which are furnished, will be followed as closely as circumstances permit.

#### VI. MEMORANDUM OF OUTFIT.

LIST OF APPARATUS TO BE FURNISHED TO POINT BARROW, AND WITH SOME EXCEPTIONS
AND ADDITIONS TO LADY FRANKLIN BAY.

#### GEOGRAPHICAL AND ASTRONOMICAL APPARATUS.

One surveyor's compass and tripod; one 100-feet chain or steel tape; one prismatic compass; one set of pins; one altitude and azimuth, 6-inch circles; one meridian transit, about 2 or 3 inches aperture; two extra level tubes for low temperatures for meridian transit; three sextants; three artificial horizons; eight marine chronometers (mean time); one marine chronometer (sidereal); two pocket chronometers (mean time); one house (astronomical observatory), plan to be supplied; charts of the Alaska coast from the United States Coast and Geodetic Survey.

Magnetic apparatus.—One complete magnetometer—Fauth & Co.—unifilar declinometer—eatalogue No. 70, price \$400, extra light needles and mirror for auroral disturbances; one Kew dip circle, large size; one bifilar magnetometer; one magnetic observatory building. (See plan.)

Tidal apparatus.—One level and staff; two pulleys and weight and float; fifty glass-stoppered bottles for specimens of sea-water.

Pendulum apparatus.—Pendulum apparatus will be carried and used by a special temporary party from the United States Coast and Geodetic Survey.

[Deep sea sounding .- Will be left to the United States Coast Survey.]

Meteorological apparatus.—One instrument shelter of open wooden louvre work, made in sections (see plan); one inner thermometer shelter of open galvanized iron louvre work, made in sections (see plan); twelve mercurial thermometers, ordinary stem divided; two metallic thermometers: twelve spirit thermometers, ordinary stem divided; six mercurial thermometers, maximum stem divided; six spirit thermometers, minimum stem divided; six special minimum thermometers, from Yale College; four psychrometers, mercurial, wet-bulb; one dew point apparatus; Regnault's as modified by Alluard, with extra thermometers for low and high temperature; six water thermometers and three cases, Signal Service pattern, for surface temperatures; two pairs Marie-Davy's conjugate thermometers for solar radiation; two pairs Violle's conjugate bulbs for solar radiation (will be sent next year); two Hicks's thermometers for terrestrial radiation (will be sent next year); two mercurial marine barometers; four mercurial cistern barometers (Green, Signal Service pattern), large bore, reading to thousandths; three aneroid barometers (Casella's make); two hair hygrometers; two self-registers, one double and one single, for an emometers and an emoscopes (Signal Service pattern-Gibbon or Eccard); six extra attached thermometers for barometers; six extra barometer tubes for barometers; four rain-gauges, two copper and two galvanized iron; six divided sticks for measuring rain and snow; ten pounds pure mercury; four anemometers (Robinson's); four arms and cups and four spindles, for Robinson's anemometer, for repairs; two vanes, small; one large vane, complete; one Eccard contact (interior); ten battery cells (Eagle) and supplies for same for three years; two thousand yards insulated wire; four telephones and two call bells; one galvanometer for obstruction of ground carrents; one hundred feet cable for the double self-register; four box sounders; one delicate scale and one medicine chest (from medical department); apparatus for collecting air and atmospheric dust; six dark lanterns for observers' use (brass or copper).

Signal apparatus.—Two Grugan's heliographs; four sets signal kits complete; six signal code cards.

Blank books and forms.—Twelve diaries for 1881, 1882, and 1883, respectively, one to be kept by each man; two hundred and fifty books for original record of meteorological observations; fifty blank books for magnetic observations, allowing two pages daily and extra pages on special days; fifty blank books for daily journal, for miscellaneous observations; twenty-five blank books for tidal observations, allowing one page daily; twenty-five blank books for astronomical observations.

<sup>&#</sup>x27;If practicable these will be rated at various temperatures at the Horological Bureau of the Observatory of Yale College,

EXCEPTIONS

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vations; fifty volumes, Form 4, for copy of original record; three hundred star charts, for auroras, &c.; one hundred forms for comparison of barometers; eight hundred forms for anemometer register.

Books.-Instructions to Observers, Signal Service, U. S. Army; Annual Reports of the Chief Signal Officer, from 1873 to 1880, inclusive; Loomis's Treatise on Meteorology; Buchau's Handy Book of Meteorology; Kämtz's Meteorology (Walker's translation); Mohn's Meteorology (original German): Schmid's Meteorology (original German); Smithsonian Instructions for register of periodical phenomena; Smithsonian Miscellaneous Collections, Vol. I; Guyot's Meteorological and Physical Tables; Crelle's Multiplication Tables; Blanford's Indian Meteorologist's Vade Mecam, Parts I, II, III; Loomis's Practical Astronomy; Church's Trigonometry; Chanvenet's Practical Astronomy; Bowditch's Navigator; Bowditch's Useful Tables; Lee's Collection of Tables and Formula: American Nautical Almanac for 1881, 1882, and 1883; Admiralty Manual of Scientific Inquiry, 4th ed.; Admiralty Manual and Instructions for Arctic Expedition, 1875; Nares's, &c., Reports of English Arctic Expedition; Nares's Narrative of Voyage to Polar Sea, London, 1878; Dall's Meteorology of Alaska from Pacific Coast Pilot, United States Coast Survey; Dall's Resources of Alaska; Harkness on Sextants, United States Naval Observatory, observations for 1869, Appendix 1, pages 51 to 57; Charts, United States Hydrographic Office, No. 68, and British Admiralty, Nos. 593, 2164, 2435; Chambers's Descriptive Astronomy; Bremiker's edition of Vega's Logarithmic Tables: Barlow's Tables; W. S. Harris's Rudimentary Magnetism; Coast Survey Papers on Time, Latitude, Longitude, Magnetics, and Tidal Observations; Everett's Translation of Deschanel; Jenkin-Electricity and Magnetism, 4th ed., New York, 1879; Reports of the United States Fish Commission on Dredging; Sigsbee on Deep-Sea Sounding, &c. (United States Coast Survey Report): Markham's Collection of Papers Relating to Arctic Geography, London, 1877; Schott's Reduction of Observations of Hayes and Sountag; Schott's Reduction of Observations of Dr. Kane; Schott's Reduction of Observations of McClintock; Manual of Military Telegraphy; Myer's Manual of Signals; J. R. Capron, Aurora: their characters and spectra; E. Walker, Terrestrial and Cosmical Magnetism; Pope's Modern Practice of the Electric Telegraph; Instructions for the Expedition toward the North Pole, from Hon. George M. Robeson, Secretary of the Navy; Suggestions Relative to Objects of Scientific Investigation in Russian America; stationery as ordinarily supplied; drawing paper and instruments.

All officers and observers of the expedition are charged to at once familiarize themselves in detail with these instructions, and in the practice of the duties they prescribe, together with a thorough knowledge of the instruments and their use; and commanding officers are specially charged to see that these requirements are observed.

Official memorandum to accompany instructions No. 76.

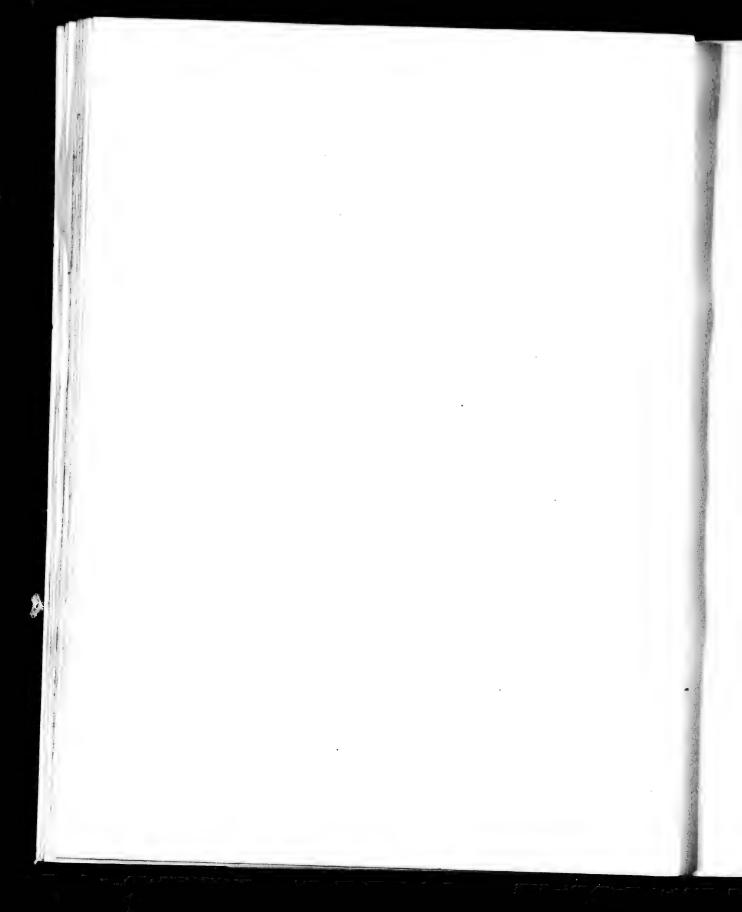
W. B. HAZEN, Brigadier and Brevet Major-General, Chief Signal Officer, U. S. Army,

Official:

Louis V. Caziare,

Firs' Lieutenant, Second Artillery, Acting Signal Officer.

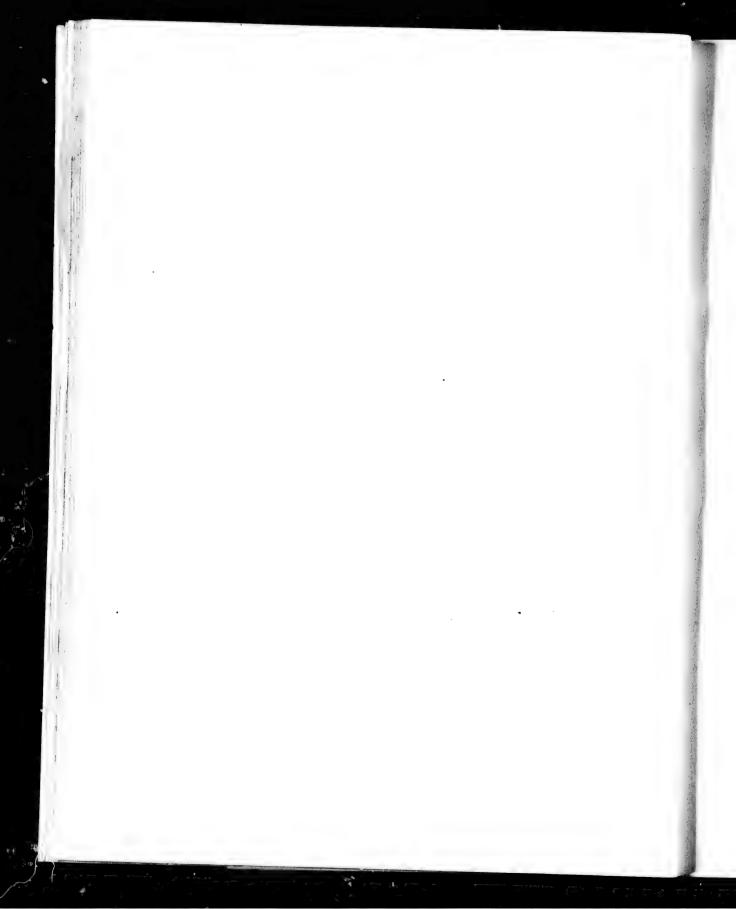
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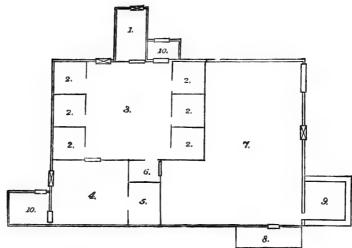
# PART II.

# NARRATIVE.

By LIEUT, P. H. RAY.







Scale: .7 inch = 10 feet.

### GROUND PLAN, U. S. SIGNAL STATION, UGLAAMIE, ALASKA.

 1. Commanding officer.
 3. Office and dining-toom.
 5. Sleeping-room.
 7. Storehouse.
 9. Bastion.

 2. Sleeping-rooms.
 4. Kitchen.
 6. Wash-room.
 8. Instrument-shelter.
 10. Storm-doors.

Official.

P. H. RAY, First Lieutenant Eighth Infantry, A. S. O.

## NARRATIVE.

On the 18th day of July, 1881, at ten o'clock in the forenoon, we sailed from San Francisco, Cal., on board the schooner Golden Fleece, a staunch little schooner of one hundred and fifty tons burden, and, being towed outside the heads, we began our voyage in the teeth of a strong northwest gale; and it was three days before the reefs were shaken out of our sails.

The expedition, on the day of sailing, was organized as follows: First Lieut. P. H. Ray, Eighth Infantry, commanding; Act. Asst. Surg. George S. Oldmixon, U. S. Army, surgeon; E. P. Herendeen, interpreter; Sergt. James Cassidy, Signal Corps, U. S. Army, observer: Sergt. John Murdoch, Signal Corps, U. S. Army, observer; Sergt. Middleton Smith, U. S. Army, observer: Mr. A. C. Dark, astronomer; Vincent Randit, carpenter; Albert Wright, cook; Frank Peterson, laborer, With one exception, all were strangers to me, and I subsequently had occasion to regret that more time was not given and care exercised in selecting the personnel, especially those intended for the scientific work. For even with experienced observers it is very difficult to do accurate work in this high latitude.

The voyage was uneventful. Owing to adverse winds and calms, it was not until August 9 that we raised the high lands of the Aleutian peninsula to the eastward of Ounimak Pass. A succession of calm days left us at the mercy of the currents, which here are strong to the eastward, and carried us in sight of Kadiak, before a breeze sprung up that would enable us to bear up for the pass. We entered it on the afternoon of the 15th, when the wind fell, but the tide serving, we drifted through during the night. After entering Behring Sea we had stronger winds, and after clearing the pass we were enabled to stand on our course, which carried us about sixty miles to the eastward of the Pribyloff Islands.

On the morning of the 19th we sighted the island of Saint Mathews, passing three miles to the eastward of it, its highest peaks only showing above the fog. We were favored with fair, strong winds from this time on until we arrived at Plover Bay, Siberia, where we anchored at 6 p. m. August 21. The weather being stormy, we were unable to get a sight of the sun until the 24th, when a series of excellent observations were obtained. This delay proved fortunate for us, for on the 22d the U. S. revenue steamer Corwin came into the harbor for coal. Her master, Captain Hooper, reported the ice very light in the lower latitudes of the Arctic Ocean: o much so that he had been enabled to reach Wrangel Land, a point never heretofore attained. To him we became indebted for a fine supply of reindeer clothing and tents, which he had collected in view of a possibility of his wintering in the Arctic. The supply came very opportunely, as we had been mable to obtain any deer-skins at San Francisco and were depending upon sheep-skins for our winter clothing.

We found that our chronometers were running steadily and well, and, after laying in a supply of fresh water, were towed outside the harbor by the Corwin on the morning of the 25th. The wind dying away suddenly, left us at the mercy of the current, which was setting strong to the northward, and during the night we drifted through the straits, getting only a glimpse of the Diomede Islands and East Cape as we passed, as we were enveloped in a dense fog the most of the time. While at Plover Bay we obtained from the natives a quantity of most excellent trout, which proved an agreeable addition to our sea fare.

After passing the straits we encountered strong northeasterly winds, which retarded our progress very much. We sighted Cape Lisburne on the afternoon of August 31, and soon after it came on to blow so heavily that the vessel was hove to, and in that position rode out the gale. For over forty-eight hours we were unable to have fires on board for any purpose whatever. The force of the gale having abated on the 3d of September, we stood to the southeast, the weather remaining so thick that we were unable to obtain a sight of the sun to determine our position. On the 7th we sighted key Cape, and then stood along shore to the northeast, keeping the land aboard until we sighted the point on the afternoon of September 8, and came to anchor about one mile to the northeast of Cape Smythe, thus successfully accomplishing the first and most important stage of our week.

The voyage, though long and tedious, had been remarkably free from any accidents, and the meager comforts of our little schooner grew wonderfully luxurious when compared with the low desolate shore, which we could occasionally eatch a glimpse of through the drifting snow.

Point Barrow, situated in latitude 71° 23′ north, longitude 156° 40′ west, the destination of the expedition, was first discovered by Mr. Elson, master in H. M. S. Blossom, commanded by Captain Beechey, in Angust, 1826; and is graphically described by him in his report of his memorable voyage, made to the Pacific and Arctic Sea, during the years 1825, 1826, 1827, and 1828.

In the lapse of sixty years but few changes have taken place on this coast. The people of the generation that Captain Beechey met have all passed away, and the story of the coming of the first white man is one of the legends of the band of Nuwükmeun. The next visit made by white men was that of Captains Dease and Simpson, of the Hudson's Bay service, who, in July, 1837, started from Fort Good Hope, and by boat passed down the Mackenzie to the sea, and along the northern shore as far as Return Reef, the point where Franklin was turned back by meeting with impassable ice, in 1826. They here found the ice fast on the land, and further progress by boats being impossible, Captain Simpson accomplished the remaining distance on foot, and thus succeeded in determining the coast line of the northern shore from Behring Straits to the mouth of the Mackenzie. H. M. S. Plover, Captain Magnire, wintered at Point Barrow the winters of 1852, 1853, and 1854, since which time the coast has been frequently visited by vessels of the American whaling fleet.

Upon arriving at the point we at once set about finding a suitable location for the observatory. At the extremity of the point is the village of Nuwuk, which occupies all the land that is free from inundation by the sea. To locate the observatory among their buts would entail endless trouble and annoyance. Between the village and the mainland, three miles away, is a low, barren sandbank, from forty to one hundred yards wide, across which, during a westerly gale, the sea breaks when open. To the south and west of this the land gradually rises, until at Cape Smythe it is fully thirty feet above the sea; but here again we found the most suitable ground occupied by the village of Uglaamie, a cluster of about twenty-three winter huts. We were unable to go any distance back from the beach, as we had no means of transporting our stores by land, and the marshy condition of the country would have prevented us from going any distance back from the beach even if we had the facilities. A point about twelve feet above the sea level, lying between the sea and a small lagoon three-fourths of a mile northeast from Uglaamie, was finally selected. The soil was firm and as dry as any unoccupied place in that vicinity, and, as it was marked by mounds of an ancient village, would be free from inundation. The lateness of the season gave us but little time for deliberation. The young ice was already forming, and the migration of the birds about over. It was on the morning of the 9th of September that the work of debarkation was commenced in a driving storm of snow and a northeast gale.

The lumber for the house and observatories was rafted alongside the vessel and warped ashore. This work was difficult and arduous, owing to the heavy surf on the beach, and the ice being some distance off shore, the strong northeast wind blowing at the time got up considerable sea, the spray froze wherever it struck, so the lumber was coated with ice as soon as it was taken out of the water. There was too much surf to use our boats, and it was not until the 13th, whea the wind fell, that we were able to commence putting the stores ashore. A temporary wharf was constructed, so the boats could be discharged without putting them on the beach. The natives, who at first appeared bewildered at the idea of our coming to stay, showed every disposition to be friendly now, and rendered us valuable assistance with their large skin boats (umiaks), and also

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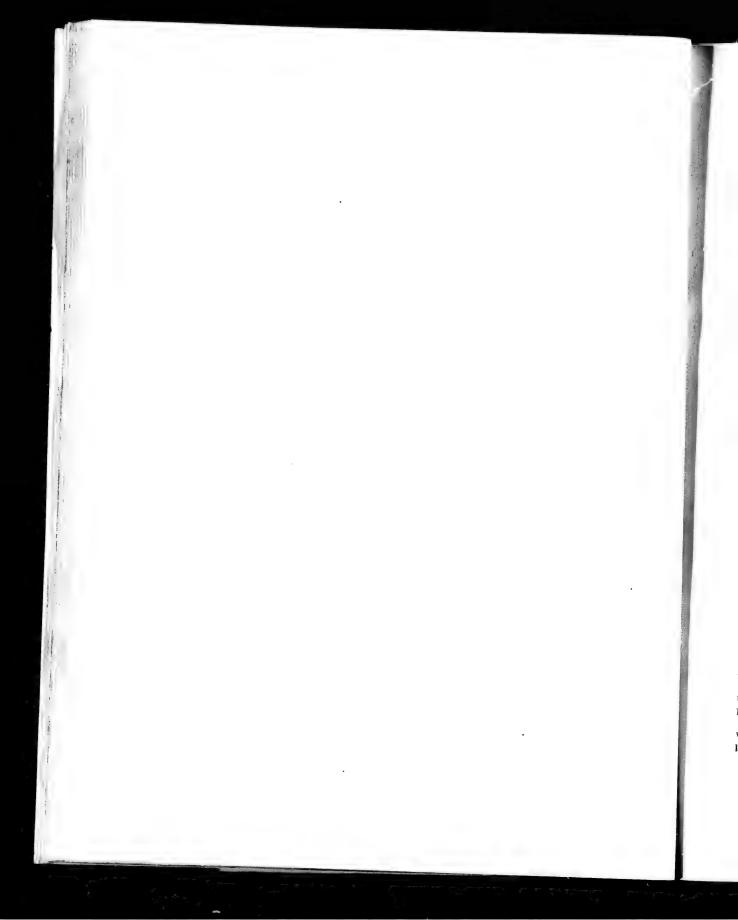
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ICE-ARCH, JUNE, 1883.



in carrying stores up from the beach. After one or two attempts at petty thieving had been firmly and quietly checked, they showed no disposition to commit any depredations upon our property. Though it was snowing heavily, the work of landing stores was pushed with the utmost vigor, as the wind was very light from the southwest and the sea was quiet, and we could land the umiaks on the beach without the fear of staving them, so that on the morning of the 15th the party was moved on shore into tents. We landed the last of the cargo during that afternoon, and the Golden Fleece was cleared the following morning, and sailed at 12 o'clock. She was the last link that bound us to civilization, and we knew that nearly a year must roll around before we could hope to hear from the civilized world again; but I did not see a single despondent face among the little party as they turned from watching the gallant little vessel out of sight to their work.

At the same time the stores were being landed the foundation of the house was laid. This was made safe and solid by excavating down to the frost, a distance of a little over one foot, and the sills and floor timbers firmly shored with blocks cut from pieces of drift-wood. Plates 1 and 2 give a ground plan and elevation of house. The bastion on the northwest corner was constructed from pieces of wreckage and drift-wood, and was pierced for musketry below and for the Gatling gun above. As soon as the house was inclosed and roofed the stores were all moved in, except a supply for about siz months, which was placed in a tent as a reserve in event of the loss of the main building by fire. The party moved in on the 22d, to put up the ceiling and partitions. We were obliged to bring the lumber in and pile it around the stove, so as to melt off the ice before, we could work it.

Winter came on rapidly; the lagoon, near the station, was closed entirely on the 26th; the weather continued stormy and thick until the sea closed toward the last of November. The work of carrying the stores and coal from the beach up to the site of the station (a distance of about one hundred yards) was very laborious, there being over one hundred tons of it besides the lumber, and we never for one moment caught sight of the sun from the time we landed until the 28th of September, and then only for a few moments. As soon as the house was made inhabitable we turned our attention to getting the instruments into position. We commenced taking hourly observations in meteorology on October 15, and in magnetism on December 1.

The transit and magnetic instruments were temporarily mounted on wooden piers, which were constructed in the following manner: Timbers sixteen inches square were cut to the proper length and placed on end in position in the observatories, the earth being removed so that the lower end rested on the perpetually frozen earth; they were cemented in their place by pouring water around them and allowing it to freeze. They remained firm and never altered their position in the slightest degree. The ice was found to be intact when the piers were taken down the following July, to be replaced by brick.

Every clear night the sky was illuminated by the most beautiful displays of aurora it has ever been my fortune to witness; they always commenced in the northeast and northwest, and seemed to spring from a dark low bank of clouds. The lights were never stationary for a single second, neither did they ever take the form of bows or arches so often seen in other latitudes, but great curtains of light flashing with all the prismatic colors seemed to be drawn across the heavens, ever rising and-changing and often culminating in a corona at the zenith, falling like a shower of meteoric fire. As the winter advanced these displays were more brilliant, and were always of a character that defies description, either by pen or pencil, as they were never for two seconds alike. They were anaccompanied by any sound so far as we were able to observe, and the deadly stillness that always prevails in this region when the sea was closed gave us an excellent opportunity to detect any sound had there been any.

During the last days of September, when the ice on the fresh-water ponds and lakes was from ten inches to one foot thick a sufficient quantity was cut, hauled to the house and conveniently piled, for winter use.

In December, as soon as the drifted snow was sufficiently hard to cut into cakes, covered ways were constructed leading to the observatories, and the ice piled so that during severe weather no person was obliged to go into the open air to carry on the regular work of the station.

Life at the station now settled down into the dull monotony of the routine work; hourly

observations in meteorology and the three elements of magnetism were carried on without interruption. To insure the health of the party each member was required to take exercise daily in the open air.

In January, 1882, work was commenced on a shaft for the purpose of getting the temperature of the earth, the results of which are given in Part V. The formation for the whole distance was sand and gravel, mingled with a deposit of drift-wood and marine shells, showing that each stratum represented the successive lines of ancient sea-shores. The earth was saturated with water. At a depth of thirty-five feet a deposit was found of clear water, unmixed with earth, too salt to be congealed at a temperature of + 12, which was the unvarying temperature of the earth at this depth. At a depth of twenty feet a tunnel was run to the east a distance of ten feet, and at the end of it a room ten by twelve was excavated out of the hard frozen ground. In this the temperature never rose above 22°. The walls were always dry and free from moisture, and the accumulation of hoar frost was very light. Here we stored whatever fresh meat, in the way of ducks, reindeer, wairus, or seal, that we were able to accumulate beyond our daily consumption. Our main supply was c.der-ducks, which, during the spring flight in May, were easily killed. We took four hundred in 1882, and five hundred in 1883; we found them excellent food, and when stored in the subterranean store-house they were at once frozen solid, and would keep for any length of time.

Fresh meat is the great safeguard against scurvy in this region; I never saw a trace of it among the natives, and meat is their only food. The immunity of my party from all disease or sickness of any kind I deemed was owing to the fact that through our own exertions, and with some assistance from the natives, we were seldom without it.

In March, 1882, I made a trip into the interior, an account of which I submitted in my report of last year. Some narrow leads opened in the ice to the north and west of the point on the 20th of April, and the natives reported seeing whales passing to the northeast on the 23d of the same month, and they were seen passing in the same direction every day from that time until June 15: that seemed to terminate their northern migration, as we saw no more of them until August 15, when they were seen going to the southwest along the edge of the pack. It is at this season that most of the whales are taken, as it is impossible for the vessels to follow them into the ice during their northern migration.

In the spring of 1882 eider-ducks were first seen on the 27th of April flying to the northeast, tar out over the ice, and a few straggling flocks were seen from time to time until May 12, when they appeared in immense numbers flying low along the shore ice to the northeast. This migra-

tion continued until about June 1, and then almost entirely ceased.

About the time the first flights along shore were seen a number of male king eider were found on the land, apparently exhausted from long flight and want of food. Some were caught and brought in alive, but they were generally dead when found, and always in an extremely emanciated condition. All species were represented in this flight, the king, Pacific, spectacled, and stellers. The Canada goose was never seen; but a few brent, white-fronted, and snow or arctic geese came at this season and stopped with us through the hatching season, bringing forth their young on the mainland. The eider duck, with but few exceptions, continued their flight to the north and east. During July and August large numbers of the males were constantly flying to the westward over Perigniak, a point about four miles to the southwest of Point Barrow. The fact that they came from the breeding-grounds was shown in the naked condition of the breast of some of those taken, the down having been plucked away to construct their nests. Those killed at this season were poor and unpalatable compared to those killed in the spring. But the natives take great numbers of them at this point at this season of the year; one often sees half a dozen families here in camp for that express purpose. Their methods of taking them will be found fully described in the chapter devoted to ethnology.

By the last of June the tundra was nearly free from snow, and narrow leads of water were open along shore. The few hardy flowers indigenous to this high latitude were in bloom, and conspicuous among them were the buttercup and dandelion. There was also a small yellow poppy, named by the natives "tūkāitūkāid jaksūn," which is also the name given by them to a small

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VIEW OF THE STATION FROM THE WEST, WITH THE CREW OF THE "NORTH STAR" IN CAMP.

batterily that appears at this season. The butterily appears as the poppy fades, and they believe that the poppy is transformed, takes wings, and flies away.

On the afternoon of the 25th of June a vessel hove in sight to the southwest. She appeared to be in the solid pack, as there was no water in sight, but we soon discovered she was working her way along a narrow lead, about six miles from shore, which was not visible to us. At about 8 o'clock that night she was bearing about west true from the station, when she came to a halt; I at once dispatched interpreter Herendeen off to her. He returned the next day at 11 a. m., and reported that it was the steam-whaler North Star, (Captain Owen), on her first voyage from New Bedford. He brought a few letters and a file of New York papers, giving us news from the outer world. It was the first information we had of the death of President Garfield and loss of the Rogers. On the 27th I went out to her; found her fast in the ice, with no sign of open water in sight from her mast-head. Captain Owen reported she had suffered a severe nip the night before, and she was raised up bodily about four feet while I was on board of her. I visited her again on the 4th of July and she was still uninjured. During the night of the 6th the wind hauled around to the eastward, causing the pressure to slacken up, and several large cracks opened in the ice, one of them in close proximity to the ice-bound ship. Early on the morning of the 7th we saw she was afloat and working through the broken ice toward shore; when about two and a half miles from the station she again became fast, and lay there all night. The following day (July 8) the pressure again slacked and a lead opened along shore past where she was laying; she got under way and steamed slowly along the lead to the southwest. After proceeding a couple of miles she again became fast; the ice closing in from the west, she was now caught between the ground-ice and the great pack which was setting bodily to the northeast. She remained immovable from about noon until 4 p. m., when our attention was suddenly attracted to her by a great outcry raised by her crew, and we could distinctly hear the cracking of her timbers as her sides were crushed in by the ice; her masts fell a few moments after, and her crew escaped to the ground-ice. I at once set off to their assistance with what men could be spared from the station; we found they had saved nothing but their clothing, a cask of bread, and three boats; the few remaining fragments of the wreck were fast disappearing in the distance, being carried away by the moving pack. The crew all safely reached the land that night, being ferried across the open leads by the boats from the station; tents were pitched to shelter them, and every care given to their comfort. Captain Owen subsequently went out with his crew and brought in the bread, and boats to be used in moving to the southward along the shore-lead, in the event that no other vessel should be able to reach the station. On July 14 other ships fortunately hove in sight, and the wrecked people were distributed through the fleet, between that time and August 2, the last going on board the bark Thomas Pope, bound for San Francisco. Different vessels of the fleet remained in sight of the station off and on until September 23, the steamer Bowhead being the last to visit the station. We sent by her our last mail to the United States.

On August 2 a small schooner was seen coming around the point to the north and east, which proved to be the relief vessel Leo, Lieutenant Powell in charge.—She had been carried out of her course to the northeast by the current, in a thick fog; her master, being ignorant of the dangers attending navigation along this shore, having allowed her to drift into a position where, but for the providential springing up of a light breeze, she would certainly have been lost.—By her we received three additional observers, Sergt, J. E. Maxileld and Privates Charles Ancor, and John Guzman, of the Signal Corps, U. S. Army; a year's additional supply of provisions and coal; also the new magnetic instruments. With the help of the natives, she was discharged on the 26th, and sailed the following day.—I relieved and sent back by her Sergt, James Cassidy, Signal Corps, U. S. Army.

The new magnetic observatory was at once put up and the instruments mounted upon permanent brick piers, and observations with them commenced September 12.

Now that the ships were gone and all connection severed with the outside world, we had nothing to break the old routine of our duty at the station but the occasional visit of a native from some distant village. The faces of those living at Nuwūk and Üglaamie had become as familiar to us as those of our own people; they had ceased to be intrusive, but visited us almost daily with some curio or game for barter; and as the season advanced rud water became scarce we were daily besieged by the seal-hunters coming in from the sea and begging for a drink of water, of which

H. Ex. 44----4

there is a great scarcity after the frost has sealed up all sources of supply. The scarcity of fuel, together with their inadequate means for melting ice and snow, causes them to suffer under a constant water famine from October to July, and they seemed to think that our supply was never failing.

During the fall of 1882 we experienced none of the heavy westerly gales so common in 1881, and the main pack, though always in sight, did not come close in, and the sea along shore froze over comparatively smooth save for the small floes that were always drifting to and fro with the current. This remained unbroken until January, when a heavy westerly gale drove in the old ice to the three-fathom bar, which here lies parallel with the coast and about one and one-half miles from it. Inside this bar the ice formed to a thickness of five and one twenty-fourth feet, and a vessel might have wintered with perfect safety at the anchorage off the station in four fathoms of water. Both the winters we were there, about two and one-half miles to the sonthwest and three miles to the northeast, the old ice came in on the land with great force. In November and December the snow galleries were again constructed to the observatories, and the winter's work went on uninterruptedly. Observations of temperature in sea-water ice were carried on, and a series of tidal observations were made extending through a period of one hundred and twelve days. These observations were taken on the open coast, and go to show that the open Arctic Sea is practically tideless, the mean rise and fall being only about two-tenths of a foot. (Report on tides.)

A peculiar disturbance was observed frequently during these observations. There would be a sudden rise and fall of from three to five hundredths of a foot, like a sudden wave. These occurred when the sea was entirely closed, with not a trace of open water in sight, and apparently in no way connected with the regular action of the tide. There would also be a variation in the height of the water of from four to five fect, often extending through a period of from seven to ten days, but in no manner affecting the normal rise and fall.

During the winter of 1882-'83 temperature of the sea-ice was taken in the following manner: The thermometer was secured in a wooden box 6 by 6 by 15 inches, with a sliding door; this was placed in the ice one hundred yards from the beach, where the sea was smoothly frozen over, one foot below the surface, and frozen in so that the bulb was frozen solid in the ice.

The temperature of the sea-water was taken top and bottom through the hole at the tide-gauge in three fathoms of water. The results are given in the meteorological tables submitted with this report. I found that the second winter with its long night was much more trying upon the spirits and strength of the party than the first; the novelty had now worn off; there was no longer anything new or strange to interest them and there was no relief from the monotony of the routine of the regular work, and there is none so wearisome and wearing as this, without any change and without hope, for we had positive knowledge that there could be no change for us until our work was finished; so the slow time dragged on; days into weeks, months into years; so that exploration, or any work that required action, would have been hailed with joy. After the return of the sun I made parations for a trip into the interior, to locate geographically some of the discoveries made last year. I had by this time secured one excellent team of eight native dogs, and the sied made at Saint Michael's, given me by Sergeant Nelson in 1881, still being strong and serv reable, I was well equipped for inland work.

Everything being ready, I left the station at 5.30 a.m., March 28, with Mr. A. C. Dark, assistant, a native guide Apaidyao, and his wife. A team of eight dogs and one sled was our only means of transportation: and on it we carried our instruments, arms and ammunition, camp equipage, twenty days' supply of coffee, sugar, hard bread, and pennnican, a small kerosene stove, and one gallon of oil. The sled was rigged with a small lug sail, which was a great help with a fair wind. We traveled along the smooth shore ice to the southwest about eight miles after leaving the station, when we came to where the pack had come in onto the land, and the ice on the sea was too rough and broken for our sled. We here took to the tundra and traveled parallel to the shore until we reached the mouth of a small stream about ten yards wide, coming in from the southeast, called Siñaru, which has its source in a lake seven miles inland. We here left the coast, our general course being—suth, crossing the lake at the head of Siñaru, which I found to be seven miles across, and camped at 6 p. m. on a small stream flowing to the northeast; marched thirty-seven miles. The

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Dark, ass our only mp equipstove, and vith a fair aving the a was too hore until ist, called r general es across, les. The country after leaving the coast was flat, and in the summer must be almost entirely covered with water, as we traveled the whole afternoon over a series of small lakes without seeing a single elevation of land that was over five feet above the surrounding country. Saw but few signs of reindeer and no natives, but saw where a hunting party had been in camp a few days before. Our dogs hauled their load with ease, though there was over seven hundred pounds weight on the sled. Weather clear, with light northeast wind.

March 29 .- Snowing heavily this morning when we broke camp at 6 a.m. After traveling four miles we struck a stream about thirty yards wide, within a narrow valley, flowing to northeast. Natives gave it the name of Iuaru. The storm broke at ten o'clock and the sun came out by eleven. The country grew more rolling and broken, and at 12 m. we came in sight of Meade River, which here flows through a valley about one and one-half miles wide, with bold bluffs on either bank from forty to sixty feet high; obtained a meridian sight of the sun at noon for latitude and a fair sight for time during p. m. Traveled up the river on the ice six miles and then left it on our right; crossed a neck of land eight miles wide and struck it again at a point where a large stream called Usûuktu comes in from the eastward, with a channel about forty yards wide and high, bold banks. Here we again traveled on the ice to a point four miles above the mouth of Usûktu, and camped at 4.30 p. m. on the left bank of the river; marched fifty-three miles. I found an Uglaamie native here in camp; he was engaged in fishing, and told us his nets were set just opposite to the camp. We obtained from him some fine whitefish; having no rifle he had been unable to take any deer. I ascended the bluffs on the right bank, which were here fifty feet high. On them found the ruins of several winter huts, built entirely of turf; the natives say that three generations ago all this region was inhabited by a people that lived by fishing and hunting reindeer, and cid not come to the coast, but that the deer and fish grew scarce and there came a very cold season and the people nearly all died from cold and starvation; the few that survived went away to the Colville or joined the little bands on the coast, so that now this whole region is not inhabited and is never visited except by the hunters from Nuwük and Uglaamie, who come here for deer during the menths of February and March; each year a few fish are also taken with gill-nets in the deep holes along Meade River, the fish being here confined by the river freezing solid on the bars; all movement of water on this water-shed is suspended during the winter, there being no rainfall or melting of snow from October to May, and springs are unknown.

March 29.—Broke camp at 6 a. m.; weather clear and moderate. Continued the march in a southerly direction along the river-bed four miles, when we left it, climbing some high bluffs on the lert bank to get on the level plain above and avoid the windings of the river; traveled parallel with its general course all day, crossing it twice, and camped at 5 p. m. on a small tributary of Meade River, and about six miles from the main stream. Marched twenty-five miles: during the afternoon passed a high bluff which is a noted landmark among the natives and known as Nūa-suk-nan; it is in latitude 70° 37′ N., longitude 157° 11′ W., and rises from fifty to seventy-five feet bove the surrounding country and is visible for many miles around. Camped to-night with Mù'ñialu, a native whom I had furnished with a rifle and ammunition to kill deer for the station. Found he had a fine supply on hand, and he very proudly showed us ten as our share. Got excellent sights of the sun during the day for latitude and longitude. Saw several large bands of reindeer and our guide succeeded in killing two. Temperature last night + 16°; during day rose to 29°.2.

March 31.—Weather cold and stormy, and as we are in a very comfortable snow-house we conclude to lie over for the day. My guide has never been beyond this camp, and I can see he has no desire to add to his knowledge of the geography of this region, so I have made arrangements with Michialu to go on with me. They were busy at work to-day preparing their sleds to haul in their venison to the settlement on the coast; their manner of doing it I have never before seen noted. The sleds which they use for this purpose are made from drift-wood fastened with whale-bone and raw-hide lashing; they are about ten feet long, two feet wide, and the runners eight inches wide and one and one-half inches thick, straight on top and no rail; they are shod for ordinary use with strips of bone cut from the whale's jaw-bone, and sometimes with walrus ivery; but this would not do in hauling a heavy load over the snow where there is no beaten trail, so they are shod with ice in the following manner: From the ice on a pond that is free from fracture they cut the pieces the length of a sled runner, eight inches thick and ten inches wide; into these

they cut a groove deep enough to receive the sled-runner up to the beam; the sled is carefully fitted into the groove, and secured by pouring in water, a little at a time, and allowing it to freeze. Great care is taken in this part of the operation, for should the workmen apply more than a few drops at a time, the slab of ice would be split and the work all to do over again; after the ice is firmly secured the sled is turned bottom up and the ice-shoe is carefully rounded with a knife, and then smoothed by wetting the naked hand and passing it over the surface until it becomes perfectly glazed; the sled when ready for use will weigh over three hundred pounds, and they load them with the carcasses of from seven to nine deer, weighing over one hundred pounds each. Men, women, and children harness themselves in with the dogs to haul these loads to the coast, often the distance of one hundred miles and over, seldom making more than eight or ten miles each day.

April 1.—The weather being clear, we improved the opportunity to determine accurately our

position. Observations were made for time, latitude, and declination.

April 2.—Broke camp at 8 a. m. with Mû/ñĭalu for guide; traveled south thirteen miles parallel with Meade River, which we struck at the confluence of a small stream coming in from the westward. For the last six miles the country had become much more rolling and broken, and at the point where we struck the river to-day the bluffs were over one hundred feet high and showed successive layers of turf and sand, where the action of the river had cut them away during the freshets in the summer. I noticed one stratum of turf five feet thick fifty feet below the surface. There was not sufficient moisture in the sand between the strata of turf to cause it to solidify under the action of the frost. On the bars in the river we found a few fragments of fossil ivory; a fringe of scrub arctic willow skirted the bank of the stream, but no drift-wood of any size was seen. Traveling now became quite difficult, as the river was too winding for us to follow its course by traveling on the ice, so we kept a southerly course, climbing the bluffs, where practicable, to cut off the bends. The dogs became tired out early in the afternoon, and we were finally obliged to go into camp on the ice under the lee of a high bluff on the right bank of the river. Marched twentythree miles. Before dark I climbed to the summit of the bluff, which was one hundred and seventy-five feet above the river, and could see a low range of mountains, running nearly east and west, about fifty miles away. From the break of the country, I have no doubt Meade River has its source in that range, so I named them Meade River Mountains. The native guide notified me upon my return to camp that he did not wish to go further south; that he was unacquainted with the country, never having been so far in the interior before. Beyond this he peopled the country with imaginary enemies. Nothing I could offer would induce him to go further. As I could not well get along without their help in dragging the sled up the hills, I was obliged to make this my turning point, much against my will. We saw no signs of deer, wolves, or any game after we struck the foot-hills; the range of the reindeer seems to be the flat country we had crossed to the north.

April 3.—Broke camp at 8 a. m. and returned to Mû'ñialu's camp, reaching there at 4 p. m. Weather clear. The san on the snow fields affected our eyes very seriously in spite of the shaded glasses we wore, and the natives were affected equally as bad as ourselves.

April 4.—Lay over in camp, having our boots dried and repaired and getting ready for the return journey. Weather clear and cold.

April 5.—Broke camp at 5,30 a. m. Traveled on our outward trail to camp No. 2 and slept in the lut we used on our way out. Weather clear and cold, with very little wind.

April 6.—Broke camp at 6 a.m. Followed old trail back to camp No. 1. Weather bright and clear; suffered intensely all day from my eyes, becoming so inflamed I could scarcely see. Mr. Dark does not seem to be so seriously affected. Temperature fell last night to  $-13^{\circ}.4$ ; during the day,  $-24^{\circ}.$ 

April 7.—Broke camp at 5.30 a. m., and reached the station at 5 p. m. Was obliged to travel with my eyes bandaged; Apaidy ao was also nearly blind. No person can be exempt from this terrible suffering who travels in this region at this season of the year; the blinding glare of the sun upon the snow affects the strongest eyes, and we found no preventive. We had several varieties of shaded glasses and goggles, but found as much protection in the wooden shades made and worn by the natives as we did in our own improved glasses, and they were much more comfortable, as the moisture from the face did not congeal upon them so readily as upon the wire gauze and

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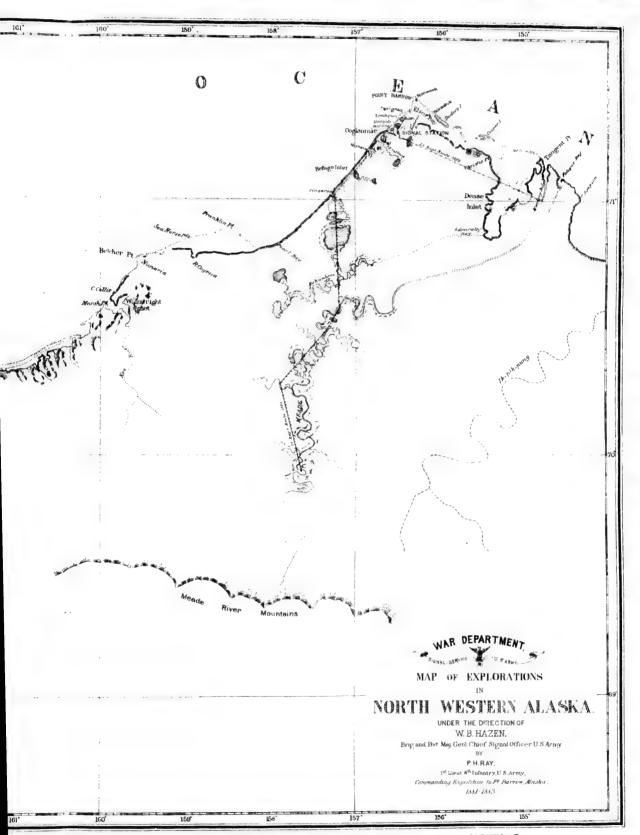
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frames of the goggles. Other than this, there are but few hardships attending travel to a small party properly equipped in this region at this season of the year, and the nearer one conforms to the habits of the natives the less liable he is to meet with disaster, and the less he will be burdened with unnecessary camp equipage and blankets.

The snow but (iglu) of these people is very quickly and easily constructed, and ordinarily does not consume more time than is required to pitch a wall tent, and is constructed in the following manner: A place where the snow is about four feet deep is selected for camp and a space 5 by 9 feet is laid off; the upper surface is cut into blocks two feet square and eight inches thick and set on edge around the excavation for side walls; at one end three feet of the space is dug down to the ground or ice; in the balance about eighteen inches of snow is left for a couch; sides and ends are built up tight and the whole is roofed with broad slabs of snow six feet thick, cut in proper dimensions to form a flat gable roof, loose snow thrown over all to chink it, and at the end which is dug down to the ground a hole is now cut just large enough to admit a man crawling on his hands and knees; the hut is now finished, sleeping-bags, provisions, and lamp are passed inside, dogs are fed and turned loose after everything they would be liable to cat or destroy is secured by caching them in the dry snow. Arms, instruments, and ammunition should never be taken into the hut; it is always best to leave them on the sled in the open air. After all outside work is done everybody goes into the but and the hole is stopped from the inside with a plug of snow which has been carefully fitted, and no one is expected to go out until it is time to break camp the next morning. The combined heat from the bodies of the inmates, together with the lamp, soon raises the temperature up to the freezing point, and a degree of comfort is obtained that is not attainable in any other manner of camping in this region. The more permanent snow huts of the deer hunters, which they often occupy for a month or more, are much more elaborate. They are usually built where the snow is six or eight feet deep, so the room is high, and is approached by a covered way and an ante-room, in which the heavy outside clothing is stored, and when fuel is obtainable a kitchen is added to the structure, with a fire-place cut out of the sould walls of snow, with jambs and chimneys of the same perishable material. I saw fire places in use that had had a fire in them for at least one hour each day for a month or more and were still intact; the parts that were exposed had softened a little under the effects of the first fire and at once hardened into ice, and remained unchanged so long as the temperature in the open air remained below zero.

By the latter part of April or the first part of May snow houses are no longer tenable and natives take to their tents (túpēks). Their winter huts at this time are also vacated, as they become too damp for comfort. After the snow began to soften so it was no longer practicable to build a snow but I camped very comfortably by digging a hole in the snow 6 by 8 feet, building up side walls three to four feet high, and stretching over it a deer-skin blanket or the sled sail, using the sled mast for a ridge-pole and our showshoes for rafters. The natives in their excursions usually carry a small stone lamp and a supply of seal blubber for illuminating purposes; they use no blankets or sleeping bags when traveling, but earry a deer-skin or a piece of walrus hide to lay on the snow underneath them; on this they huddle together without any covering other than the clothing they travel in. \*\*t such times their food (meat or fish) is eaten raw, except where they have provides themselves with a kind of penmican, which is made by mixing chewed deer meat with deer tallow and seal oil. This food is not agreeable to the taste, probably owing to the fact that the masticators are inveterate tobacco chewers.

The sled we used on all our journeys was made by a native at Saint Michael's, and presented to the expedition by Sergeant Nelson when at Plover Bay; it was twelve feet long and twenty inches between the runners; had side rails, with a steering handle at the rear end, and was fastened throughout with rawhide lashings; the runners were shod with steel, and it was far superior to any sled I ever saw on the northern coast; it was still in excellent condition after two years' service; its carrying capacity was about 800 pounds, and I think it was the best pattern of a sled I ever saw for Arctic work; it was light (weighing only about fifty pounds), strong, and durable, and could always be repaired with the material at hand among the natives, should it at any time become damaged.

Early in May the hunters began to come in, and altogether I succeeded in gettir g from them eighteen deer, which together with five hundred eider-ducks killed by the party during the spring flight, gave us a large reserve supply of fresh meat, which was carefully stored in the cellar.

Sergeant: Mure och and Smith were indefatigable in their work, completing the collection so far as practicable in natural history, and many valuable specimens were obtained. Cracks opened in the ice to the north and west of the point, and whales were reported seen by the natives April 12; the leads were narrow, often closing entirely, with no water in sight for days, and the natives reported hearing or seeing whales nearly every day up to June 12.

The spring was very backward and we experienced a great deal of cold, disagreeable weather; the shore leads opened slowly. In Elson Bay and along shore to the eastward of Point Barrow the ice held on until late in August, and this prevented my getting along shore to the eastward with the whale-hoat before the arrival of the relief vessel, as I had intended. It was my desire to explore the coast as far as the boundary at least, and had the season been as favorable as that of 1882 I could have left the station by June 12.

On June 9 the natives succeeded in killing a large whale, the first they had taken since we had been on the coast, and was the cause of considerable excitement among them for several days; they came in from all points to join the general feast on the carcass, which was free to all who cared to come and partake.

By the first of August we were becoming extremely anxious about a vessel reaching us this season, as the ground ice was still intact from Point Barrow to the Sea Horse Islands, and it was impracticable to work a small boat along shore. The whale-boat was fitted and provisioned for a voyage and held in readiness for a move as soon as the ice would let us out; outside the bar there was one narrow open lead extending as far as the eye could reach to the southwest, but there was no break in the ground ice to let us into it; besides, it closed under a westerly wind or when the prevailing northeast wind slacked up. On the morning of August 1 a thick fog hung over the ocean, and when it lifted, about 7 o'clock, our eyes were gladdened by the sight of three steamers six miles away, working slowly up the lead from the southwest. With Captain Herendeen I at once crossed the ground ice and went on board the nearest ship, reaching her about 11 a. m. Found it to be the Orca, Captain Colson, from San Francisco, a new vessel on her first voyage. From her we received our first mail, and from private letters learned that the station was to be abandoned as soon as a vessel could reach us. Captain Colson reported the balance of the whaling fleet lying at anchor along the coast between Point Hope and Cape Belcher; not being so well fitted as the new vessels, they would not venture into the pack. The Orca tied up to the ground floe off the station until along in the afternoon, when, in company with the Bowhead, Balæna, and Narwhal (all steamers that had now come up), she proceeded on up to the Point; the lead here was closed and the pack was solid to the north and east, and fast on the land to the eastward of Point Barrow; they tied up under the lee of a large floe berg that had grounded in four fathoms of water.

The following day the steamers Belvidere, Lucretia, and Mary and Helen, came up bringing considerable mail, but no orders, except one from the Chief Signal Officer directing me to dispose of such stores as could be sold to advantage. I sold what I could to the fleet, packed everything not required for immediate use, and as far as possible, without discontinuing the work of observation, made everything ready to embark, so that when the vessel sent to our relief should arrive she would be delayed as short a time as possible.

By August 15 several sailing-vessels had worked up to the station, and all were at anchor behind the ground ice which had now broken away in several places; there was also an open lead along shore. On the 16th the bark Sea Breeze (Captain McDonald) anchored off the station and reported that he had spoken the schooner Leo at anchor off Point Belcher, eighty or ninety miles to the southwest, with orders for the station. He also reported the ice close in off Sea Horse Islands, and that he thought the master of the Leo did not care to venture into the ice, as he had been lying there over a week. I at once prepared to go to her in the whale-boat by working along shore, but a heavy gale springing up from the northeast on the 17th prevented our sailing. In the mean time Capt. L. C. Owen, of the bark Rainbow (who was master of the North Star when she was wrecked in 1882), came to the station and tendered me the services of his steam whale-boat for the trip, which was very gratefully accepted. He sent it down to me on the 19th, with Mr. Rogers, his first mate, in charge, and a crew of three men. I left the station at 6.40 p. m. the same day, with Sergeant Murdoch and Interpreter Herendeen. The weather was clear and warm,





ARCTIC OCEAN FROM THE STATION, AUGUST, 1883.

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with little or no wind when we started, so we steamed along shore about one-fourth mile from it, keeping inside the ground ice. At 8 p. m. a strong breeze came out from the northeast, when all sail was set, and we made great speed, so that by midnight we were off Sca Horse Islands; by this time there was a heavy sea running, and the wind had increased to a gale, and we were running before it under clove-rected mainsail and all steam, to avoid being pooped and swamped, as the sea was breaking heavily on the shoals off Point Franklin. The heavy pack was aground on the outer bar, but there was room for a vessel to pass between it and the shoals.

After rounding Peart Franklin we headed for Point Belcher, and at 2 a. m. sighted several vessels at anchor off the point, apparently making very bad weather of it, as there was no shelter here from the wind and sea. As we neared them we were able in the dim twilight to make out the Leo by her peculiar rig, she being a topsail schooner, and we here up to her and succeeded in getting a line on board as we swept past, and with considerable difficulty were taken on board. The gale increased in fury, and before we could hoist in the launch the Leo dragged her anchor and drifted rapidly to the leeward. The captain ordered the cable to be slipped, and the vessel got under way, and I requested him to keep her on a northwest course until he came up with the ice. While the vessel was being got under way, Mr. Rogers, who saw his launch was in danger of being swamped, sprang into her with his crew, cut the painter, and they disappeared from our sight in the storm. We were extremely anxious for his safety, and we had seen that all of the whalers had been obliged to put to sea at the same time we did, and that it would be impossible for him to land north of Wainwright's Inlet without losing the boat, and it was doubtful if he could keep her afloat until he reached that point. At 4 a. m. we came up with the main pack, and the vessel was hove to under the lee of a large field of ice that seemed to be nearly stationary. Here she safely rode out the gale, which abated during the night, so that on the morning of the 21st we were able to stand in toward the land, which we sighted at 7 a. m., and stood in in search of the launch and the anchor which had been slipped and buoyed the day before. At 10 a. m. the captain recovered his anchor, and we stood to the southwest along share in search of the lannch, but were unable to find any trace of her that day.

The next morning, when off Wainright's Inlet, we spoke the bark Helen Mar, and found she had the boat and party safe on board, having picked them up that morning. We then learned that Mr. Rogers had succeeded in making Wainright's Inlet after he went adrift from the Leo. and had ridden out the gale at anchor there, and, sighting the Helen Mar before he did the Leo. had gone on board of her. The wind being southwest, strong and favorable, I directed Captain Jacobson to put the Leo on her course for Uglaamie, which he did, and we came to anchorage of the station at 7 p. m., on the 22d, passing through and past considerable pack on our way. I at once landed Mr. Marr, an assistant of the United States Coast and Geodetic Survey who had been sent up to make a series of pendulum observations, with a part of his instruments; gave them all the assistance I could. At the same time I pushed the preparations for embarking, as the ice was liable to close in at any moment. We suspended work at 10 p. m. It came on to blow heavily from the southwest during the night, sending the pack in. The Leo slipped her sable, and escaped around the Point to avoid being crushed or forced ashore. We could see her spars above the ice to the eastward of the Point when we got out in the morning. Private Clarke, of the Signal Corps, and Mr. Schindler (Mr. Marr's assistant), who remained on the Leo, came down to the station overland during the day, and reported the Leo uninjured. During the aight of the 23d the wind came out from the northeast and blew heavily, setting the ice about one and onehalf miles off the western shore, allowing the Leo to work around to the westward of the Point during the following day, where she came to anchor at 10 p. m., the wind being too light for her to stem the strong northeast current that was setting along the shore. The wind hauled to the southeast and freshered during the night of the 24th, so that she was enabled to get under way and reach the station, anchoring there at 7 a.m. I at once caused the balance of Mr. Marr's instruments and material to be landed, but was unable to embark any stores, as Captain Jacobson in his efforts to recover his cable and anchor which he had slipped on the 23d, had gotten so far off shore that we were unable to run a line to the vessel for the purpose of warping our boats to and fro. This was necessary, as I had not sufficient men to fully man the boats and handle the stores, and the natives' boats could not be with safety used in the sharp ice that was running

with the coeffit and piled high on the beach. We worked all day trying to kedge the schoener in, but the wind blowing a gale off-shore rendered all our efforts futile. I placed Interpreter Herendeen on board that night, so that Captain Jacobson could have the benefit of his experience and advice should she again be driven away from her anchorage, as Captain Jacobson was totally inexperienced in Arctic navigation.

Just before dark five whaling barks came around the Point and anchored one and a half miles above the station. We all spent an anxious night for, the wind increased to a gale and hauled to the southwest and we could hear in the darkness the grinding of the pack as it came in, and were not surprised in getting up the next morning to find that the Leo was gone again, and that the sea was closed as far as the eye could reach. The Leo had escaped again around the Point, but three of the whaling barks had not been so fortunate; they were all fast in the pack, the crews were passing and repassing from the ship to the land over the ice. Two of the vessels had gotter foul of each other, and one, the Abraham Barker, had lost her rudder. With a glass from the lookout we could make out the Leo to the eastward of the Point, looking like a speek among the great ice fields. During the day the gale abated, the pressure slackened up, and toward night several small leads were visible. The wind came out from the southeast during the night, and early the next morning the Leo was seen to be under way slowly working her way back to the station through a narrow shore lead that opened during the night; she came to anchor off the station two hundred yards from the beach. Upon going on board I found her considerably damaged; she had been nipped, her stem partly knocked off, her rudder post split, and she was leaking badly.

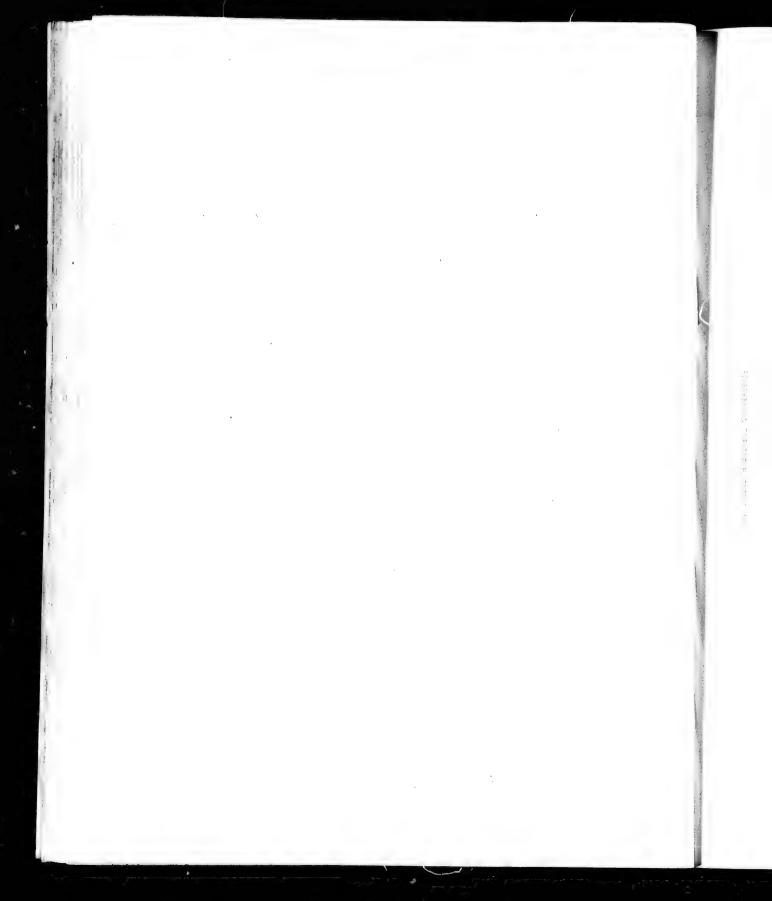
In view of these facts, and orders having been received for the return of the party to the United States, I determined to abandon the station at once. During the past two days I had caused all the subsistence and quartermaster stores worth saving to be carried down from the house to the beach; a whale-line was run from the shore to the vessel, so one man could had the boats to and fro, and the embarking was commenced at once, the first boat-load going on board at 8 a. m. Mr. Marr discontinued work on the pendulum, and took down the parts he had placed; the work went on rapidly with the two whale-boats belonging to the station. It was still impossible to use the native boats with safety, as there were great masses of loose pack-ice running with the current, and the beach was piled high with broken ice; at 2 a. m. the instruments were taken down and packed, and observations on shore ceased; the last boat-load was sent off at 10 p. m., and at 12 midnight the party went on board, leaving one man on shore, to see that the natives did not carry off anything

that might have been accidentally left.

The ice was too heavy and compact the next morning to enable us to get under way, so the captain improved the time in grappling for the anchor and cable he had slipped the night of the 25th; he succeeded in recovering it, which was extremely fortunate for it was his best, the remaining one being very light. I took a party on shore and brought off the few remaining articles of any value that I did not intend to give to the native;. I left them the house and furniture intact with the stoves, and about 12 tons of coal, a grindstone, some old canvas, and a few worn-out tools, were about all that was left; but these were of great value to the natives, and after giving them a feast of hard bread and molasses we bade them good bye, amid many expressions of regret at our departure. I placed the buildings in charge of some of the most influential men, who promised they would not allow them to be torn to pieces, but be kept as a place of refuge for any shipwrecked people who may chance to be cast ashore on this barren coast. A whale-boat passed up during the day with Captain McKenna, of the bark Cyanne. He reported that his vessel was driven ashore off Point Belcher, in the gale of the 25th, and would prove a total loss. He came up to get assistance from vessels at the Point in saving her valuable cargo of whalebone.

On the morning of the 29th, the lead to the southwest being open and the wind being favorable, the captain took his anchor and got under way at 6 a.m., and we commenced our honeward voyage. The familiar shore and village and the house that had been so good and comfortable a home to us for two long years soon faded in the distance. After sailing two miles we got clear off the loose ice that was running with the current and into clear water, with the old pack close in to the northwest, arriving off Point Franklin at 9.30 p. m., when the wind fell, and we came to anchor in company with cleven ships of the whaling fleet that had worked out and had come down

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the same time we did. The wind came out from the westward during the night, and the captain got under way; stood off and came up with the pack about six miles from the land, when he tacked and stood in towards land; but again the current was setting so strong to the northeast that we could not make any headway on our course, and we were very glad to get back to our our anchorage under the lee of Point Franklin, where we lay until the next day, when we again got under wry with a light southeast breeze, which let go after we had gotten around the Point, and we were again obliged to anchor at 10 a.m., to prevent being carried off to the northeast by the strong current setting along shore here.

Sailing-vessels navigating this sea should never allow themselves to get off soundings north of Point Belcher, except in a strong, steady wind, nor allow the vessel to drift during thick, calm weather, if i\* is possible to get an anchor down. The needle is useless here; the land or lead line is the only safe guide, for, should a sailing-vessel be carried off soundings off Point Barrow with light wings or calm, she runs gree\* danger of being lost; this has been the fate of nearly all

vessels so caught, especially late in the season.

At 4 p. m., the breeze freshening, we got under way again and stood on our course along the coast and about four miles from it. We experienced light, baffling winds, making but little headway from that time until the afternoon of September 2, when the wind came out strong and steady from the northeast. We sighted and passed Cape Lisburne that day and sighted the Diomede Islands at noon on the 3d. During the day the wind increased to a gale and the weather grew thick and cold, with considerable snow; sail was shortened, and at 3 p. m. we passed Cape Prince of Wales, running at great speed before the wind; after passing through the straits the vessel was headed for Norton Sound, it being necessary that I should go to Saint Michael's to land Private E. Clarke, of the Signal Corps, who had been sent out to relieve Sergeant Leavitt, an observer on that station. As soon as we hauled under the high land to the south and east of Cape Prince of Wales we ran out of the wind, and our progress was slow.

On the 4th of September the fog lifted and we sighted Kings Island and Cape York, and on the 6th passed close to the southward of Sledge Island, but, owing to a head wind, did not sight the high land near Saint Michael's until the 8th. We stood in towards it and came to anchor off the fort at noon on that day, where we were received by a salute fired from a couple of old ship guns. Soon after a boat came off to us bringing, very much to our surprise, Lieut. Frederick Schwatka. Third Cavalry, who reported that he had made the passage of the Yukon on a raft, exploring its course from its source to its mouth, making one of the most remarkable raft voyages on record. He had been at Saint Michael's since the last of August, and was extremely anxious to get away with his party. Though we were very much crowded on the Leo I did not think it would be right to refuse him passage, as there would be no opportunity for him to return to the United States before another year, this station being visited only by vessels of the Alaska Commercial Company, and there would be none due before the following June. So I directed him to hold his party in readiness to come on board as soon as we were ready to sail. We were short of fresh water and had to lay in a supply before again putting to sea. For the first two days we were in port it blew a gale from the southeast, so it was impossible to get any water off to the ship; on the afternoon of the 16th the captain reported he had succeeded in getting enough on board to last us until we could reach Unalaska or Plover Bay, whichever place I should conclude to go to, so at daylight on the 11th Lieutenant Schwatka and his party were taken on board and we put to sea at 10 a.m. Found it was blowing a gale from the northwest when we got outside, and after making a few tacks under close-reefed sails, found we were making no headway, so we were glad to run back into the harbor, where we came to anchor at 3 p. m.

The following morning, the wind having hauled more to the north, we again put to sea, and the next morning sighted Cape Darby, a high headland on the northern shore of Norton Sound. We were obliged to make this northing to avoid a dangerous shoal that makes out from the mouth of the Yukon; in running out of Norton Sound it is not safe to run west, south of 64 Lat. During the afternoon of the 13th the wind settled in the northwest and blew hard and steadily all that night, and we found it would be slow work beating up to Plover Bay. The ship was leaking so badly that the pumps were kept going one-third of the time and the slightest accident to them would soon send her to the bottom; and as I knew that the meridian of Unalaska had been as well,

if not better, determined than that of Plover Bay, I decided not to go to the latter place, but to proceed direct to Unalaska and there make an effort to repair the vessel, as I was told that there was sufficient tide at that place to enable us to get at her bottom by discharging her cargo and placing her on the beach at high tide and working on her during low water; so as soon as we were clear of the Yukon fatts she was put on her course for that place. The wind increased to a heavy gale from the northwest on the 15th, and we made excellent time as we were running nearly before it. During the night of the 16th, the vessel was hove to to wait for daylight, as we knew we were near land, and on the morning of the 17th we sighted the island of Unalaska to the south and about twenty miles away; the wind had fallen so light during the night we were able to make but little headway and did not get into the barbor and at anchor until 10 o'clock that night.

We found the United States steamer Corwin and the Alaska Commercial Company's steamer Dora at anchor here, the former on her return from Kotzebue Sound and the latter on her annual voyage to the Aleutian Island stations. The wind not being favorable to sail into the inner harbor, which was the only place where the vessel could be safely beached, I made application to Captam Healy, commanding the Corwin, for the assistance of the cutter to tow the Leo in . he very readily complied with the request, and at once got up steam, and at 11 a. m. placed the Leo at the company's wharf, where the bulk of her cargo was discharged; owing to a severe wind storm prevailing at this time we were unable to haul her up until the afternoon of the 20th, when she was beached at high tide; we improved the time in getting observations of the sun, and determining the declination of the needle. We were unable to get at the leak on the first ebb, but on the 21st the water fell sufficiently low to enable the workmen to repair the damage, which was found to be about four feet below her water line, where a butt had been started, and the water was so clear that we could see that she had sustained no damage below that point, and we were pleased to find upon floating her off on the next high tide that the leak was entirely stopped.

Such stores as had not been disposed of were re-embarked on the 22d and the vessel warped out to her anchorage ready for sailing. The 23d was too stormy to admit of our going to sea, but the wind having abated slightly toward night, I directed the captain to get under way on the morning of the 24th, which was done at 8 a. m., being towed outside the heads by the Corwin, whose services had again been kindly placed at our disposal by Captain Healy. We found the wind blowing strong from the northwest when we got outside, and a very heavy sea running: we parted company with the Corwin as soon as we passed the capes by the breaking of our tow-line, and the Leo was at once headed for the pass of Akontan, through which we passed out into the Pacific at 12 m. From this time the wind continued fair during the whole of the voyage across the North Pacific. We followed nearly in the track of the great circle route, and made such

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remarkably good time that the Farallones were sighted at 3 p. m.

On October 6 the wind fell as we ran in toward land, and we drifted through the Golden Gate in a dead calm that night at 12 o'clock, coming to anchor off the Presidio at 2 a. m. October 7, and

reporting to the Chief Signal Officer by telegraph the same day.

The object for which the expedition was organized being accomplished, it was formally disbanded October 15; its work having extended through a period of over twenty-seven months, during which time the expedition had sailed over 7,500 wiles, had established and maintained itself at the northern extremity of this continent in latitude 71° 16' north, and successfully carried out the instructions received from the Chief Signa! Officer, and brought back the record of an unbroken series of hourly observations in meteorology, magnetism, tides, and earth temperatures, besides a large collection in natural history and ethnology, and penetrated into the interior to a point never before visited by civilized man.

During the whole period all the members of the expedition enjoyed excellent health, not having

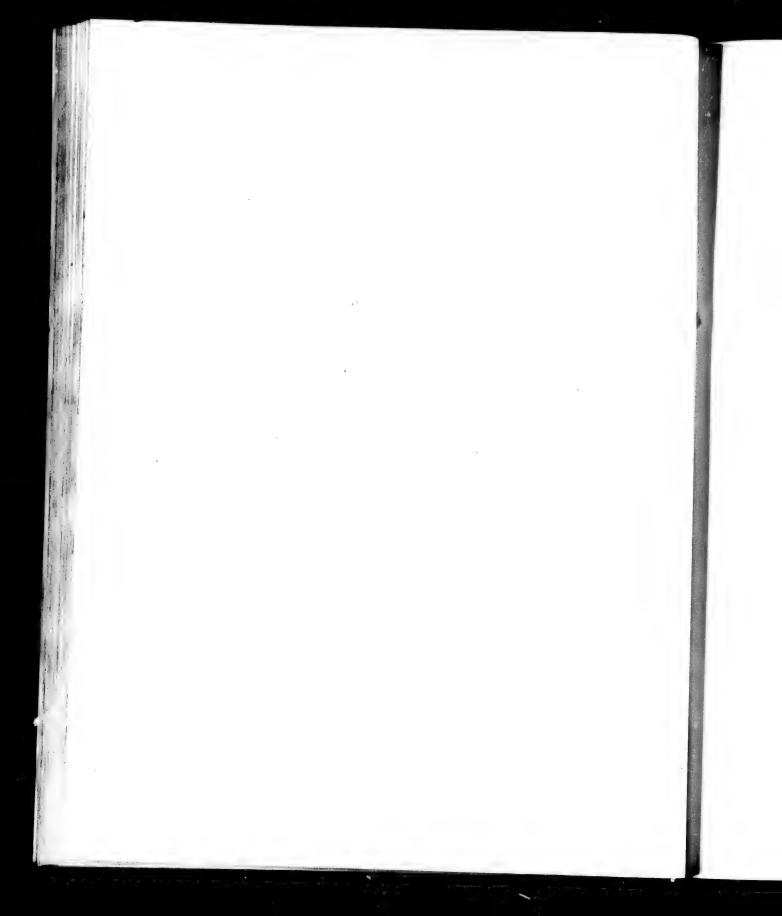
a single man on the sick report for two years.

To the individual members of the expedition who returned with it to the United States great credit is due for their obedience to orders, faithfulness, and intelligence in performance of their duties, and for their patient endurance of the many trials they were called upon to suffer; for the work of scientific observations in these high latitudes is one of patient endurance on the part of the observer, confined, as he is, within narrow limits, without the excitement incident to travel. The unvaying monotony of the work is necessarily very wearing, but during the whole time no murnaur or complaint was ever heard.

## PART III.

## ETHNOGRAPHIC SKETCH OF THE NATIVES OF POINT BARROW.

By LIEUT. P. H. RAY.







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## ETHNOGRAPHIC SKETCH OF THE NATIVES.

I.

During our stay we improved each opportunity to add to our knowledge of the peculiar people inhabiting this coast. A want of sufficient knowledge of their language at first made the work difficult, as we had no interpreter. So our first energies were devoted to learning their language sufficiently well to communicate with them, as none of them could speak a word of English relater did they show any disposition to learn.

Of their origin and descent we could get no trace, there being no record of events kept among them. Even the sign record of prominent events in individual life, so common among some of the natives in the lower latitudes, is almost unknown among them. Their language abounds in legends, but none of these gave any data by which we could judge how long these desolate shores have been inhabited.

That the ancestors of those people have made it their home for ages is conclusively shown by the ruins of ancient villages and winter huts along the sea-shore and in the interior. On the point where the station was established were mounds marking the site of three huts dating back to the time when they had no iron and men "talked like dogs"; also at Pevigniak a group of mounds mark the site of an ancient village. It stands in the midst of a marsh; a sinking of the land causing it to be flooded and consequently abandoned, as it is their custom to select the high and dry points of land along the sea-shore for their permanent villages. The fact of our finding a pair of wooden goggles twenty-six feet below the surface of the earth, in the shaft sunk for earth temperatures, points conclusively to the great lapse of time since these shores were first peopled by the race of man. That they have followed the receding line of ice, which at one time capped the northern part of this continent, along the easiest lines of travel is shown in the general distribution of a similar people, speaking a similar tongue, from Greenland to Behring Straits; in so doing they followed the easiest natural lines of travel along the water-courses and the seashore, and the distribution of the race to-day marks the routes traveled. The sea-shore led them along the Labrador and Greenland coasts; Hudson's Bay and its tributary waters carried its quota towards Boothia Land; helped by Back's Great Fish River, the Mackenzie carried them to the northwestern coast; and down the Yukon they came to people the shores of Norton Sound and along the coast to Cape Prince of Wales. They occupied some of the coast to the south of the mouth of the Yukon, and a few drifted across Behring Straits on the ice, and their natural traits are still in marked contrast with their neighbors, the Chuckchee. They use dogs instead of deer, the natives of North America having never domesticated the reindeer, take their living from the sea, and speak a different tongue. Had the the migration come from Asia it does not stand to reason that they would have abandoned the deer upon crossing the straits.

The following table will show that physically the Inyu of North America coast does not conform to the typical idea of the Eskimo. They are robust, healthy people, fairer than the North American Indian, with brown eyes and straight black hair. The men are beardless until they attain the age of from twenty to twenty-five years, and even then it is very light and scattering, and is always clipped close in the winter; at this season they also cut off their eyebrows and tonsure their crown like a priest, with bangs over their forchead. Their hands and feet are

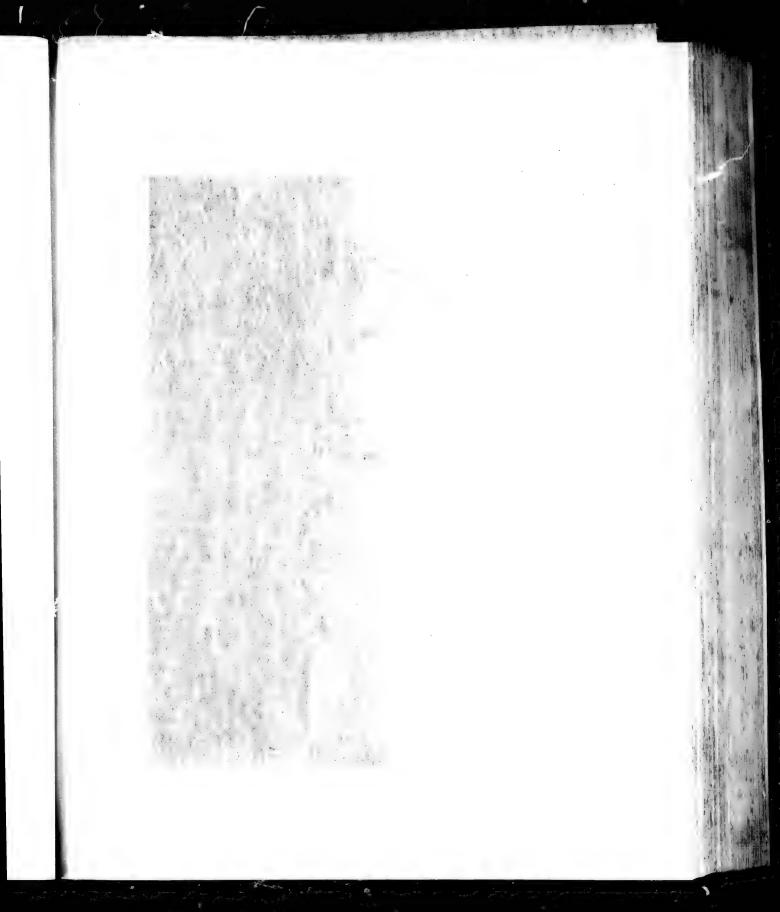
extremely small and symmetrical; they are graceful in their movements when unincumbered by heavy clothing; they are kind and gentle in disposition and extremely hospitable to strangers; though they may rob a stranger of every means of obtaining a subsistence one moment, they will divide with him their last piece of meat the next. They have no form of government, but live in a condition of anarchy; they make no combinations, either for offensive or defensive purposes, having no common enemies to guard against, nor have they any punishment for crimes. I never knew one to attempt to reclaim stolen property, though they might see it in the hands of the thief or left on his cache; though given to petty pilfering they rarely, if ever, break into a cache (except into one of meat when driven to it by hunger) or enter a tent or but for that purpose, During the first winter we had stores, of which they were in great need, in a Sibley tent, and they all knew they were there; and although the tent was only tied, with no regular guard over it, nothing was ever disturbed, though if anything was carelessly left out it would be stolen at once. They never made the slightest resistance to our reclaiming property when discovered, and would laugh about it as though it were a good joke. They are very social in their habits and kind to each other; we never witnessed a quarrel between men during the whole time we were on the coast, neither did we ever see a child struck or punished; and a more obedient or better lot of children cannot be found in all Christendom. I never saw one of any age do a vicious or mean act, and while they were always around the station during the fall and winter, they did no mischief, but, on the contrary, would busy themselves in shoveling the snow out of the tunnels and running on errands and doing any work they could for a little food each day. The children would wait around the door for members of the party to come out to take their daily exercise, and, even more, would accompany each member, and every few moments they would say "naumi-tanity" (now let me see), and would scan the traveler's face for frost-bites, and were ever ready with a handful of snow to be applied should they detect the slightest sign of freezing; for when the temperature gets below  $-45^{\circ}$ , and there is a light breeze, it cuts every exposed part of the body as though white hot metal were applied, causing no pain. Their games were very alike what we see played among children of our own race, and in imitating the pursuits of the elders, we often saw them with snow play-houses cut into the hard snow, with snow images set up, and the little fur-clad mites of humanity bustling around, playing at keeping house and making calls, with the temperature at  $-40^{\circ}$ .

All the people on that coast from Wainwright Inlet around to the mouth of the Colville are comprised in the following villages whose population comprise all the inhabitants of this coast:

Name of village,	Location.		Total population.
Kunmenm	Wainwright Inlet	10	80
Sidára	Southwest Point Belcher	8	50
Ŭglaamie	Cape Smythe	23	130
Nuwak	Point Barrow.	31	150
Total			. 410

Between Point Barrow and the Colville the country is uninhabited in the winter. The resources of this region are so limited that in the struggle for existence, these people are obliged to devote all their energies and time to procuring necessary food and clothing to maintain life, never being able to get a sufficient supply of meat ahead to lay in a reserve; famine always stares them in the face should they relax their efforts.

With the return of the sun each year their active life commences. These that have arms and dogs go into the interior about the 1st of February to hunt reindeer; those belonging to the villages of Nuwük and Uglaamie go to the south and hunt along the Meade and Ik-pik-piū; those from the vicinity of Wainwright Inlet hunt along the Ku; the others scatter along the western shore for the purpose of taking seal, and ducks as the season advances. Their tents, one or two in a place, seen by summer voyagers in this sea, has given rise to the belief that this coast is much more densely populated than it is in fact. For when the tents are out the villages are empty.





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The hunters return to the winter huts between the 1st and 10th of May, and the omeliks or boat-headers make up their crews for the whaling season. A boat-header (omélik) is one who is noted for his success in taking whales, and of course is a man of experience and considerable influence. The crews are made up of men and women, generally ten to each boat; some crews are paid by the omelik, who feeds them and pays them in deer skins or other articles of native traffic; others ship on a lay, each member furnishing his own supplies and they all share alike in the catch, the boat-header furnishing the gear. The women who are tabooed and the children cook and carry food out to the crews, who come in to the land as seldom as possible, and never go into a house, if it can be avoided. At this season, too, no work is done that will necessitate pounding or hewing or in fact any noise, neither shall there be work of any kind carried on in the tent (tupek) of any member of a crew. Should their garments be accidentally torn, the woman must take them far back on the tundra out of sight of the sea and mend them; they have little tents, in which just one person can sit, in which this work is done. During the spring of 1882 they came to me and asked that I stop the work on the shaft, saying that it would offend the whales at this season. Early in March all hands turn to and build a road through the pack over which the boats can be hauled out to the lead; this often necessitates a great deal of labor, especially when the lead opens far off shore, as it did in 1882.

The village and camps are in a constant state of bustle and excitement at this season of the year; boat covers are being renewed or repaired; harpoons and lances are gotten out and every part of the woodwork carefully scraped; seal-skin pokes are lying about, looking like bloated seals, and the skulls of wolves, raven skins, or eagle skins are in great demand, for no no boat would be considered equipped without some such talisman. Daily the old men, especially those who are successful in curing the sick, meet on the sea-shore and (abawa) talk for an east wind, so the ice will be driven off shore and a lead, favorable for whales, opened; and their faith remains unshaken through repeated failures, and when questioned as to the reason why their supplications remained unanswered they always attributed it to some offense they had given to the spirit. When the lead opens there is great rejoicing, and for a few days they display the utmost vigilance; but should the whales fail to appear in a few days, they soon grow careless and cease ernising, haul their boats up on the ice and patiently wait for a whale to come to them, taking turns in standing watch while the others sleep or shoot seal and duck, which abound in the open leads at this season.

As the season advances the boat crews are gradually broken up, and by the middle of June all boats are brought to the land, when parties are made up to go to Nigalèk, a place at the month of the Colville, where the people from Nuwik and Uglaamie go to meet a band called Nn-na-tá/ñ-meun (inland people), where they barter oil and blubber for deer, fox, and wolverine skins. They sometimes meet here the Kûñ-mû/d²-lûs and It-kû/d¹-lûs, bands that live along the coast between the Colville and Mackenzie. This meeting breaks up about the 15th of August, when they slowly return along the coast, hunting by the way, and reach their winter villages from the 15th of September to the 1st of October, about the same time the traders go to the eastward.

A few of the leading families from both villages pitch their tents at Perigniak, a point on the sand spit, about five miles from Nuwük, where the eider ducks fly over, and spend the summer there, living entirely upon ducks and whitefish. The ducks they take with slings and guns and the fish with gill-nets made from sinews of the reindeer. Those who are too poor to own a gun or to have oil for trade scatter through the interior, carrying their kaiaks on their heads to cross the numerous lakes and river's, and gain a precarious livelihood by catching the young reindeer, the young and moulting ducks which are found in great numbers in the lakes and along Meade River, where they also take a few whitefish with gill-nets. The ducks are taken with a light ivory-headed spear, which has a shaft seven feet long, one-half inch in diameter, with three long ivory barbs in the middle. It is thrown with a hand-board from a kaiak, the barbs catching the birds by the neck when missed by the lariat stroke.

Their usual mode of travel along the shore in summer is by the umiak, the large skin boat; with a fair wind they hoist a small lug sail, but the boats being flat bottom will not sail on the wind, so with a head wind or calm weather the boats are towed by dogs, using the walrus harpoon line for a towing line; they never resort to the labor of paddling except when in pressuit of game or in

some emergency. When a landing is made the boat is hauled up above high water, and turned over and serves temporarily for a tent. By the 1st of Oetober all have returned to their winter huts, and are busy getting them in order for the winter; all the inside timbers and floors are carefully scraped, the passages which have become filled with ice during the summer are picked out, windows of walrus intestines are stretched over the openings, and by the 15th all are housed for the winter. And the seal-nets and spears are repaired and made ready, and, as soon as the ocean is frozen over, parties are constantly out on the ice, hunting for air-holes where the seal come to get air. As soon as one is discovered a number of families go off to it in the following manner: the nets are twenty-five feet long and fourteen feet deep, with meshes large enough to admit a seal's head, and are rigged with stone sinkers along the bottom, and at the two upper corners are attached two rawhide thongs ... out for a set long, one of which has a light weight attached to the end. Holes twelve inches in dia... the ice about sixty feet ted fine is dropped through one hole, and hauled up through the back from the air-hole. other by a long pole with a book attached; this pole is made from small pieces of drift-wood carefully spliced together with lashings of whalebone; by this line the net is hauled underneath the ice, hanging down like a curtain between one of the holes and held in its place by the lines being attached to a wooden pin. In this manner the air-hole is surrounded by nets as far as practicable; one man or boy is left to attend to each net, and the strictest silence enjoined; no word is spoken; the watcher, wrapped in his heaviest coat, patiently awaits through the long hours; he occasionally scratches the surface of the ice with a scratcher, which is made of a set of seal claws attached to a piece of wood. The seal, in coming to the hole for air, strikes into the net; the strain loosens the lines from the peg and he entangles himself and soon drowns, when he is hauled out through one of the sealing holes and the net reset. Over one hundred seal are sometimes taken at a single air hole within twenty four hours, but they can be taken in this manner only during the dark of the moon—any light will betray the presence of the net. During May quite a number are taken at their breathing-holes, which have become enlarged, and through which they haul out on the surface of the ice at that season, by removing the weights from the nets and setting it across the hole with four lines on the under side of the ice.

At this season, also, many seals are taken with the hand spear, at the "adlu," the breathing-hole of a single seal. It is usually detected by an excessive deposit of hoar-frost on the surface of the snow over the hole; the snow is cleared away down to the solid ice, and in the hole, which is about one inch in diameter at the surface, is placed an ivory needle about one foot long and one eighth of an inch in diameter; to the upper end a small cross-bar is attached, to prevent it dropping through, and a small feather, and the hunter takes his stand on a three-legged stool, which is always a part of his regular equipment, and patiently awaits the coming of the seal, of which the feathered needle gives warning; after the stroke is delivered, if he succeeds in fastening to the seal, he proceeds to cularge the hole until it will admit hauling him to the surface; this is usually done with an ivory pick attached to the shaft of his spear; as soon as a seal is taken its mouth is fastened open with a piece of ice, and a slot cut through the lower jaw before it becomes frozen. Should be be far out in the pack, where the ice is too rough for a sled to be used, the seal is dragged home by a hand drag, which is a strong loop about two feet long, made of walrus hide thong, fitted with an ivory toggle or handle, generally carved in imitation of two seals fastened together; this loop is passed through the slot in the seal's jaw and over the toggle; each hunter must be supplied with at least one of these drags, as it is not considered proper to fasten to a seal with a line that is used for any other purpose; when they get near shore the drag is removed and a few drops of fresh water is poured into the mouth of each seal before it is taken from the ice to the land; they generally go through with the same ceremony with ducks that have been killed at sea, but never with those that have been killed over the land, and the bones of seals are carefully preserved unbroken and returned to the sea, if possible, either by being left in a crack in the ice, far out from the land, or dropped through some open hole in the ice. By so doing they believe that good fortune will follow them in pursuit of seal, which is their main dependence, for from its skin they make their summer boots and soles for their winter boots; its blubber supplies the oil for their lamps during the long night, and with any surplus they may have they purchase deer-skins for clothing from the natives from the interior, and its flesh when cooked is an excellent article of food. The few

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walls were acros in fre reindeer and water fowl they take are looked upon more as a luxury than a necessity, and the flesh of the reindeer is the greatest luxury of all; those who have it careful: Fourd it, and when they knew that we had some in store they would often come and beg for a small piece to be used as medicine for some sick person.

Immediately after the departure of the sun, when food is plentiful, it is asstomary for each village to hold a kind of high carnival for three days; friends are invited from the neighboring villages, and the time is passed in dancing, singing, and feasting; the "kûdyigin" (council-house) is fitted up with a new roof of ice, and crowded day and night, fresh dancers taking the places of those tired out, and the dull tum-tum of the drum, mingled with snatches of song and shouts of laughter can be heard coming from almost every iglu.

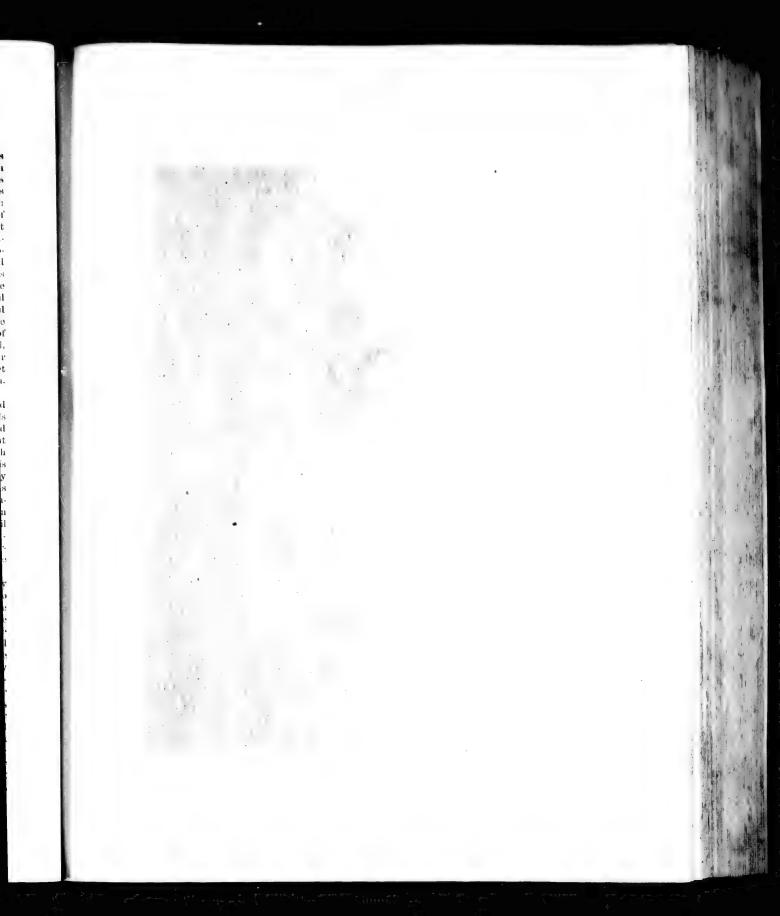
It is customary at this season to exchange presents, especially among the more wealthy and influential ones; but the giver expects value received in return, and should be fail to receive a satisfactory present he does not fail to let his wants be known, and he often announces beforehand what articles would be most desirable in case he should make a present. In 1883 I was invited to attend one of these gatherings at Numuk, and the old omelik who was sent as bearer of the invitation brought a statement of what they were going to give me; after waiting around the station for an hour or two he called me to one sale as called over a long list of articles that they expected me to give in return, but as rum (tût $\tilde{r}$   $\sim$ ), rific  $\sim$  and ammunition were leading items in the list, the visit was never made. A trade is made a matter of grave debate, and frequent discussions asking for a little more, no matter how much has been offered, and when an offer has been made they will go away and send the article by another person; and often when a trade has been completed they will come and demand their goods back, often leaving the articles they had received on the door-step, and when asked what tive will take have great difficulty in making up their minds; and in making boots and clothing they will slight their work in every imaginable way unless carefully watched. I had occasion to purchase seal-oil, and they commenced bringing it to me in old tin cans that they had picked up at the station, and after a few honest deliveries they commenced bringing us cans filled with two-thirds ice and a little oil on top, and betrayed themselves by being over-anxious to get their pay before we emptied the cans.

My first invitation to one of their ceremonies came in December, 1881, through old Nikawaalu, of Uglaamie, who came over to the station with a small delegation and in a grave, dignified manner said that the people of Uglaamie would be made glad if Captain Herendeen and myself would come with him and see the dance. We at once started over, and as we approached the village we found a crowd upwards of 200 people collected around the council house; besides the Uglaamie people, there were delegations from Nuwuk and Sidaru. They were silently watching a pantomime that was being enacted by five men and two women who were standing in a row with the women on the right and left, facing the south, with the council-house behind them, and the crowd in front. They were attired in new suits of deer-skin worn with the flesh side out, dressed perfectly white; the men were tall conical hats of seal-skin, ornamented with dentalium shells and tufts of ermine and Arctic fox fur. The women were bareheaded, with their hair neatly plaited. Behind the dancers sat a drummer and two singers, to whose doleful chant the dancers kept time with their feet, at the same time swaying their bodies from right to left with spasmodic jerks, the women occasionally joining in the song, while the men one at a time would spring a few paces to the front and in wild gestures portray how they had taken seal, bear, or deer, being cheered by the crowd as they finished and took their place in the line. The day was clear, and their grotesque figures showed in sharp relief against the southern sky that glowed with the twilight of a winter noon; their wild surroundings, backed by a frozen ocean, made up a picture peculiar only to the Arctic, and, once seen, not soon to be forgotten. After each had danced in turn, and it seemed a long time to us standing waiting in the snow in a temperature of 18°, they adjourned to the council-house, where as many crowded in as could find standing room, in a room 16 by 20; the air was redolent with odors from the lamp and the unwashed crowd, and, as the frost had hermetically sealed the roof and walls, there was no ventilation and the heat and stench soon became almost unbearable to us who were unaccustomed to such life. Two large stone lamps lit up the low room with a hazy light; across the side opposite to the entrance a space 6 by 8 feet was curtained off with deer-skins, and in front of it was a model of a tree suspended from the ceiling, and, as the knowledge of the native who designed it was comined to the few pieces of drift-wood found on the beach and some pieces of timber cast ashore from wrecks, the specimen was unique; it consisted of two oblong boxes open at both ends loosely attached together endwise with seal thong; the part representing the body was 2 feet long, 8 inches square, and that representing the top 18 inches long and 6 inches square, and was suspended by a thong with the lower end two feet from the floor. On the right and left of the tree hung the skull of a wolf and the dried carcass of a raven; two of the singers sat flat upon the floor with their legs extended, one close behind the other, the foremost one with his nose just touching the tree. As soon as all were in position the drummers, accompanied by the women, struck up a doleful chant to which the man at the tree kept time in his supplications to (Tuña) the Great Spirit to give them success in pursuit of whales, deer, seal, &c., and to send white men with plenty of rum and tobacco; and he particularly dwell upon certain articles he knew we had at the station; at the same time he beat the body of the tree with a wand. As he completed his schedule of wants the lower edge of the curtain was raised and five natives crawled forth on their hands and knees. They were dressed in the skins of the bear, wolf, lynx, fox, and the dog,t he heads being dressed complete, showing the grinning teeth. On their hands were large mittens of dried seal-skin, with shells and small pieces of copper attached with pieces of thong, so that they swung and rattled as they moved their heads. They crawled slowly forward, swinging their heads in unison, keeping time to the music in hoarse growls, and by shaking their huge mittens until their heads touched the singers by the tree, when they all sprang to their feet with a loud shout, and the performance was brought to a close by all joining in a wild shout accompanied by spasmodic gestures that seemed to threaten a dislocation of their joints.

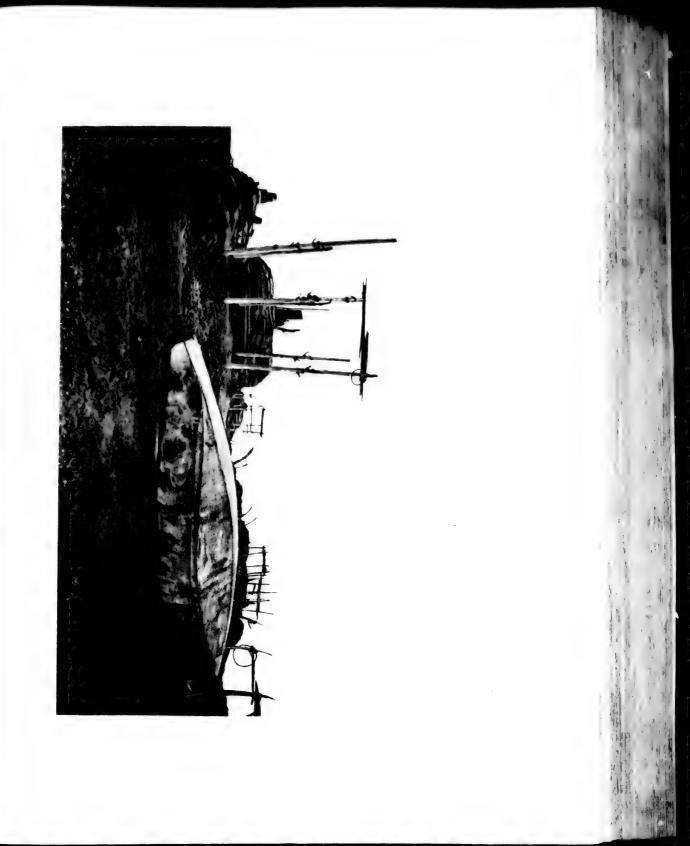
As we came out in the open air we found another party just commencing the out-door dance, and so they kept it up night and day. Each party as they completed their dance were feasted by friends in different iglus. The invisible spirit (Tuña) peoples the earth, sea, and air; we never could find that they gave it any place of fixed abode; visible at times, as many of the old men insisted that they had seen him, and described him as resembling the upper part of a man, but very wide, with an extremely large head and long fangs; he is the creator of all things, and also the destroyer, is ever to be feared, especially in the night, and men and women, when out at such a time, usually carry a large knife to defend themselves should they meet him. That they believe in ghosts was apparent in the case of a woman who had been doing some work for our party. Coming to the station one day and being asked to mend a pair of gloves, said she dare not, as there was a dead man in the village, and his body had not yet been carried out; that he would see her and some evil would befall her. Upon being urged, she first obtained her husband's permission, and then seating herself in the middle of the floor, she drew a circle around her with a hone snow-knife she carried, and remarked that now he could not see her; she was very careful to keep her work all inside

the circle, and would not leave it until all was completed.

They dislike to go out on a dark night, but if obliged to, they generally carry a bone or ivory snow-knife or a long bladed steel knife, to keep off Tuña and Kíolya (Aurora), which they believe to be coually evil; but Tuña especially is concerned in producing all the evils of life. Should the whales fail to put in an early appearance, the birds fly high or far out over the pack, the shore lead open late, a gale blow down their caches and break their gear and boats, the old and wise would meet in solemn conclave to devise some means whereby the works of Tuña shall be exorcised and he shall be driven forth from the village. Various means are resorted to; the most common one is for the principal men to meet and (abawa) talk, chanting together in a loud tone, accompanied by beating of drums; they call for the east wind (nigyû) to blow on the ice (siko) to open it. Individual wants are by personal supplication, and to them, earth and air are full of spirits. The one drags men into the earth by the feet, from which they never emerge; the other strikes men dead, leaving no mark, and the air is full of voices; often while traveling they would stop and ask me to listen, and say that Tuña of the wind was passing by. With the return of the sun he is hunted out of each iglu by incantations that would daunt the boldest spirit. A fire is built in front of the council-house, and at the entrance to each iglu is posted an old woman wise in ghost lore; the men gather around the council-house while the young women and girls drive the spirits out of the ight with their knives, thrusting them under the bunk and deer skins in a vicious manner, calling upon Tuña to leave the iglu; after they think he has been driven out of every nook and corner,







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The area of the she to retur coast have somet slight not at of du seque other weigh T mittee with t they drive him down through the hole in the floor and chase him out into the open air with load shouts and frantic gestures. While this was going on the old woman at the entrance, who was armed with a long knife used for cutting show, made passes over the air with it to keep him from returning. Each party drove the spirit towards the fire and invoked him to go into it; all were by this time drawn up in a half circle around the fire, when several of the leading men made specific charged against the spirit; and each, after his speech, brushed his clothing violently, calling upon the spirit to leave him and go into the fire; two men now stepped forward with rifles loaded with blank charges while a third came with a vessel of urine, which was thrown upon the fire; at the same time one fired a shot into it; and, as the cloud of steam rose, it received the shot, which was supposed to have finished him for the time being. While they were ever threatening or supplicating Tuña we never knew them to offer thanks or be grateful for any benefits he was supposed to bestow; everything they received was taken as a matter of course, and as the result of some particular incantation.

I saw a very ingenious contrivance an old man had rigged up to keep Tuña from entering his ight. He had his seal drag, which was fitted with a carved ivory handle, suspended over the entrance inside his hut; the thong was fastened by his hunting knife being driven through it into the roof; he explained to me that Tuña in coming in would catch hold of the handle of the seal drag to help himself through the hole and would pull the knife down upon his head and be frightened away. He contemplated his contrivance with a great deal of satisfaction, and assured no that Tuña was very much afraid of his ight.

Their dead are carried out and laid on the tundra without any ceremony other than the near relatives following the body to its last resting place; it is usually wrapped in deer skins, and if a man, his sled and hunting gear are broken and laid over the body; if a woman, her sawing kit and some few household utensils are placed at her head, but everything so left is broken and rendered useless. With but few exceptions I never knew them to pay any attention to their dead after they were carried out, and all showed great reluctance about speaking of them. The bodies are usually eaten by the dogs, especially in the winter, and it is no uncommon sight to see them grawing the bones on the roofs of the iglus. The sled used to carry the body out on the tundra is not brought back to the village at once, but left out on the tundra not less than two moons, and while they all claim that it is bad to use anything that belonged to the dead, I noticed that no matter how good an outfit he had while living his was the most worthless sled and gun that could be found, and I knew of a number of cases where there was a general division of a dead man's effects on a basis of first come first served. As a rule the dead (Nu'nami-sintk, on the ground asleep) are soon forgotten, and the names of the noted whalemen or hunters only live in legend.

There is no marriage ceremony among them, but children are often betrothed by their parents ar an early age, and this promise is very faithfully kept, and they enter upon their marriage relations at the age of twelve to fifteen years; where there has been no childhood engagement the mother makes a selection of the wife for her son, and the girl selected is invited to the house, where she takes the place of a servant for a short time, doing the housework and cooking, generally returning to her father's iglu to sleep. They usually avail themselves of the summer trip along the coast or into the interior, and take upon themselves the full obligations of marriage. They often have family disagreements, the husband resorting to blows when the wife is sulky and disobedient, sometimes with the result of her running away; and we knew of one instance where, owing to a slight mistake the husband had made in his estimate of his wife's character, he obtained results not anticipated, for while out on a deer hunt he attempted to chastise her for some fancied neglect of duty when she retaliated, and, being the stronger of the two, she gave him a severe thrashing, and then taking with her an adopted child she fled to a village seventy-five miles away. She subsequently gave up the child, but would not return to him, and soon after became the wife of another man. At the time we landed at Uglaamie this same woman carried on her back a box of lead weighing two hundred and eighty pounds a distance of over two hundred yards.

The women as a rule seem to have an equal voice in the direction of affairs, when once admitted to the position of wife, and in each village there are a number of old women who are treated with the greatest consideration by all, they being credited with wonderful powers of divination, and are consulted in all important affairs. And the wives are treated with more consideration by

their husbands than they are by savages of the lower latitudes, though to her falls the dradgery of housekeeping, dressing skins, and making boots and clothing; his task is equally hard, as he is exposed to the dangers of the ice and storms in the pursuit of seal and deer, often returning to his iglu completely exhausted. She aids and assists him by following his trail with the dogs and sleds to bring in the game which the hunter catches in the snow where he kills it, setting up a cake of snow or ice with his mark upon it, to mark the place. The wife is invariably consulted when any trade is to be made, and the husband never thinks of closing a bargain of any importance without her consent. When traveling they take turn about in leading out ahead of the team, and all assist in building the snow but when camp is made. The wife also has the care of the dogs, with whom she often shares her food, giving as much care to the puppies as she would to a child, carrying them in the back of her altega or wrapped in skin on the sled when traveling, until they are old enough to be harnessed into the team, when by their faithfulness and endurance they make full return for all kindness shown them in their childhood (puppyhood), and although a dog team would try the patience of a saint, they never use a whip and rarely strike them; they coax and encourage them along by the voice; and often toward the end of a journey they hasten their pace by dragging a piece of resh meat by a string in front of the team, being careful to keep it just beyond their reach. They give the most careful attention to their foot-gear, especially when traveling during the winter; and here a woman's services are invaluable, as she is very expert in the use of her needle, and she dries and repairs the boots of the party before she sleeps; this is necessary owing to the frail character of the skins used in making their winter boots. Men do such work when alone, but not so well as the women. She also carries a sealskin water-bottle on her back under her "alige," which is replenished with snow after each draught, and is their sole dependence for water on long, rapid journeys during the winter.

Large families are very rare, and children are born at intervals of from two to four years; they do not often bear children before twenty, and a couple is very seldom met with that has a family of more than three, though upon inquiry they may have some that "nuna-mi-sinik," sleep on the ground," and where the people are poor it is not unusual for a mother to give away all but the first-born to some couple that have no children; boys are in greater demand than girls for adoption, and the adopted mother gives it all the care she would a child of her own, and will rarely if ever tell who the real mother is. So it is very difficult to trace the antecedents of any one man, for during his childhood he may have passed into two or three different families by adoption, and many of them do not know who their mother is, much less their father, and matters are still further complicated by a custom of exchanging wives. This is often done when a man is obliged to make a long trip, and his wife from any cause is unable to accompany him. He will exchange with some friend who has an able-bodied wife, each entering upon their new relations with the

greatest cheerfulness.

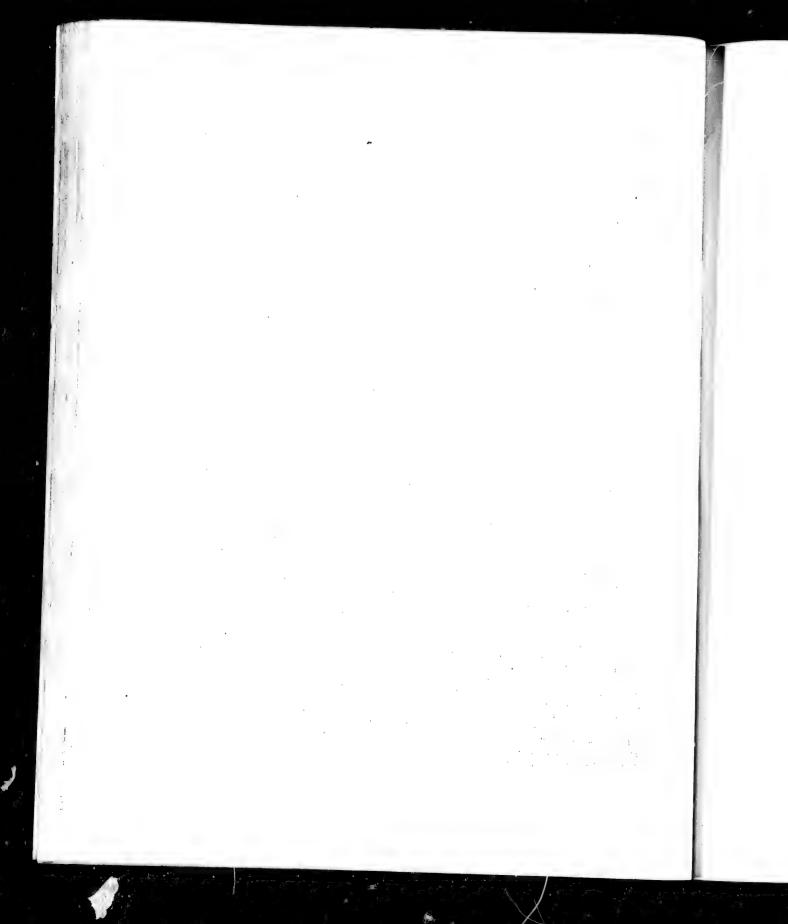
Polygamy is not common, being confined to the leading influential men; even then, they are taken into the family more as assistants for the first wife, as she rules over them, treating them as servants; the system is not popular among the women, and we knew instances where the first

wife abandoned the iglu in a rage when a second was brought home.

When a man of matured years loses his wife, either by death or from incompatibility of temper, he selects one for himself, and that they sometimes use force to coerce them, when they have no near relations to protect them, I am well satisfied from an incident that occurred at the station. A native from a village to the westward, whose wife had left him, came up to Uglaamie to obtain another; one day we were attracted by loud outcrics from a woman who had been waiting around the station for food, and upon going out to see what the difficulty was, we found our friend from Sidarn vigorously enfling her ears, and it was some time before we could make him desist; as soon as she got free from him she ran off, and he explained that he wanted her for a wife, but that she was not willing to go with him, and he was persuading her. His courtship was certainly unique, and I never heard that he succeeded in winning the affections of an Uglaamie maiden, and it is but just to add that he was very unpopular among both men and women.

The tie of relationship binds them to deeds of kindness that they would not show to people outside of the family; if a brother dies the survivor takes the family to his iglu until he can find another husband for the widow, and we know of an instance where a man lost his wife, and his







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brother who had two (who were sisters) gave him one. Their efforts to get husbands for the widows of dead relatives were often very amusing. Mû/ñialu, a hunter employed at the station, was supporting his widowed mother, who was a great scold; he brought to his iglu several candidates for her hand, who had been induced to take the step by Mû'ñialu offering to make them presents provided they would take her, but a few days or weeks was about all the most patient could bear; after several trials and failures among the men of Nuwak and Uglaamie, he finally gave it up, but on one of his trips to the eastward he brought back with him a Nunatáñ-meuñ from Colville; as he was quite deaf and could not understand the Uglaamie language very well, her shrewishness had no effect upon him, and Mûñi was happy; he would laugh immoderately when talking about it; but never, through it all, was he disloyal to his mother; she always had a place in his ight, plenty to eat, and was always treated with the greatest respect.

In the treatment of their aged and infirm parents, the example set by these people could well be followed by many of the more civilized nations to their advantage; they never forget the tender care they received in their childhood, and as their parents growedd and are unable to maintain themselves the children display the greatest devotion. The first fruits of the chase is freely given up to them, and no project undertaken without their approval; and in all things the son remains obedient to the father so long as he lives, and speaks of him with the greatest respect after his death. In their summer journeyings, should they wish to remain at home they fit them up a tent (tupěk) in some pleasant locality, and leave them an abundant supply of provisions, but more often accompany them in their wanderings, being comfortably transported by sled or boat; but the old people are rarely idle, for while the father busies himself making new seal spears and nets the mother assists in providing clothing and boots and dressing skins. We often had our day's journey brought to a sudden termination by some old woman in the party announcing that it was time to go into camp because she wast tired or cold, and nothing we could say would overrule her decision.

Owing to the exposure and hardships they are obliged to undergo in the struggle for existence they very rarely attain a very great age, and the majority by far die under the age of forty years, and a man at sixty becomes very decrepit. They have no means of keeping a record of their age, and it is generally calculated from some event connected with their history, as the coming of some ship, or a time of famine or pestilence. There was one man at Uglaamie, on board H. M. S. Plover, Captain Maguire, in 1853 and 1854, who, Captain Hull (who was master under Maguire) informs me, was about thirty years of age when the Plover passed her winters there; at the time of our visit he was very decrepit, was bent nearly double, and crawled rather than walked, with a staff in each hand; his shriveled skin, toothless gums, and shrunken limbs gave him the appearance of great age, but he could have seen but little more than sixty years, if that. I met several who said they were children in Magnine's time, and they had every appearance of men of

forty-five or fifty.

That the race is rapidly decreasing is shown by the fact that during the two years we were on the coast, in the village of Uglaamie alone, there were eighteen deaths and only two births in a population of one hundred and thirty souls; and Dr. Simpson states that in 1854 the village had a population of over two hundred. He also reports forty iglus, while we found only twenty-six. At Nuwuk, he reports forty-eight iglus, and two hundred and eighty-six people. We found this village had dwindled to thirty iglus, and less than one hundred and fifty people; and the freshlycached bodies and numerous half-ruined iglus bore silent testimony to the fact that famine and disease had quite recently been at work. This is undoubtedly owing to the fact that the foodsupply is rapidly growing less, and that the great number of whales taken off the coast by the American whaling fleet during the last twenty years has nearly exterminated that valuable animal. That they are decreasing in numbers is well known among the whalemen, and the fact that Dr. Simpson reports that during the time the Ployer was at Point Barrow there were twenty-four whales taken by the natives, while only two were taken during our stay, one of which was a calf, goes to prove that they will soon be classed among the extinct mammals, and with them will soon pass away many of the people inhabiting this shore; they are slow to take up with an innovation, and they do not really adapt themselves to the new condition of affairs which the loss of this great foodsupply has brought about. The seal are not numerous, and often leave this coast entirely for a season. When this occurs, famine with all its horrors is upon them, and they have no place to flee to for help. During the first winter at the station, food became very scarce, and scarcely a day passed but some poor native, with starvation written in every line of his face, hung around our doors begging for a mouthful of food. We gave them all we could spare with safety to ourselves, and undoubtedly saved many lives. Walrus hide and pieces of old boat-covers were considered delicacies, but we never knew them to resort to violence to obtain food, and cannibalism is looked upon by them with horror, and I could not find that a case had ever occurred. They will not even eat their dogs. Some seasons a few white whales (Beluga) are taken. The skins of this animal are in great demand for soles to water-proof boots, and often bring a high price.

Dr. Simpson reports that quite a number of narwhal were taken on the coast during the stay of the Plover, but I could find but one Indian that had ever seen one, and they are not common in this ocean at the present time.

Physically, both sexes are very strong, and they possess great powers of endurance; are capable of making long journeys on foot, with a very small allowance of food; in fact, when food is at all scarce, or while traveling, they never cut but once each day, and it was a surprise to us to see them when on a journey get out before daybreak, and, without taking a mouthful of food, make a journey of thirty or forty miles before breaking their fast; and they treated their dogs in the same manner, saying that they traveled better when fed only at the end of the day's journey; sometimes they would give them a mouthful apiece toward the middle of the day, but the practice was looked upon as bad.

The flint and steel is the most common method of procuring fire, using for tinder the down from the seeds of plants, impregnated with mealed powder or charcoal. Sometimes two pieces of iron pyrites are used, and we found the ancient fire drill still in use among some of the old, conservative men; the drill was a shaft of spruce eighteen inches long and three-fourths inch in diameter, the lower end terminating in the frustum of a cone, the upper end made to fit the socket of a stone rest that is held between the teeth; a block of hard wood with a small cavity in the center is used as a friction block; a small quantity of tinder is placed in the bottom of the cavity and the drill pressed down by the mouth-rest and turned rapidly with a small bow like a jewcler's bow. They are anxious to obtain matches, but they are not considered a necessity, and will not buy them as a rule. Flints are an article of traffic, and are brought from Cape Lisburne and the Romanzoff Mountains, there being none indigenous to this part of the coast. They believe that the pyrites come down from heaven in the form of meteors, and they call it fire-stone for that reason.

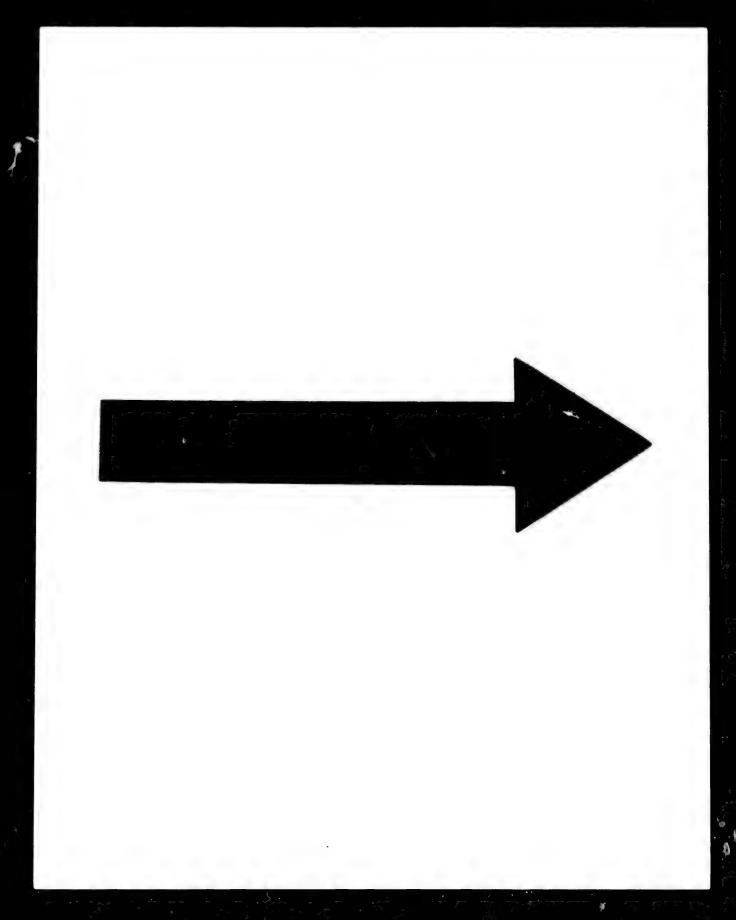
The children receive the tenderest care, and we never saw one punished by its parents. It is no unusual sight to see a child nourished at the breast until it is four or five years of age; this is especially the case with boys, who, as a rule, receive more care than girls. His food is carefully selected by his mother, and he is enjoined from eating certain articles that have been tabooed by some old woman, usually a relative; and this prohibition extends through life. With each individual there is always one or more article of food from which they carefully abstain, though the pangs of hunger may be upon them, and, as an old man expressed it, when declining a piece of bear meat, "It may be good for all men but me," shows the individuality of the custom.

To us the treatment the women receive during confinement seems harsh in the extreme, and it is a matter of surprise that either mother or child ever survives the ordeal. Several days before her confinement the mother is placed in a small snow hut, if in the winter, and in a small tent, if in the summer; no one is allowed to go near her, except her husband, who brings her food and passes it in to her without entering the hut. Here she remains entirely alone until the child is one moon old. Should the child die, then she can return to her husband and iglu after eight or ten days. No person will knowingly drink from the same cup or eat from the same dish that a woman has used during her confinement until it has been purified by certain incantations. And any woman who has suffered from premature childbirth, or given birth to a child during the winter, is allowed to go into a canoe or out into the pack during the spring. Premature childbirth is of frequent occurrence among them, and we frequently noticed the greatest solicitude on the part of the husband to guard the wife from any accident during pregnancy.





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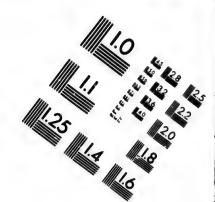
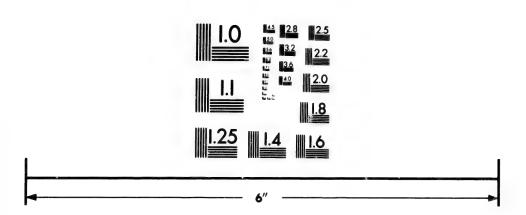


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During the long winter night, when food is plenty, they delight to meet at the council-house. or at different iglus, and over their work recount, recall, different events of their lives, and repeat the legends of their race, which have been handed down from father to son, to which the young people listen with rapt attention. These legends go back to the origin of man, and they tell with care full detail of a time when there were no men in all the land, but that a spirit called "a-se-la" dwelt here alone, and that he made the image of a man in clay, set it up by the shore of the sea to dry, and after it was dry he breathed upon it and gave it life and sent it out into the world. And he called the dog from a long way off to go with man, that he might have help in traveling. After a time the spirit made the Tuk-tu (reindeer) and sent him out into the land, and the teeth of the deer were like the teeth of the dog. After many days man came to the spirit and said. "The deer is bad, he devours man." Whereupon the spirit called in all the deer and removed all the front teeth from their upper jaws, since which time men have lived on deer, and the deer have lived on moss and grass. Then the man asked the spirit that there might be fish in the rivers and sea. And the spirit took a piece of pine and a piece of balsam and sat by the river where it emptied into the sea, and he whittled long shavings from the pieces of wood, and the shavings fell into the water, and the shavings from the yellow wood became salmon, and those from the white wood became whitefish and swam away.

Their faith in these legends is very strong, and they are extremely opposed to any expressions of doubt or ridicule, and it is only by gaining their confidence and abstaining from any expressions of doubt in their presence that they can be induced to talk about their people or repeat their legends. We heard but one legend that referred in any way to the regions to the northward. It was said that many generations ago a man from Nuwük was caught in the moving pack that was setting to the northward so rapidly that he was unable to return to the land. After a great many days, more than he could count, he came to a land where dwelt a strange people; they spoke a strange language, and dressed in deer skins like the inyu. He remained with them a long time, but, wishing to return to his people, he left them one winter and started south over the ice, living upon the seal he caught by the way, and renewing his boots with their skins. The journey was so long that he wore out fifteen pairs of boots in returning to Nuwük. Dr. Simpson reports a similar legend told him during his stay.

They all have a natural craving for rum and tobacco; it is always the first thing they ask for when they come to trade, and they are never satisfied unless they can get sufficient rum to make them dead drunk. The old men deprecate its use, and will tell how bad it is, and how certain men were killed in drunken fights, and will be very strong in their denunciations of its use so long as they cannot get it, but generally fail to resist the temptation when it is offered to them, or an opportunity occurs for them to get it. Fortunately there is but little to tempt the trader to this region, and the little they get from the whale ships is consumed on the spot, so there is no drunkenness after the sea is closed. Their tobacco they hoard carefully, and it is used by old and young in quantities only limited by the supply; they prefer a black-leaf Russian tobacco, but this is hard to get, as only small quantities of it reach this coast by the way of Behring Straits and the Diomede Islands. Next to this they prefer the black navy-plug of the commonest kind. Men and women both smoke and chew, and the children are given tobacco in their earliest infancy. It is no uncommon sight to see a child not old enough to walk lying asleep with its cheek distended with a huge chew, or to see a woman with an old quid behind each ear which has been thoroughly masticated, and put up to dry, for the future use of her lord and master. Chewing does not seem to have the slightest deleterious effect upon the children, while smoking affects the men very seriously. Their pipes are made of either stone, wood, or ivory, and consist of a flanged bowl, from one and one-half to two inches in length, with a bore one-fourth of an inch in diameter, attached to a curved wooden stem made from two pieces of wood grooved and lashed together with seal thong; the bottom of the bowl they fill with deer hair and place on top of it a piece of tobacco about the size of a pea. It is all consumed at one whift, and they hold the smoke in their bangs until they become nearly sufficiated; a violent fit of coughing follows each smoke, and with the old men it frequently so prostrates them that they are quite unable to walk for some little time after each indulgence. From what the old men told us, and from some ancient stone pipes found in the ruins of aucient iglus, it would seem that they smoked before tobacco was known among them, and they

used a kilikinic) made from the eatkins and bark of the arctic willow, which they now use to adulterate their tobacco. They all seem to have a natural appetite for this weed in any form. The men would often beg the privilege of cleaning the deposit from the stem and bowls of our pipes, which they are with great relish, and, strange to say, without being nauseated in the slightest.

That these people have not yet made the transition from the stone to the iron age is shown by the large number of stone and bone implements still in use among them at the present time. Many of the old conservative men still cling to the habits of their fathers, and believe that stone arrow and lance heads possess virtues that makes them superior to those made of iron. They still teach the young men the art of chipping flint, and over their work tell them of the happy days before the white men came to drive away the whales and walrus, and when food was always plenty. An old man, when asked what he would do without the things the white men brought them, answered it would be very hard, and then to show us what he could do he showed a pair of boots he had on, and told us with great pride how, when his boots gave out while hunting, he killed a deer, made a needle from a piece of his bone, thread from the sinew, and made himself a new pair of boots from the skin, and asked, Could a white man do that? In the spring of 1883, when they came to prepare their boats for whaling, they decided after many grave debates that the bad luck of the previous year was owing entirely to their having equipped their boats with white man's gear, of which they had abundance, obtained from wrecked whalers; so it was decided that they would go back to the implements of their fathers, and the old ivory and stone harpoon and lance heads were brought forth and repaired, and that they took one whale was attributed entirely to this change; the fact that the whale was killed by a shot from a bomb gun we loaned them to the contrary notwithstanding.

From the head of Kotzebue to the mouth of the Mackenzie there is not found any timber of any size indigenous to that region, and the Colville, Ik-pik-pûñ, and Meade River bring down no drift of any size, only the arctic willow. The drift cast up by the sea consists chiefly of spruce, birch, and poplar; it often comes ashore with the bark and roots intact and but slightly water worn. That this drift comes principally from the Mackenzie is shown by the fact that it is found in great abundance to the eastward of Point Barrow, while to the west of it not so abundant. We occasionally saw large trunks of trees, from two to three feet in diameter, stripped of roots and branches, generally of cottonwood, which seemed to have been a very long time at sea. What little drift we saw coming from the westward was always old.

The streams that have their source in Meade River Mountains bring down no drift larger than the arctic willow, and we saw no drift along the arctic shore that resembled that from the Yukon, found along the shore of Norton Sound. The natives in the vicinity of Point Barrow are always on the lookout for pieces of drift wood, and every piece that can be utilized in building hut or boat is at once marked and placed above high water. At leisure they work them down to the size required, stick them up so as to show above the snow in winter, when they are hauled to the iglu and placed on the cache. It is often a work of from three to five years to accumulate enough timber to construct a boat or iglu. Every cache shows a store of neatly dressed sticks, that are highly prized, and that have a commercial value.

In the small inlets along the coast drift wood was found from ten to fifteen feet above the highwater mark of the sea, and at first we were led to believe that such drift represented an unusually high tide, but we subsequently learned that it was caused by the heavy ice pack, which, in the winter, is forced in on the land by the violent gales, and makes a dam across the entrance to the inlets. The water from the melting snows in the spring fill up the inlets and finds no outlet until it overflows this barrier, when, running down rapidly, it leaves the drift high above the sea level.

These openings, seen in the early summer, have often been mistaken for the mouths of rivers by people passing on ships. It is very doubtful if this vast stretch of country contains anything that will ever render it of any commercial value to the world. But on our voyage south we were struck with the fertile appearance of the Aleutian Islands where we halted for a few days to repair our vessel. On the island we visited, though late in September, we found a luxuriant growth of grass still untouched by frost. All the islands we saw were high and rolling, intersected by beau-

n. 1r

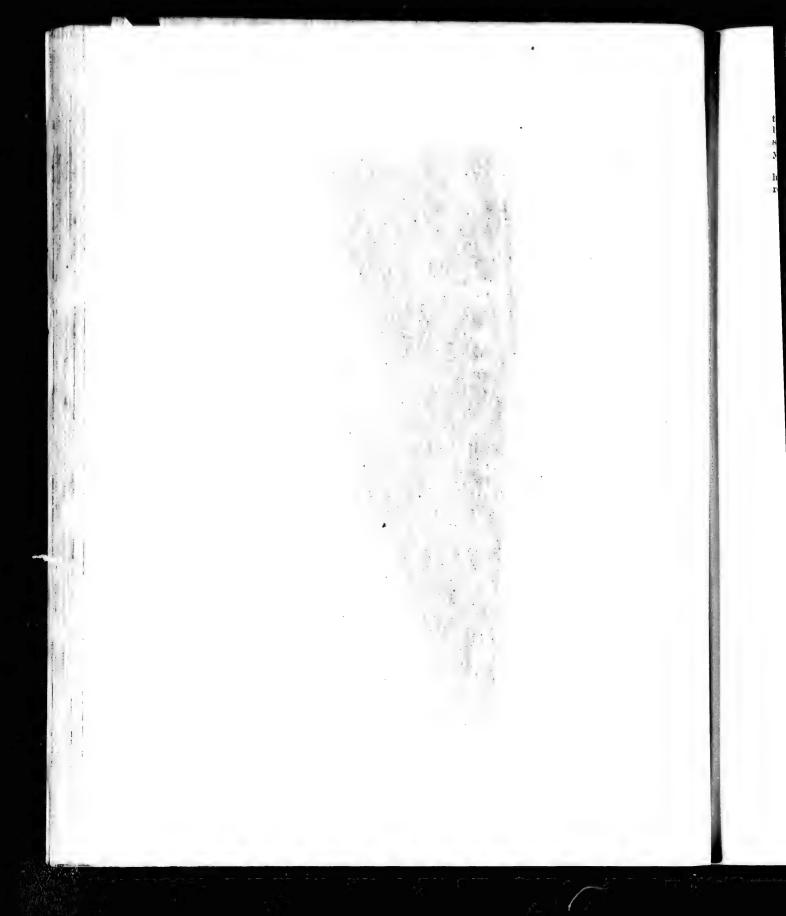
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tiful valleys, watered by streams that abound in excellent trout. They were destitute of timber, but we could see no reason why they should not be valuable as grazing lands. The climate is similar to that of Ireland, and in about the same latitude; the lowest recorded temperature in seven years is -6° F., and the annual mean is.

The great Japan current gives to these islands a climate peculiarly mild and equitable for so high a latitude, and I think a careful geological and geographical survey would develop valuable resources.

# П. APPROXIMATE CENSUS OF ESKIMOS AT THE CAPE SMYTHE VILLAGE.

 $[\,\textbf{E} \text{ach brace includes one household.} \quad \textbf{A} \text{ dash indicates that the person's name was not obtained.}]$ 

Man.	Wife.	Male children.	Female children.
Nik-a-wá-a-lu. O-we-t-nii.	At-kak-sa.	X li Friend	Nět-th-půň.
Pú ků. A-ka bi a-nă. (Pt û ma-lu, deceased.) Tu-ga*.	Yelfeli lu. A lehin mi. Mu man i n a	Seek a-bwu'n d.	Yu kû/l-ya lu.
Xm-ni yú ná.	1 Seek a bwat 3	management of the same of the	
Kal-yá-ná.	A. Chark, g i ca. mother in law a Sa, wa uyo a.	figuen.	1
Túã-a-zu.	Ak egut ta-	An and wight	
Aftenfelle sile	Parsi myń.		Mûl-i-gi-á-na.
A-bu k ka mia Ai'-bwnk.	Mù t u-mi ä. Fau sen d.	Mûn t k sá.	Same 1- Arteriate
Taú-yu'-ä.		*******	
S I-gu-lá. Kú-ma-sia.	An an bw ; i. I dro.		
Ak-qlá nii.	· Al adi.	Ketyb.	
Σ A ñ 0-1 a.	Nink sa tii.		
To kû. Pennaŭ (d.		Ke pi ira su.	I deregů tisk I genisbinsk
U ja lu. Võik sa.	În xu xu u â Au tug â ta:	I ta que	i geni innen
Ligado frada frontinola, Municiadu, A pandono, Udubwega,	Ka-ka gu-nā. Ku na na. A ke b h y h		Perioder-In.
Aŭ oraja.			Ter vg'du.
Nû g-0 10. Tu/k-a lûñ.	i Suk sa mi.	În yn ti a.	, Pe ga edu.
(U-já h	Tüok qlüü.		Nu-ta.
Š Ýn wrī a lu. Yn-wai a lu.	Al a b. Al a b.	Ku ná lu.	Ki fi a lu-ku-ná.
N1 2 1 0.	24 1-41 114	Kıñ ia.	Ad-wû'n-ii (adult)
Adyam da		I'm yn ti di	, , , , , , , , , , , , , , , , , , , ,
1	Ku-si ban mi.	,	
Siesand. Aice a.	Tau pa-na.	In the	Kud ki-lu.
Sh who in		Kok'da.	
Ady) grá.	Ú su.		Kib vä.
Kug ran ta.		Ko-ko-lê'n a.	
Käx-yo-b o ä.		Pûn-1-y û-nii-y u.	
(Näga-wau-tä, deceased.)	Mû't-u-mi ii (wife's sister).		
Ne't-u-na.			
A-bà k-ka-ná.	A-no-u.		i
A-múp-ka-ná.	Name and Administration of the Control of the Contr		1
Ka'k-ak-pa. Ad-11-gaud'-lo.	Ni'p-plii.		1
Pan yú-nä.	Ku-pi-dro.		
(Ne-ca'g-a-lo, deceased.)	A tuñ trai. Ni-yu-t-sû'n-ii. Tuok-qluñ. Nu-sytñ-trai.	Is-Y-gai-û'.	

Totals: 45 men, 52 women, 27 boys, 14 girls; in all, 137 souls.

# MEASURES AND WEIGHTS OF THE ESKIMOS OF CAPE SMYTHE AND POINT BARROW.

[Collected by George Scott Oldmixon, acting assistant surgeon, United States Army.]

No.	Name.	Age.	Hei	ght.	Weight	Occipito-frontal circumference.	No.	Name.	A <sub>i</sub> te.	Heig	girt.	Weight	Openpito-frontal
2 Ai 3 Ai 4 U. 5 U. 6 A 7 Su 8 Ta 9 Yi 10 No 11 No 12 Ti 13 Yo 14 No	MALES, red nii noovii. " Dig tentik si ja dit na li nii ja dit na li nii ja dig na li li li li li ja dig na li li li ja dig na li li li ja dig na li li ja dig na li li ja dig na l	30 . 65 33 40	F7. 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	In. 6 71 7 7 1 1 2 7 7 1 1 2 7 7 1 1 2 7 7 1 1 2 7 5 1 2 7 5 1 3 1 3 1 3 1 3 1 1 1 1 1 1 1 1 1 1 1	Lbs. 161 182 126 112 171 186 146 145 156 150 140 143	10ch. 23 22 22 22 22 22 22 22 22 22 22 22 22	43 44 45 46 47 48 49 50 51	MALES.  L-péak-at-na.  A tint-artrit  A paid-tyle o  Null 100  A ba karani  FEMALES.  Ni ak satrit  Pu satanytu  Micanini-t na ba	45 30 45 30 27 19 38 25 20	FY. 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		Lhs. 168 160 160 154 147 144 187 166 149	21   21   21   21   21   21   21   21
15   Ai 16   A- 17   A- 18   bt 19   A- 20   U- 21   Ni 22   Ni 22   At 22   At 23   Ni 24   Mi 25   Car 26   Car 27   U- 28   U- 28   U- 29   Ai 30   Ai 31   Ni 32   Ai 33   Ai 34   Tai 35   Ai 36   Ai 37   Tai 36   Ai	warms in bewinn in bewinn in indicate i	40 28 40 40 40 40 40 40 40 40 40 40 40 40 40		0 0 5 8 2 5 5 2 3 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 5 2 5 5 5 2 5	1455 1655 1675 1564 1770 1544 1770 1614 1614 1614 1614 1614 1614 1614 161	201 201 201 201 201 201 201 201 201 201	1 4 4 4 5 6 6 7 7 8 8 9 9 10 11 12 13 14 15 16 17 18 19 22 23 24 5 26 27 8	Michael Marchell Asilominia Marchell Asilominia Marchell Marchell Asilominia Marchell Marchell Asilominia Marchell Marchell Asilominia Marchell Asilominia Asilominia Marchell Asilominia Marchell Asilominia Marchell Asilominia Marchell Asilominia Marchell	26 25 35 40 65 25 25 26 28 18 27 28 28 29 20 40 40 40 40 40 40 40 40 40 40 40 40 40	55054445555554455445544	13 10 10 10 10 10 10 10 11 11 11 11 11 11	139 128 172 130 100 124 152 154 147 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 127 148 148 148 148 148 148 148 148 148 148	200 21 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

#### Estimated.

Average height 5 (t. 2/1) in.	
Average weight	
Average height of males	
Average height of females	
Average weight of males 153 ; 1bs.	
Average weight of females	
Tallest male	
Tallest female	
Shortest male	
Shoriest female 4 ft 64 in	

### III.

### FOCARULARY COLLECTED AMONG THE ESKIMOS OF POINT BARROW AND CAPE SMYTHE.

[This vocabulary is arranged according to the schedules given in the second edition of the "Introduction to the Study of Indian Languages," by Maj. J. W. Powell. The alphabet (which will be found on page 37) used in writing the words is that given in the same work, with the addition of the character of for the sound of the French su. A sound indistinctly or occasionally heard is put in parentheses.]

English.	Eskimo.	English.	Enkimo.				
Per	#ONA.	Parts of the body—Continued.					
1. Man.	ล์นิ-นท.	39. Shoulder blade.	ki-a-si-a.				
2. Woman.	añ-na. añ-nul-yo-kwák-to, -să.	40 Blank					
3. Old mau.	an-nul-yo-kwak-to, -sik	41. Breast of a man. 42. Breast of a woman (mam-	i-bi ir fi-ni-ii, střt-ka.				
1. Old woman.	a-ko-ak sa.	42. Breast of a woman (mam-	mi'i u.				
5 Young man.	ni-mu-yo-awan-io, -ma. no-ko'i sa. no-ko'i piā.! ni-viù k si-n. ni-viù piā-ru.!!	ma).					
6. Young woman. 7. Boy.	ni-vi fi k al-a.	43. Nipples. 44. Hip. 45. Belly.	mudr' go. muk lod.				
7. Boy.	na-kut pi á ra. *	44. Hip:	múk lesá.				
8. Girl.	ni vi-uk sa-ru.3	45. Belly.	nád-dra.				
II. I bill, able to walk.	muk gauk-to.	The Navet.	kūtasia.				
10. Child, creoping.	pa-mok-tu-a.	47. Arm.	tud It a.				
11. Intent, nursing.	inúk-glúk-to-a yá, an-a tPk-sa.	48. Armpita.	tifi a. ák-sátt kwa.				
12. Male infant.	100-1011 K-80L	40. Arm above elbow,	ák-sátt kwa.				
13. Female infant.	an-nu'k-sa.	50. Elbow.	i ku si-a. Yu-ni buun, nub-gu- <b>h'fi-a.</b>				
14. Twins.	nn-neksu, mād ri fin, mād re-ru 8, A-no- kā t-i-ge, ū-tica,	öl. Wrist.	Then brun, nubegu u'a-a-				
	Ku tage.	52. Hand.	á drí gal. túl ú k pl-á. saú ml á.				
15 Married man.	ú-lii a,	53. Right hand.	túl-ú k pi-ä.				
16. Married woman. 17. Widower.	no-ji 6 6-3.	54. Left hand.	surice grafities				
17 Widower.	1111 H H K 80.	55. Palm of hand.	I t u ma.				
18 Walow.	mi neuckesiin, iteleffet keto.	54. Left hand, 55. Palm of hand, 56. Back of hand,	a-dri gan tu-nu-a.				
19 Bullelor (old).	nu nege t-to.	or, Pingers.	Yn yn gai.				
20 Maid (old).	H-W1-20 I-10.	os. Immb.	Kub di.				
21. A mother.	ou-mara.	59. First finger.	tik i tati'k a(b.				
20 Maid odd). 21. A notfuer. 22 The young people. 23 A great tabler. 24. A silent person. 25. The f. 26. An active person. 27. A lazy person. 28. A fair Eskimo. 29. A same.	u-natural Al-Kun.	ast, fught hand. 34. Left hand. 35. Paim of hand. 36. Back of hand. 36. Back of hand. 36. The largers. 46. First finger. 46. Second finger. 46. Shad finger. 48. Small finger. 49. Finger hall. 41. Knuckle. 46. Finger hall. 46. Knuckle. 46. Finger tips. 47. Rung. 48. Leg. 49. Leg. 49. Leg. 40. Leg. 40. Leg. 41. Knuckle. 41. Shade below knee. 42. Leg above knee. 43. Calf of the leg. 44. Shade below knee. 45. Shade of the leg. 46. And below knee. 46. And below knee. 47. Shin. 48. And below knee.	ka bi kajim.				
24. A EFGH THREP.	in Burn III-Fil.	or, I find linger.	mik i l yo-ta				
24. A sucht person.	1-mun ) a K-to, ma ki mayi-tu a.	62. Smail inger.	ym-km ko.				
20. Little L.	праналикано.	ns. ringer nan.	KII KIII.				
26. An active person	August 1 - August 11	64. KINICKIE.	hab yu din.				
24. A BEST DELEMENT	YHE THERE PHEAL	05. Space between knucktes.	na nk si				
29. A name.	an an e cyn a.	or Pager tips.	nu nu i				
wife an architect	or in the	da Lora	11164 1 (1.				
	1	60. Lag abasa kasa	III MIII d				
		To Kron	ROE DA.				
Parts of	the bodu.	71 Know min	SILE WILL				
		71. Lor bolow knoo	BILL K.W.				
		73 Calf of the les	male and mi				
1. Head.	ni a k-o ä.	74 Shin	Lab. A				
2. Han.	nu t ve, mi't ko.	75 Ankle	stest û pe riû, stû ni û'û nê.				
3. Crown of the head.	nu yu g i a.	76 Ankle hono	Lower to				
4. Scalp	ki si a.	77 Insten	ka ni				
5. Face.	ki-na.	74. Foot.	t's i gai				
6. Forehead.	Kau.	79. Sole of foot.	steach ne rìù, siù n <b>i d'h-në</b> - ku m a. ko ni. L's i gai. al u a, al u na. kt nomi i				
To ENC.	1-din.	80. Heel.	kt nami a				
8. Pupil of the eye.	tu K-u-vi-a.	81. Toe.	no to co a 5				
9. Evejash.	Kim mer id ve n.	82. Large too.	but to gains, tod. M.A.				
19. PACBTOW.	ka b dub, ka b dud,	83. Second too.	the trains				
11. Upper eyend.	kan a, ir-tip-kod-la,	81 Third foe.	mil. Il.va ri 6				
12. Lower cyclia.	fr-ri bu't a.	85. Fourth too.	vinkant ko				
1. Head. 2. Han. 3. Crown of the head. 4. Scalp 5. Face. 6. For chead. 7. Eye. 8. Pupil of the eye. 9. Everasid. 10. Everasid. 11. Lower cyclid. 12. Lower cyclid. 13. Ear lule. 14. Far. 15. Per footation in ear. 16. External opening of ear.	а-кт-а go-а, ра-wа.	72. Leg below knee. 73. Culf of the leg. 74. Shin. 75. Ankle. 76. Ankle. 76. Ankle. 77. Foot. 77. Foot. 77. Foot. 77. Sole of foot. 80. Heel. 81. The. 82. Large toe. 83. Second toe. 84. Third toe. 85. Foorth toe. 86. Foorth toe. 86. Reond. 87. Hood. 88. Hood.	al u a, ai u m. ky n.mi a. nu tu gu a.; pu tu gu a.; pu tu gu a.; tik i mi <sup>4</sup> mi k 11-yo ria. <sup>6</sup> y mk-ut ko ; ku kin. m.				
H. Ear.	arm, pr. aru-tin.	67. Blood,	au. tu k-kūń.				
io. Periolation in car.	purtual	68. Vein or artery.	tu k-Lúñ.				
<ol><li>External opening of car.</li></ol>	ono an a.	89, Brain.	kax za.				
17, Nose. 18, Ridge of nose. 19, Nostril. 20, Septum of nose.	K1 II-B.	87, Blood, 88, Vein or artery, 89, Brain, 90, Bladder,	na kasurn), kā pis i y ũũ tĩ, ứ ma ta.				
ie, mage of nose.			ka-pis-t-vana.				
19. Nostul. 20. Septum of nose. 21. Perforation of septum of nose.	Kill till.	92, Heart. 93, Kidney. 94, Lung. 95, Liver.	ú ma ta.				
20. Septum of nose.	pi-tu-ta, ku'k i vi a.	93. Kidney.	Tak til.				
21. Perforation of septum of	pa-tu-ga.	94. Lung.	pú-wi. Uń-u.				
now.	. 4 1 /4	95. Liver.	11' ñ - n .				
22. Alae nose.	at-kát-vu.	98. Stomach.	a.kó.a.vo				
23. Check.	yfők-sa. kú-kúg-lú-é-tín.	97. Rib.	tud li mud tiu.				
24. Beard.	úm fyln.	98. Vertebra.	pi k-kwin.				
10 31	um nym. kan-a-	99, Spine.	pi k-kwin. ku-ya-pi k-kun.				
26. Mouth.	u-mi-drú-in, úm-ni.	100. Sternum.	strk i tili til.				
os tomorlio	ket alas	101. Claviele.	kú tú à.				
27. Upper lip. 28. Lower lip. 29. Tooth.	kak-qluñ. kTg-u, ki g-u-tai.	102. Humerus.	ák sat-ko (a).				
29. TOOLB.	kt'g-u, kt g-u-tai. ó-ka.	103. Femur.	kūk-tu-ā.				
so, rongue.	O-Mit.	104. Radius and fibula.	a-mt l-va-růň.				
31. Saliva.	nú-wa, mi'-wùñ.	105, Ulna.	sûk-Pb-ru-ta.				
32. Palate. 33. Throat.	kī'l-ta, u-kaú-ra. túšk-qlu-ra.	106, Foet-print.	tú min ! pl. tú mai.				
33. Throat.	tuak-qitt-ra.	107. Skin.	á-mia.				
34. Chin	táb'-lú-a. kuñ-a-si-na, kāk-ča-lu. tup-kú-ra.	10s. Bone.	saŭ nii.				
35. Neck.	Kun-a-si-na, kāk-éa-lu.	109, Intestines.	i-na-lu-tiñ-a.				
36. Adam's apple. 37. Body.	tup kú ra.	110. Penis.	it su, u-sit-it.				
37. Body. 38. Shoulder.	kā-ti-gal. tu-in-yā, twi-twi'n-yā, nīg ā-	93. Stomach. 97. Rib. 98. Vertebra. 99. Spine. 100. Sterman. 101. Clasticle. 102. Humerus. 103. Feaur. 104. Radius and fibula. 105. Ulna. 106. Foet-print. 107. Skin. 108. Bone. 110. Penis. 111. Vulva.	út-yu.				
or spoulder	tu-m-va. twi-twin-va. nic a	110 131.4	yá-kít-kai.				
	blu-a.						

<sup>1 &</sup>quot;Youth."
2 Dim. of "youth."
5 Dim. of "young woman."
5 Same as nose.

 <sup>51&#</sup>x27;n-yu-gai toes, = fingers.
 6All natives do not give names for these toes. These correspond to the names for the fingers.

# EXPEDITION TO POINT BARROW, ALASKA.

### VOCABULARY COLLECTED AMONG THE ESKIMOS, &c.-Continued.

English.	Eakimo.	English.	Enkimo.
Drenn ttat	ornaments.		and Utenzils.
1. Can attached to freek	t tour A	1. How of a out.	nist kat
1. Cap attached to frock. 2. Tume. 3. Outer tunic. 4. Inner tunic. 5. Kucc breeches. 6. Fur socks.	, a ti ge.1	1. How of wood. 2. Fowering. 3. Sinew on back of bow.	c pi-zi k-si. nu-kā k ta. kā k u-tai, kām-ni-gai.
3. Outer tunie.	ka tu ru a	3. Sinew on back of bow.	ka'k u-tai, kam-ni-gai.
5 King handloo	ka k si Hw.	4. Arrow. 5. Note hin and of arrow for	Az elu o.
6. Fur socks. 7. Pair of moreagins, reach	a luk sin	busystring.	
7. Pair of more saites test li-	ku acuatik	6. Noteh mend of arrow for	itero.
the to knee 8. Pair of moccasing reach-	an tack alto f	arrow head. 7. Arrow head of stone.	ko kin.
the to know water proof.	An war widenes.	8. Attoy head chipper	h) at li(x).
B. Shries.	ki b lu a tyrä. 3	imade of horn &c).	
0. Woman's moccasins.	ku m mun.4	9 Posta et arrow head.	l'g ni ä.
l. Girdle 2. Rain frock, of walrus gut.	a. In not 2	11. Arrow teathers.	su hi tu.
3. Mytens, deerskin. 4. Mittens of bearskin. 5. Gloves.	are leaf to	12. Quiver	pi zi k-si-zaq.
6. Mittens of bearskin.	s preadult.	13. Quiver from	mo n nau ta.
t Elankot	BULL OF THE	15 Wat club small.	to gradien.
7. Robe of deepskin.	n 1 20t.	16 South a short	tu bilu kun.
· Buckskin.	yea 61 yi kua.	<ul> <li>17 1 5 spinor.</li> </ul>	kak i bu a.
Filinge of skin.	to kin a.	12. Died datt.	пи уа к рав
. Thread of sinew).	13.10	a to Bear lance.	pu'n-116.
4. Mittens of bearskin. 5. Gloves. 6. Elanket. 7. Robe et deerskin. 8 Buckskin. 9. Sinew. 1. Thread of sinew). 2. Print: black lead. 5. Tattoo marks. 6. Pouch. 6. A ting. 6. An earring. 6. Lakiet. 6. Barchead. 6. Nuked.	hil it iib.	1 21 S. Therpoon (stabbing).	, it h0,
i. Tattoo marks.	tale facilitina	22 Head of same,	nati lit.
A ting.	ka tu k ale ma.	24 Loos shaft" of sans	1 - 21 - 10 ().
An earring.	roces in.	<ol> <li>Fore short of same.</li> </ol>	ka tu.
Lathret.	ta to	26 Wo sien sterft of same,	t-put it.
L. Date feast.	received in strink to.	28. Ivory see pick of same.	111 11 to 1111 to
). Naked.	mat tak for	23. Scal barpoon darting.	n in h-gû.
		39 Ne work same.	nad tu
Dwell		54 Stort 10090 Spirit 01	i gi-mu.
		6. Note in coal of arrow for arrow head. 7. Arrow head of stone, 8. Arrow head of stone, 8. Arrow head of stone, 19. Arrow head of stone, 19. Arrow heathers, 10. Arrow beathers, 10. Arro	n ku mat lo-ta.9
. Village. . Wigwam (permanent dwelling). . Doorway.	creva at tak to a gladon.	1d - Attit .	
. Wigwam (permanent	1.2 los	at tong wooden out of	i por n.
Describe	0.0.1.1.1	G. Leshing of same.	tim-va.
. Wooden trap-doorway.	Late fin	36 Tyery it or a k of same.	for the
Smoke hole,	prevo ko vra jegatok lac	28 Property for the of same	leader hwin.
. Pire-place, Fire	1 24 7 24 100	29. Bone se I spear head.	5 lt guk.
Fire-wood.	kim na taskin.	10 Read of within harpson	f a list.
. Blaze.	ka to in 1 sit a.	42. Br. d of same	1 (21141)
Living confa	hand ture	43 Poke for stine.	a -o-tu k-puñ.
Dead coals.	ki i.i. to.	41 Line or cope.	. ե գիս ոս.
. Ashon.	kanj ni u mana im.	White of stone.     White of stone.	at viini lega.
Smoke,	1 wilk.	47. Wossan's found knotes	e la tal
Poker.	tg ma kun.	4 Sling.	1 1 106
Bench or bed-place.	ig la-re, r'g li sin.	1 49 E41d hollow	kelan-wi-taú-tin.
A post,	if kea run.	51. Large skin boat.	nemisi (k).
Roof.	ki li stů.	52. Paddle,	âneun,
Wall.	kut-ye.	23. Long v wooden shaft of star of sta	na-pak-sú.
Short beams below win	In it-kaŭ-rún.	55. Harpoon rest.	kara-na.
Opening for window	Leads.	of. Cantren made of scal skin	i na tin.
Window-frame.	l gada. Kon tin. Li ktin.	57. Uish line.	ipiruda.
Window-stretchers.	1 i ktm.	59. Fish book	ta le sin, i'nkalan.
Floor.	nun i k si, nat-kylů.	60. Net for catching fish.	Sa portin.10
Opening for window. Window-frame. Window-stretchers. Window-skin. Floor. Pole hung up for drying clothes.	Emay With	61. Pipe.	ku cu-ya.
clothes. Frame for same. Lower frame for same.		63. Pipe stem of wood.	nica, sicuena.
Lower frame for same	totalia.	64. Sledge.	ka m o-tin.
	tu pek.	65. Flat sledge.	u ni L
		67. Scal dart	a nun.
Snow house	St-ne g-Wi.	68. Snow-shovel.	pi k-sun.
Little house.	rg lo vu, ig lú-ril.	ot. Camben made of scal skin 57. Fish for sen het. 58. Fish for sen het. 60. Net for catching fish. 61. Pipe. 62. Pipe of stone, 63. Pipe. 64. Stone, 65. Flat sledge, 65. Flat sledge, 66. Dog harness, 67. Seal dart. 68. Snow-shovel, 69. Walrus harpoon.	u nak-pûk.
Little tent.	si ni gewi. n-pu-ya.? Igalo yu. Ig hi-ril. tu-pe k-o-yu, au-ruk-th, ka lox- win. sud li yw)h. tu mai-kûn. u ia ruh.		
Sewing-tent.	and h va)ō.	Woods	u ware.
A ladder.	tu mai-kûn.	i	
A stone.			
Water.	tim cak 80 iD.	1. Cup or dipper.	1' mo-syn.
	ap-ko-át-tii, kai-nìt-tin.	1. Cup or dipper. 2. Meat tray. 3. Bowl. 4. Fire-drill. 5. Bucket.	i' mo-syû. jedi-bi-ä, nû/l-u-In. pi t tiûi-o. ni-o o-tin. kut aû-ä.
Trait or path.	ap ko-tin. it-s)-bau-tin.	4. Fire-drill.	ni o o-tin.
Soar, chair.			

<sup>1&</sup>quot; parka," Russian territory.
2 Lit. "scalskins."
3 Deer, or scalskin.
4 Tronsers and shoes in one pieco.
6 f. sil2, "weather."

<sup>6</sup> Also of dogskin for children, 7 apun = "snow," 8 "Shaft" in general, 9 "Weight."

### FOCABULARY COLLECTED AMONG THE ESKIMOS, &c. - Continued.

English.	Eakimo.	English.	Eskimo			
Wooden w	are-Pontinued.	Numerals—Card. a	or regree Configured			
e. Tub (large). 7. Tub. 8. Tub. 9. Tub (urinal). 9. Of tub. 4. Deepdish for cooked me		11. Penricon 12. Entro) 13. Twent 14. Twent 14. Twent 15. Thirty 15. Thirty 15. Thirty	a 'A BBAF of and Minor'  1 to a  1 to a do gli  1 to Ado gli  1 to A			
Stine	implements.	17. Forty	total turn visin a			
E. Adze. J. Korte point, J. Knife e Ige. 4. Scraper. 5. Borer.	nd trum ig tra, kian, i kur i tau, i tig et san,	16. One handred. 19. One half 10. All.	e l lt um bapfal. nu bac. nu k w c.			
Curved Laite for wood, Curved Kalle for Every, K. What bone took 9. Lamp.	FEET 06 1131.	1. One.	enceson, "How many U)			
0. Bridge or partition i	n na po tiá.	2 1 0 0 2 11 res.	h - 1 to their			
1. Blubber stick for Lamp. 2. Keytle 3	P pi k tim. ut ku zu	4. Font 5. Five 6. Len 7. Filtern	To Design the Control of the Control			
I tensilie of all	tell, horn bene, de.	8 los carv? 9 A restrany.	k to strong a madrek turki %			
1. Horn cup. 2. Horn buile. 3. Fessil iyory dipper.	fine av 6 left estritt. Left wilder neue 2	Dicken of time				
a. ressurvoy upper. b. Ivorvoileum. b. Ivorvoileum. b. Ivorvoileum. b. Bow drill of bone. b. Drill bow. b. Prill month piece.	kilig wiig n-ro. * o ho ywin ussemi ni a k-tun pi yik su ki a mi a . *	1. A mee b 2. Fourth quarter of moon. 3. Window. 4. Summed 5. One winder ago.	to t kun a-taŭ 29k. Per ta Sal, to a. II Fro. II Ji Odesia, II-re			
	Perd	<ul> <li>C. Two winters ago.</li> <li>Night.</li> <li>David.</li> <li>Santise</li> <li>Dr. A.</li> </ul>	n kiso si bwa a nh. ta ag' hi. sah, un yak paun a.			
1 Food neat, 2 See, 3 Mode 4 deacetre (*) 5 Whole skin, 6 Juliet of an at cooked, 7 Whole segme	n toké, u ri vyra rita kő, i sham uk le mi, ma kkitak, u rim, ma ma, a kayta,	10. 10. x before day before the edge. 12. Lay before yesterday. 13. Yesterday. 14. Too. 15. Too ballow. 15. Too ballow. 16. Dec. after to morrow. 17. Dec. after day after to 1100.	riporti. is ha? k pû k-sa. a roch wan, añ a h a nii. kua na an. i bla so. ik pa k sa. is la.?			
		Ds. Now adverb).	to dwa			
t. Black, 2. Blac. 2. Green, 3. Red.	v lock. mañ-a'k tu il u mu dradstu il, kaŭ ma ru-il, u mu dradstu il, kaŭ ke kousil, kasnak tu-il, i	18. New adverb. 19. Pass time cadverb. 20. Future time (adverb). 21. Anciently. 22. Widen? On past). 23. Who i? On future). 24. Anciently. 25. declyshins into sew. 25. declyshins in be sew.	ni på ni. 14 ni v.i. ko.!! a dr. i ni. ku e il ! Ki-ko go ! sud li v.wtñ.			
5. White, 5. Yellow, 5. Spotted,	pi sa. ka-tû k tud. ka murea su 14-yu û. rûg-lû k tu û.	1 ing tent. 26. Dark winter moon. 27. Moon when sun returns. 28. Moen to start deer-hunt-	i dásen-gä-ru. kai-bwi d-a-wi. aud-lak-to-bwi.			
Numerals-t	ardinal numbers.	ing. 29. Next neon. 30. Whaling moon. 31. Duck moon.	suk ûn-vî su-ga wî, u-mi su r'-bwiñ, sûk sî-lâ by kau ker'-bwiñ.			
	STANTIVE.   ADJECTIVE.	52. The moon. The rest of the year—	yö'g-ni-a-bwtii. "No moon, san only."			
1. One. a-taú zi-fi. a-taú-zi-k. 2. Two. in-pa. indat-to. 3. Three. phi a-yū-ai. pY-a-a sim. 4. Four. s' s-tain. s' s-tain. s' s-tain. ti-tall-liman tù-d.		Animals-	- Mammals.			
L Siv a taŭ tui	li-mut.	1. Bear, polar. 2. Bear, cinnamon (barren	nä' t.u. å k-alak.			
l. Seven. Id i gh l. Seven. mad-re-n l. Eight. piñ-a-sur	norm ackarom n. túd-li-ma. 4 uli. & c, n-lú. & c,	ground).				

<sup>41</sup> mided to 5.
2 "To reduced " \$\epsilon\$ in the first of the first of the first of the number of one."
2 "One in "number," " to the number of one."

And preceding days.
 And succeeding days.
 More than four years ago.
 Lit. "by and by."
 Under five years.

# VOCABULARY COLLECTED AMONG THE ESKIMOS, &c.—Continued.

English.	Eakimo	English.	Eskimo.
Animals-Mam	mals—Continued	Birds-C	outinued.
7. Dog. 8 Dog puppy which can walk.	ki m mev, ki ű műk. kim-mi á tu.	17. Goose (white). 18. Goose (brant). 19. Grouse (white), Ptarmi-	kú ú-o. núg'-lú'g nú, a-kú'd-a-gin.
9. Dog puppy, blind. 10. Ermine. 11. Fox. 12. Fox (red). 13. Fox (black).	ki m nil yu ferd di. kai a'kank. ka na k tu a. kalaina. kui a k tuk man a'k- tu a.	gan. 20. Gull. 21. Gull, Sabine's. 22. Gull, Ross' Rosy. 23. Ivory gull. 24. Gerfalcon.	nai-yā. yūk-kūd-rī-gūg-i*ā. krīf-max-i-lu. nau ya-bwūñ. krd-rī-gūm-iñ.
14. Fox. Arctic. 15. Lemming. 16. Marmot (Parry's). 17. Moose.	terigunia. av whin. sik shi. tuk ta whi.	24. Gerfalcon. 25. Loon (white-billed). 26. Loon (red or black throated). 27. Owl (white snowy).	túd'-liñ. kñ'k-sau. úk-pi(k).
18. Narwhal. 19. Ox, musk.	tu ga hō. u-miñ mau. ka b-we a ti a. në t-yi.	27. Owl (white snowy), 28. Phalarope, red. 29. Phalarope, northern, 30. Pigeon (sea), 31. Plover (black-bellied),	gá-brag. 8a-brúñ-na. séak-bwúk. ki-mi-ón.
Same. Seal, ringed. Li. Seal, ringed, yeeng. Li. Seal, harbor. Li. Seal ribbon. Li. Seal rented. Li. Seal rented. Li. Seal rented.	net yi si ru. ka si gi si. kai xo lin. ug' ru. Fm mea.	32. Plover (golden). 33. Raven. 34. Sandpiper (pectoral). 35. Sandpiper (Bonaparte's). 36. Sandpiper (red-backed). 37. Sandpiper (ced-backed). 38. Sandpiper (semi-palmated).	túd'-bñ. tu-bí ä. aí-bwúk-i.i. koiñ-l-a-lu. méa-ka-piñ.
<ul> <li>Sheep, mountain.</li> <li>Wolf.</li> <li>Wolf.</li> <li>Wolf.</li> <li>Whate.</li> <li>Whate.</li> <li>Whate, killer.</li> <li>Wolverine.</li> </ul>	a-má-xo. ai-bwitk. ak'-bwitk. ak-lo.	39. Snine, robin.	nt-wil-t-wrl-úk.
31. Whale, white, 32. Wolve (inc. 33. Mammoth (fossil), 34. Fuctus,	kile l-vu á. káb wiň. kil Vg -wá. i'-blau.	40. Swan. 41. Skua.	kúg'-ru. 1-suñ-ú. ut-yu-tá-kin. túl t'g-u ä.
. Parts of the budy	. de. of manimals.	Parts of the boo	y, de., of birds.
1. Antlers.	nívg è-ra. sau-ná.	1. Beak, or bill.	si go.
2. Bone. 3. Brain. 4. Claw.	káx-za. kú kiu.	2. Month. 3. Eve.	kañ a. Vd-druñ.
5. Dung. 6. Entrails.	an-na. i na-lu-ún a.	4. Neck.	kó-mo-zin. tu lú-gã.
7. Fat.	úk-suk.	o. Wings. 7. Wing-feathers. 8. Tail. 9. Tail-teathers.	i s-a-xo, r's-a vu lu.
8. Hair. 9. Heart.	mi't ko u-ma-ta.	8. Tail.	súdu. púpskiu časkosko.
10. Meat. 11. Milk.	nía-ke. i'-muñ.	9. Tail-leathers. 10. Logs. 11. Toes.	mip-kwo.
12. Paw. 13. Penis.	18-1-gai'. 11-80-2, ft 80	11. Toes. 12. Claws.	ku-kin.
14. Stomach.	a-ké a-xo.		
15. Skin. 16. Tail. 17. Tendon or leader.	á-mia. púm-l-ú nä. i'-va-lu.		l't-ka. mii'n-ni.
18 Tooth	ki'r n tá.	16, Shell (of egg). 17, Yolk (of egg).	sati-nañ-a. ká-nuñ-ra.
19. Walrus-tusk or ivory.	tú-ga. ó-ka.	17. Yolk (of egg). 18. White (of egg). 19. Bird's nest.	r'k-ti-a. u-glu(n).
19. Walrus-fusk or ivory. 20. Tongue. 21. Testicles. 22. Whale-bone (a "slab").	i g-gru. eu-kûk, eu kai (pl.).	20. He flies.	tin-i-ru-a.
20. Seat breathing hole (in	a(d) lu.	Fi	
Bi	rds.	1. A fish.	yú-ka-lu.
	The state of the s	2. Burbot. 3. Cockle.	fistá lá. sl-u-ti go.4
1. Data.	kaŭ-we. <sup>1</sup> tl ñ-mia. <sup>2</sup>	4. Crab. 5. Lycodes.	kl-naú-ra.5 kúx rau-nä.
2. Auk. 3. Bunting (Lapland)	át-pa. nesgáid lí gá, "nésgáid-lí-ga-	6. Sculpin.	ku'l-ai-o, kû'n-ai-o. if-ho a-nîñ,
	bi ii a man dega, ¦ a maú-lt ga bi-ii, tùt-f-d-ri-gù, tu rá-tu tá, kaù-we, <sup>5</sup>	8. Whitefish.	a nak-qlàù. 
7. Duck. 8. Duck (pintail).	kań-we.3 i'v-wń-gń.	Parts of the boo	ly, &c., of fish,
n. Duck (king).	i'v-wû-gû. ' kt'n-a liñ, γ añ na-bi ä β a-maŭ-liñ, γ eu-gä-lû'k-tun. bg-n'-knuk-to.	1.35-41	1.40
6. Duck. 8. Duck (pintail). 9. Duck (king). 10. Duck (Pacific cider). 11. Duck (Steller's). 12. Duck (Spectacled cider).		1. Mouth. 2. Eye. 3. Gills.	káň a. íd-růň.
	ka-wa-so, of tu-tu-lu. 2 vu/k- il	4. Breast tin.	más-si. nñ-u-taú."
13. Duck (long-tailed) 14. Eagle (golden).	qlu-lu, á-bád-líñ, ád-yf-gi-ä. tVñ-miak-púk.	5. Back-tin.	sit-ka.
15. Finch or any little passe-	sû k-sa-xi ä.	7. Scales.	piim-i-ii-na. kap-i-si.
rine bird. 16. Goose (white-fronted).	n@g'-l@g'-ru-ä.	8. He swims. 9. Claw of a crab.	añ o ák tu ă. pu dja tiu.
1 " Fo	all bird."	*Siu-" ear." Hyas latifi	OUT.
<sup>3</sup> Lit.	"fowl,"	6 From anun	"paddle."

#### EXPEDITION TO POINT BARROW, ALASKA.

#### VOCABULARY COLLECTED AMONG THE ESKIMOS, &c.—Continued.

English.	Eakimo.		English.	Eskimo.
Ti .	wectu.		tisographical no	rmes—Continued.
1. Bec (humble). 2. Barterfly. 3. Fly. 4. Horse fly. 5. More. 5. More. 7. Spider. 8. Worm. 9. Branchipus (aquatic).	t-gu-tyai. 110k. ii-link. 1 co., tük - ii-lük - i- djaksaim. 11-bra-rusi. 1-bgu ta (2). ku-muk. 1-bgu ta (2). ku-muk. 1-bd-rui-rusa. 1-bd-rui-rusa. 1-bt-tum-a. 1-bt-tum-a.	6. N 7. L 8. F 9. S 10. T 11. F 12. F 13. Si 14. Sc 15. Ei 17. W	and below village, south- west.  sext piece of land, and at d rubte largon, and at d rubte largon, below, bird camp below, bird camp below, bird camp below, fifth camp below, xth camp below, yenth camp below, inth cimp below,	A munima.  KPk ku. Nu maya. Seak-qhi ka. Na-ke dali-ya. Ku osang ani Nu ma'k tu ani Ip-persana. Wa'lak-pa. Ermi-yem. Su'a aru. Sa'kaman. Nu-ma'riä, is Sidaru. ii
1. Leaf. 2. Willow catkins. 3. Limb. 4. Body or trunk. 5. Root. 6. Tree, willow. 7. Wood. 8. Small wood. 9. Large wood (timber). 10. A flower, yellow poppy of buttercup. 11. Flowers.	ktú-mé té, kt m-mi-u tu u k kwa té, mű-a, kt/lyen é ta, u k-pu k), kc/an, na-kt/lywä ké rú, ua pak tu, <sup>1</sup> tuket-hrk í ca, & e, <sup>3</sup> naú-ru un.	16. W 20. V 21. Pr 22. E 23. E 25. Se 26. T! 27. Fo	ainwright's luici, ainwright's luict, ainwright's luict, cillage, southwest of the inlet. (2) sint Hope, son Hay, (1) epond at Pern-yù, rat beach lugoon (salt), court beach lagoon (iresh), uitel beach lagoon (iresh), cutth beach lagoon (salt), fith beach lagoon (salt), fith beach lagoon (salt).	Astune, 9 Kibane-bi witi.  Tik e-ra, 9 Tra synk, 9 Kikyink-ta ketu-ra, 9 I meak pu nagalin, 9 St n-nya, 9 Uk pi-ha, 9
Geogra	ohic terms.	29. Si	(goose-pond). xth beach lagoon out station).	
1. North. 2. Northust. 3. East. 4. Southeast. 4. Southeast. 4. Southeast. 6. West. 7. Southwest. 9. Northwest. 9. Northwest. 9. Northwest ward. 1. Eastward. 1. Eastward. 1. Eastward. 1. Southwest ward. 1. Here. 1. Hirter. 1. Wither: 1. Sea. 1. Se	u mani. a kil yuimä mi. kil wami. kil wami. kil wami. kil wami. a wami kil mä. ja mi. a wami kil mä. ja mi. a wami kil mä. ja mi. a wii mä. kil yui mämun. kil wii mämun. kil wii mäkil miä. ja miä. kil yui mämun. kil wii mäkil miä. ja miä.	30. L1 31. L2 32. Fig. 31. L3 32. Fig. 33. Fig. 33. Fig. 34. Fig.	ttle village-ponds. It lever oast of Point Barrow. Text large river east of Point Barrow. Text large river east of Point Barrow (Meade), ind large river oast of Control (Meade), ind large river at Negatives of the Nunataisen	Ku-a-ru, Ku hi-gru ä. Pk pik-piñ. <sup>20</sup> Ta s yūk piñ. <sup>20</sup> Kū/-piñ. <sup>20</sup> Kū/-piñ. <sup>20</sup> Ku/ <sup>24</sup> Nū-(m)a-tōk/ <sup>23</sup> Tū/t-yo, No g a lek/ <sup>23</sup> cal-and other physical phenolipets. a.no-wi-é k sa-xo, nu-bū/s/ia-bū/k lu-ä.
Point Barrow and village     Summer camp, Flson Bay     U. S. signal station.     Village at Cape Smythe.	No mul. 7	B. 11.	ion, ilt moon, ilf-meon, escent moon, ars,	su kunyanyi turing lukdu ä. navakdo. aun tyu a.? uglii ri ä. neglii-ri-ä a-nak tu-ä.
2 ·· Little † 4 ·· Puppie 4 Cf. na-pá 5 Samo as 6 ·· Water. 7 ·· Tho Po	S. "(f) ssi, "mast." [butterfly." int." o of lagoon, ifs." supply		1) Island 14 Big wat 15 Big wat 18 Shoestr 19 With hi 19 The Sec 21 The Gre 22 Great e 23 The kr 24 The kr 25 The kr 26 Googeb 27 Litt. th	ter, too." or." ing." (2) gli banks." ond Kuāru." cat Cliffs." nelosed water." cat River." cort."

## VOCABULARY COLLECTED FROM THE ESKIMOS, &c.—Continued.

English.	Lakimo.	English.	Eskimo.
	nt -Continued.	Social org	ganization.
12. Autora, 13. Rambow,	ki odoya.	1. E-kimo.	l n yu.9 ka bhu na, tá'n fiyin.
13. Rambow, 14. Fog.	n' g c tu k te.	2. White man, 3. Negro.	tak sepun.
15 Hour fr est.	si no mig è ru k to.	The following are local design	ations, signifying men of suc
<ol> <li>Spicy,</li> <li>Palling snow,</li> </ol>	p.10. Ket L. 10.	and said	
18. Drifting snow. 19. Had.	to great ko sak to. s. ko.	1. Point Barrow. 2. Cape Smythe.	Nu-wa n-me un. Ut la av-wa h-mé un.
20 100	s. ho.		Si di Tun ménti.
21. Teacle. 22. Water,	i maka mak.	5 Kilab da Wiii	Kan ng un. Ke au t ta wiji ng un.
23. Deeb water.	i t 1 ta i l, i to,	4. River Ku 5. Kil at a ta win. c. Peint Hope, 7. Potlar [h]cl.	A.A. c tan me un. S. la we femesun.
<ol> <li>Stailow water.</li> <li>Image reflected by water.</li> </ol>	1.1 ((), D		Learner to the 1010
26. Found.	ka pak-qlu. ma l lai, mû l lûk so.	9. Na a take and Celville Revers.	
26. Foam, 27. Wave, 28. Carrent, 29. Northeast current,	such both.	19. Months of Mackenzie	Ku pû û mê tu
30. Southwest current.	ha tah mu prio ah mi. nu tah mu.		na. ics.
31. North current.	hat ten na.	11 Between Colville and	
32. South current. 33. Eddy. 34. Whalpool	this sort in a	Maria nzie.	
34. Whalpool	renden Grah	Macia nzie. 12 - In) and Deyond Colville. 13 - In) and beyond Colville (%).	Lara, ke ti ma ti
5. Overflow of river. 6. Hood tide.	engrica n'a Stata len tuo.		
67. 1285 tide. 88. Rami	len fan. S. I in Recein	(no.	dut d*.
9. Thunder. 0. Lightning.	King has		
41. Wind.	S. Reform	: 1. Capt in of a beat.	u matik.
42. Strong wind, 43. North to east wind,	11 h 1 m i i i 80.		
44. Southeast wind, 45. South wind,	n n Lee Leo. Programme m 200 kd n n n mi	1.:	laten.
6. Southwest wind.		1	
ld. Son-hwest wind. 17. Northwest wind. 18. Whirlwind.	Lancon rd. n va la nd.	1. A demon or hobgoblin.	to u.t.
or. The ground.			
50. Dust or sand flying. 51. Wad	payal so, a cottona.	Mortvar	ic stoms.
<ol> <li>Sand,</li> <li>Sad.</li> </ol>			
53. Sa.t. 53. Sa.t. 54. Rock. 55. Stone (jadelte, pectolite). 55. Co.d.	never to a chiro. Kum lo.	I. Dead body.	r In won.
			take mai, no ne nasimak to?!
7. Scapstone, 8. Pitch.	to the letter with the	*	by a car state was
9 Amber.	201. 21. (	16	wine.
<ol> <li>Eclipse of sun or moon.</li> <li>Earthquake.</li> </ol>	policina. Policina.	alates	
2. Storta 3. Sart	Hara le k půk.	1. He dache	a nun na ptu á.
4. Daubles.	par line	2 To Shahe. 3 A cyd.	krosa komat.
5. Ursa major (tail). 5. Pl. mies.	in a fact a in.	3 A cod. 4. Syphois.	na wak. u su lu ka ro.
* Vi. 10103	salaward li.	5. A boil	a vita.
O. Vega.	a grada bwata	C. A cal 7. A lame man, woman, or	BUSINE LICE
<ul> <li>Altair.</li> <li>Vega.</li> <li>Cassopea.</li> <li>Orion's belt.</li> </ul>	to dean.	5 A Unite boy 9. A Used man, 19. A blind woman,	nu pra du
2. Ice hummieck,	nie alya.	9. A US d man.	ad ir , ad lo.
		11. A de f man. 12. Breath.	a you a ta ä. ta sa ak too
Ken	ship.	12. Breath. 13. Sweat.	an ca sak tu il. Ok nai, ta il.
-		13. Sweat. 14. Blcol	21.11
1. My child!	á pa <sup>ra</sup> pa n i n, pá n-i-gít.*	15. Prime. 16. Dung.	ku, ku-leru ä. kök la, an-na.
2. My daughter! 3. My father. 4. My father's father.	an o ta	17 A medicine man. 18. A medicine woman.	nemak sa. pun th-ú-nã.
4. My father's father. 5. My mother's father	a no ta	ie. A me queme woman.	para m-u-ua.
5. My mother's father. 6. My grandfather!	a ta figu.5	4	ements
7. My elder brother. 8. My 8 ster.	a fish a. To ya da.	Amus	синског
8 My s ster. 9 My younger brother.			a 47/1 for 0.16
1. My father's sister	ata na sa a	1. Song. 2. Dance.	n-tő/k tu ä. <sup>18</sup> - u-a-mi.
9 ally vollager protaer. 19. My made. 11. My father's sister. 12. My mother's sister. 13. My mother's brother. 14. My mother's brother. 15. My father's brother's wife, inches mother's wife.	a fa gat	3. Mask.	ki nan. sa k i-mita.
4. My mother's sister.	an hi titah	5. Dance cap.	ka b 1tt. ke l vau.
<ol> <li>My father's brother's wife, male speaking.</li> </ol>		6. Drum. 7. Whizzing-stick.	Im 12 Ink-tu ä.
inale speaking.  16. My wife brother.  17. A step brother.	nu-li u li d. kut un u-tai. ¶	8. Tectotum or top.	kaip sa, no trg B-gaun.
8. Orphan.	il-i á-ru.	5. Dance cap. 6. Dram. 7. Whizzing-stick. 8. Testotam or top. 9. Bean snapper. 10. Playing sticks.	la pa ta.
der m			
Lit. "hole." 2 "Fire." 3 "Sea."		"Lit. "a human bein: <sup>10</sup> Come to Point Barr	z." ow every summer.
4 Address also	child to parent.	11 Uskimus.	
( Address	cana to parcut.	h Red Indians—" Tin	1117

Address, also child to Address, "Address,"
Nukarin, "brothers,"
Female speaking, bOf a different nation.

<sup>6</sup> Red Indians.
6 Red Indians.
6 Lit. "sleeps on the ground."
16 He sings.

## $FOCABULARY\ COLLECTED\ AMONG\ THE\ ESKIMOS, \S c.- Continued.$

English.	Eskimo.	English.	Eskimo.
Xe ·	er pota.	Number and gender of not	ins-prenouns-Continued.
2. Large barrel, cask. 3. Small barrel. 4. Whilp. 5. Axe. 6. Fron-headed arrow. 7. Nails of metal. 8. Beads. 9. Broom. 10. Button	i me si deru, i me si deru-ruil. i me si deru-ruil. i pi radeli, a matti (without lash), rema tit tu ku'n-ga-ruil. si ki ki'en, teun adeli. ti kasa-ri, ti tasa-ri, ti tasa-ri, ti tasa-ri,	14. One boy. 15. Two hots. 16. Three hoys. 17. Many loys and girls. 18. One dog. 19. Two slogs. 20. Three dogs. 21. Few dogs. 22. Many dogs. 23. All the dogs. 24. One arrow.	nu-kût-pl si ru a-bû-zlk, nu kut-pl si ru ma-bro, nu kut-pl si ru in pl si sa am, nuk, plake bu sa ibih, kira uni mad-rô, kira uni mad-rô, kira uni mad-rô, kira uni mad-rô, kira uni na ba ru, ha ba na sa ibih nuk, be ka ru a ba ru, le ka ru a ba ru, le ka ru a ba ru,
13, Comb. 14, Clock. 15, Knife, pocket. 16, Hammer. 17, Iron kettle. 18, The can or pannikin. 19, Tin fish both.	cuckistal, a tikequin, tife durati, not) kacistin, sok in yau in. yau ark tu, kacisti, kacisti, kacisti, di kacisti, di kacisti, not ku zian jal, so, jak qlak keun, o ya un, u in siletan,	25. Two arrows, 27. Few arrows, 27. Few arrows, 28. Many strops, 29. One stone, 30. Two stenes, 31. Three stones, 32. Many stones, 33. Al the stenes,	pin a sun kules suchin, kules in ket ten il. kules in ket ten il. kules in pinili, oj va tun a taŭezik, ti valekim, pi u isan nj vastin, ili valestin, ili valestin, valestin, uj va va im ona wije.
20. Fife. 24. Saw. 22. Glover's needle. 23. Scissors.	su d li stii, pl.; slug, one blade, su d lin.	34. Mab dog. 35. Female dog. 36. Male scal.	อกับ s 1 ก. อก และ s 1-ก. นักร ออกับ
28. Riffe, Sparps . 29. Riffe, Spancer.	ku l manā, cu, pura manā, a ki mmalinā, sa viv vā binā, kai p susaliā, kai p s., vi u germ.	<ol> <li>Male bearfield seal.</li> <li>Male reindeer.</li> <li>Female reindeer.</li> <li>Female reindeer.</li> <li>This me.</li> <li>Thom.</li> </ol>	Rad (1906).  yu te mus.  ku lan tin.  yu tem.  wuti 5  u ti m-nun.  110 tt  tt ti nun.
34. Powder. 35. Shot. 36. Iron.	Kaka tu-til. * So Vilo.	48. At your "place" house- hold &c. 49. To your "place," &c.	at an a
io. Cap or hat.	Lakeneri' bwih, ne kesa rat, nesaerid, lacti ge, ki memili, keke oda, padan di Litto kesaegur, te abbota	50. Ve. our "place," Ac. 52. To our "place," Ac. 52. Ye. 54. At your "place," We. 55. Try your "place," We. 56. Try your "place," We. 56. This, that, 57. His, that, 58. All this, 59. Who, 59.	on p turn, u a'p turn, u a'p turn, u a'p turn, u bi'p stirah, <sup>17</sup> t bi stirah, <sup>17</sup> t bi stirah, u na o kwa, u na da, ma na u, mfuanahi nu kwaahe, kasa, 'kasa,'
TRIME.	1837 (fl.) fu. kodu. , i a loskskun, tanowak, tan wako, tri ba, t	i ou what what is it.	enouns-transitive verbs.
I. Spirits.	TH'H H	1. I am striking him (now) with closed hand.	ka-ka-ta-rû/ñ ä ú-nä.
5. Door. 6. Pencil. 7. Paper, book, newspaper. 8. Steamboat.	ka-ta-k-dp-run. ki ma-ram, tgak tu en. ki lu-kpuk. 10 k-ka-ra, dp-kwa. mt. p. ra. ki da k tun. 0 mtk p. ra. ki da k tun. 0	He is striking with closed hand.     Lam kicking (him).     He is kicking him.	třígduka, wůtí á aski-gá, ak stucernánii
9. Ship. 9. Ship, "three master," -	n mi k pukt", u mi-a k puk pih a-sun lii-na- j ak sa-liii.	2. He is striking with closed hand. 3. I am kicking chim. 4. He is kicking him. 5. It at little one due k with the sling. 6. He kills duer. 7. He kills duers. 8. He has killed no dueks. 9. Who kills dueks. 10. They kill walenses. 11. He kills acals. 12. He divides into portions. 13. Are you making snow-	lttu ataúteimin kelaultaúti kaowúksímero, tu'k-tu-tu ä, kau-wú k-tu-ä, kau-wúñ-mt-yo,
	er accus-preneaus.	<ol> <li>Who killed the crano!</li> <li>They kill walruses.</li> <li>He kills seals.</li> <li>He divides into portions.</li> </ol>	ki si tutidali-gaŭstitt ni'-bwûkstwûn. nét-yl(b-susi, pastûkstusi,
1. One person. 2. Two persons. 3. Three persons. 4. Few men. 5. Many men. 6. What a number of men!	Un yu natao zik. In yu mideto. pi hasun Yasuu In. in yu ketudin. In yu gi irketudin. in yu kakepa si I-yu!!		ting-it-lu/-lt-bi?
7. All the men. 8. Some men. 9. Yo man. 0. Another man. 1. One woman. 2. Two women. 3. Three women.	my testar post vya: mi kwa t nam ti myngi u'tatu du nayu aitayo. H Yn-yu aita. ai na a-taú-21k, ai na a-taú-21k, ai na a-taú-21k,	1. My hands. 2. I have no tobacco. 3. You have no tobacco. 4. He has no tobacco. 5. Ye have no tobacco.	wû'n-ii a-dI-gat-ka. ti-bax-ot-ait-yûn-ii. ti-bax-ot-ait-tu-tin. ti-bax-ot-ait-yo, ti-bax-ot-ait-yu-se.
5 !! One	le labret." le sun." le kettle." le gun." matopule. " " " " "	10 "big iglu." 11 ml/n-un = bla 12 "pla-un = "fre- 13 "big canoe." 14 "There is m 15 Phoca fatida 16 Where there	ck lead.

8 "państń." 2 " Little bullets."

## EXPEDITION TO POINT BARROW, ALASKA.

## VOCABULARY COLLECTED AMONG THE ESKIMOS, &c.-Centinued.

English.	Eskimo.	English.	Eskimo.
Possession-	Continued.	Intransitive verb	s, de.—Continued.
6. They have no tobacco.	ti-bay-of-ait-yu-än.	61. I did not enter, 62. Shall I came in?	Is-tù-ai't-yùñ-ä.
7. I have plenty of tobacco.	ti-bax u-ti-ka k-tun-a.	62. Shall I came in?	rank-lan-#!
8. You have plenty of to	ti-bax-u-ti-ka k-tu-tin.	63. Come in!	ls-n-ti'u-(go)!   kai'-lùñ-ii !
bacco.  Whose dog is this!	ki'ä-o-kwa-ki'm-mea!	64. Shall I come? 65. What shall I (do)?	cú-lùñ-ii !
0. Whose party is thus!	kit-kun tú'd-wä.	66. What do you (want)? 67. Where are you going!	cú-ru-tin!
1. This is Angorn's party.	Añ-o 1ut-kun tú'd-wä. I't-túb ki'm-men tú'd-wä.	67. Where are you going	su-nla'k-pin (S.), su-nl-a'k-pl se (P.)!
2. Here is Itth's dog. 3. Whose bow is this!	ki'ii ó-kwa pi-zi'k-si !	68, 1 am not going (any)	su-nl-nn-l't-yhn ä.
4. Whose knife is this:		where.	ig-lu-mun-ai-ni à k-tùñ-ñ.
5. Whose are all these	kit-kun mu'k-wā ád-ri-gai /	69. I am going home. 70. When will you go south?	ká-ko-go pauů a ni á k-pi !
hands / 6. Nûvern's (possessions).	Núg é-rát-kun.1	70. When will you go south? 71. To-morrow I will go east.	ká-ko-go pauű-a-ni á'k-pi † u blá-xun go ka-wuñ-a-ni á'h
6. Nûgeru's (possessions). 7. At Nûgeru's.	Núg é-rút-kun. <sup>1</sup> Núg-é-rút-kun-nt.	72. Whither will ye go?	tuñ-ă. cu-mun ll (p-si al-ùk-ta-ni-ă/l
8. To Núgeru's. 9. A tern's bill.	Nûg ê rût-kun-nun. ut-yu-ta-kib si-go-	12. Whither win yo go:	pi-ai?
9. A woman of sospstone.	tu-nak-tú/p-ku-ni ii.²	73. When it becomes good or	na kuo si k pht.
		gets well. 74. It will become good.	na-kuo-stu-f-ā/k-to.
Tutamaniti	e verbs, de.	75. — will be plenty.	a-ma-dra-ni-à k to.
Imransacc	e reros, are.	76. If or when - shall be	a-ma-drák-pút.
	!	77. When —— was plenty.	a-ma-dráñ-mút.
1. I am hungry. 2. I become hungry.	kák túň-ä.	78. I forget.	whiha nudiona.
2. I become hungry. 3. I shall become hungry.	kák-st-ruň-ä. kák-st nt-á/k túñ ä.	79. You forget.	t'l-u-it pu-i-gi. pu-i-gak-sim-ér-ü-ü ä.
4. You are hungry. 5. You become hungry.	kák-tu-tin.	80. I forgot completely. 81. They will come, be here. 82. They will not come.	min. i o't. tun
5. You become hungry.	kák-si-ru-tin.	82. They will not come.	pin-)-ùñ-l t-tun.
6. You will become hungry. 7. Ye are hungry.	kak-si-ni-a k tu-tín. kák tu-sé,	83. I am going to stay. 84. It has gone out (pipe, &c.).	a-kút-ján-tá'k-túñ ä. kanstv.woń.nii
8. Ye become hungry.	kák si-ru-se.	85. They dive (ducks).	kam-tv-wań-nä. a/g-lúk tu-än.
a Va will become hungry	kak-sin-t-a'k-tu-ső. kák-to,	86. They come un (ducks).	ku katanyu an.
0. He is hungry. 11. He becomes hungry.	kák +1-ro.	87. There will be a dance. 88 Dance!	u-a m)-ni-a'k-to. u-ö'-mi-tin (S.),u-ö'-mit-yĕ (P
2. He will become hungry. 3. They are hungry. 4. They become hungry. 5. They will become hungry.	kak sin-ta'k-to.	89. I am drunk.	turer ketureit.
3. They are hungry.	kak-tu-än. kak-s)-ru än.	90. I cut.	wû'n-ii pi-lûk-û. wû ñ-ii kl-lê ii.
5. They will become hungry.	kák st-nt-á'k-tu án.	91. I sew. 92. I've hurt my shin.	wu n-a ku-le a. kun-a-drák-tuñ ä.
to, tain making water (iii)-	ku-i-ja k-túñ ii.	92. I've burt my shin. 93. I hit my nose, make it	pu-st-kák-tuñ-ä.
nating). 17. I was making water.	bodisk to 5 A chi 5	bleed.	
8. I am going to make water.	ku-i jāk-tu n.ē-rūn-ā. ku-i jāk-tu nī ā'k tūn ā.	94. I bump my head. 95. I bump my forohead.	a-pók tuñ ä. ka-tı-ruñ-ä.
19. Ittů is making water.	ku-i-jà'k-to.	96. I hart my knee.	ait-ko-ák-tuñ-á.
20. I am talking.	ok-ba'k tüñ-ä. ok-ba'k-tüñ-ér -ű-ä.	97. I crack my crazy-bone.	lt-kut-si ák-tuñ-ñ. ka-kll i-sák-si-ruñ-ñ. *
21. I was talking. 22. I will talk.	ok-há'k-tu-ni-á k-túñ-á.	98. My foot's asleep, 99. He falls in the snow.	ná-kok-to.
23. You were talking.	ök-hák-túű-é-rú-tin, ök-há/k-to.	100. He falls backwards.	ni-wéak-to.
24. He is talking. 25. It-tit is talking.	1't-tu ök-há'k-to.	101. He falls sideways.	in-pa/k-to. pu-tu-kl/t to, pa-sak to.
26. I am singing.	a-to k-thñ-ii.	102. He falls forward. 103. He falls into the water.	i-mak-to.
	a-tók-tűű-e-rűű-ű.	104. He falls by slipping on his	
28. I will sing. 29. You were singing.	a-tők-tu-ní-á/k-tűű-ű. a-tők-tűű-e-rű-tín.	heels. 105. He falls by slipping on his	ko ai-jaŭ-na k-tu ii.
io, rie is singing.	a-to'k-to. a-to k to l't th.	toes.	t .
31. Ittú is singing. 32. I am laughing.	a-to k to l't th.	100 Ha almost fulls by alin	ko-ni-ja-kčt-kai-ák-to.
33. He is laughing.	ig-luk-túñ-ä. ig-luk-to.	ping on his beels.	něk-sa-ták-tu-ii.
ta Ho is amiling	ku-mu-yúk-tu-ä. pi-so-ă/k-túñ-ä.	107. He shoots at a target. 108. He (the deer) has no	núg-é-ru-t t-yo.
35. I am walking. 36. He is walking.	pi-80-à'k-tuà-a. pi-80-à'k-to.	antiers.	1
37. Itth is running.	I't-tû ak-paûk-tu-ä.	109. What are you laughing	
38. The bird is flying.	ff/n-mia lz-f-kû/l-vé-ru-ä.	110. You strut with your el	- † añ-u-tau-kwák-tu-tĭu. 6
39. Ittú's knife is bad. 40. I am cold.	Pt-túb sá-vík a-sí-ru-ä. a-la-pák-túñ-ä, ki-yin-a/k-túñ-ä.	bows out. 111. It is bad.	pi-łú'k-tu ä.
4). He will become cold.	a-la-pak-si-ni-à/k-to.	112. It is very bad.	pi-lu-pi k-su ä.
42. I am getting warm.	u-nā'k-si-rūñ-ii.	113. It is done with, over.	ni-vů k-so. Interrog, ni-vů
43. He will become warm.	u-nāk-si-nī-ā'k-to.	· 114. 1 want.	pa ? wūñ-ā pi-sú-kǐ-ga. a-ti'-g1-lūñ-ā.
45. It is hot!	u-mak-st-m-ak-to, ki-yin ûk-pa-si'l-yâ'l u-mâk-pa-si'l-yâ'l ta-pa-si'l-yâ'l u-bla-xo al-a-pak-sin-t-â'k-to.	115. I want my jacket.	a-ti'-g1-litii-ii.
46. It is dark!	ta-pa sPl-yä!		l i'-mûk-lûñ ä.
morrow.	· ц-она-хо ага-рак-ми-та к-го.	117. I want a chew (of tobacco	kûm-mik-tâ k to.
48. If it is cold to morrow I	. u-bla xo al-a-pák-pút, aud-lan-	118. He puts on his boots. 119. He puts on his jacket.	a-ti-gl ro.
shall not go.	I-úñ-l't-yúñ-ä.	120. He outs on his mittens.	ait-kat-t-ró.
49. A stone sinks in the water.	nj-yá-ruñ kữm-mě-ro i-mứ-mi.	121. Mo puts on his breeches. 122. Wake up!	ká/k-a-lik-só. it-úg i-cá!
50. Who is that (man)?	kin-aú-ua?3	123. Give me a light! I wan	t Vg-nyúñ-miñ! ku-kúg lùñ-
51. Lie down (to a dog)!	a-ko-wi'd'-h.4 a-ko-wi't-yō!	to smoke. 124. Where have you been to	! cú-mun kid-lt-iù-a-bwi!
51. Lie down (to a dog)! 52. Lie low! pl. 53. Go away!	a-with-a-rin (S.), a-win a-tit-	125. How long will you be	kap-si-nik si-nik tá lu-tín t
	vő (P.).	(on a journey).	
54. Go home! pl. 55. Go home! (to the tent).	ig lú-mun-Yt + 4 ! tu-peñ-mun-Yt-ye!	126. Is it far! 127. Is it near?	u-ma-sl/k-pa?   kai-m) t-pa?
58. Come!	kai(n) (S.), kaii-yĕ (P.).	127. Is it near: 128. It has sunk, fallen unde	r - ka-tuk-si-me-ro ta-su'm-mä.
57 Let him come'	karli.	(water).	1
58. You darken (the window). 59. He went in, entered.	ta'k-tu-tin. Is-l'ñ ĕ-ro.	129. He (the bird) has flown. 130. Your shoe-string i	s   tiñ ik-st'm-ér-o. siñ yû'k-su-tin.

<sup>&</sup>lt;sup>1</sup> Household, party, &c. <sup>2</sup> ''Ku-nt-ii,'' jargon for woman, Danish. <sup>3</sup> =:: kt-na ú-na !

Third person singular.
 Decome numb."
 Cf. añ u-tá-o, breast-fin.

**5**9

## EXPEDITION TO POINT BARROW, ALASKA.

#### VOCABULARY COLLECTED AMONG THE ESKIMOS, &c.-Continued.

English.	Eskimo.	English.	Eskimo.
Intransitive verb	, de Continued.	Intrasitive verbs	, &c.—Continued,
131. Tie your shoe-strings! 132. I have no shoe-strings. 133. He weighs. 134. Take one! (one of two). 135. Get out of the way! 136. He sits down. 137. He is angry. 138. He is raying.	ali.yért/n! ali.yk/tűnä. u/ko mal-riki-to, u/pa p/k/sas-rii! ka-telilliä/k/sa/ga/ et/tű: sa-perg-nik/to, sa-perg-sák-to, mi-pak-to, Inter-u-mi-m/k-	214. I have gone. 215. I shall go. 216. I did not go. 217. I do not know. 218. I do not know it. 219. You did not know. 220. I hear. 991. I beard	a-lük tük al-mö-tün ä. a-lük ta-m-a'k-tün ä. a-lük tün-al-yün ä. u-lu-min al-tuga-ga. wir ü i a-lu-ga-ga. t-uit n-lu-gi, n-lu-t-tu-sa-rin ä. wir ü tu-sa-ga-ga.
139. They are copulating. 140. I come. 141. Thou comest. 142. He comes. 143. We come. 144. Vo come. 145. They come.	ku-ya k-tu-an. kai-ran-a.	322, You heatd.  223, I saw. 224, I do not see. 225, I did not see. 226, Did you see. 227, Did you see. 227, Did yo see. 228, I , lilled. 230, He killed. 231, I die, am dead. 232, I am not dead. 233, Kakaguna neadly died.	171-131 triesiegl, with a tractife kiega, tau-ton all yone, tau-ton all teateka, tau-ton all teateka, tau-ton kiega, tau-ton kiega, with all tractife kiega, viluat tu-kotek ki. tri-koteka,
148. He came. 149. We came. 150. Ve came. 151. They came. 152. I shall come.	ka -me-ru-lin. kai-nt-a k tun-li.	234. It is spoiled.	tu-ku-từ B-3. tu-kuñ aft-yiñ-3. nn na mi-st-nik-kai ák-to - Ka- ka-gá-nä. pi-luk-sť m-6-ro.
155. We two will come. 156. You two will come.	kai-ni ă'k-to. kai-ni ă'k-tu-xu. kai-ni-ă'k-tu-xu. kai-ni-ă'k-tu-xu.	Adjectives an	nd participles.
160. They will come. 161. If, when, &c., he shall	kai-ni-a'k-tu-sé. kai-ni a'k-tan. kai' pút.!	2. Thin, stender. 3. Square. 4. Round. 5. Now young	ablyk-tu ä. a-mi't-yu ä. it-kuú-tä. kai-ú'k-su-ä. nú-ta.
162. When or because he came. 163. I came not. 164. Thou camest not.	kain-mut.2	6. Old. 7. Near. 8. Far. 9. Good.	ú-tá-ka. kai nít-yu-ä. u-ma-zi k-su. nä-kú-rúk. a-si'-túk. u-ko-mait yu ä.
170. Will ye come! 171. I eat. 172. Thou eatest. 173. He eats.	kni-ni-a k-př-so l ne/x-e-rui-ă.	11. Heavy. 12. Light. 13. Clean. 14. Strong. 15. Killed. 16. Landed, on top. 17. Frozen. 18. Lost.	aké tyusi, pyktysi, stříst mei, en a řetensi, tusku teká, ka ktřeká, ki kreká.
174. Ye cat. 175. They eat. 176. I sleep. 177. Thou sleepest. 178. He sleeps. 179. We two sleep. 180. They two sleep.	ne vertetat. ne vertush. ne vertush. slad katulin. slad katulin. slad katulin. slad katulin. slad katulin. slad katulin.	18. Lost. 19. Big. 20. Little. 21. Long. 22. Short. 23. Elongated in shape, but short.	GARLER A
181 We sleep. 182. Ve sleep. 183 They sleep.	sen saucun, sint'k-tu-we, sint'k-tu-we, sint'k-tu-iu, si-nt'k-tun, si-nti-u-ii a'k-tun-ii, si-nti-u-t-y-inti, si-nti-u-t-y-inti, si-nti-u-t-y-inti,	24. Pretty long. 25. Cold. 26. Hot. 27. Full. 28. Broken. 29. Returned, brought back.	
190. I am scared. 191. Thou art scared. 192. He is scared. 192. Va are scared.	si-nt'k-pi / si-nt'k-pa / ku-ga-luk-tun-si, ku-ga-luk-tu-fin, ku-ga-luk-tu-si, ku-ga-luk-tu-si, ku-ga-luk-ait-yun-si, ku-ga-luk-pi /	31. Notted. 32. Blown away. 33. Inside-out. 31. Fast. 35. Hard.	na-pi-t-to. tin Pt-kä. tin Pt-kä. til P
194. I am not scared. 195. Art thou scared! 196. Is he scared! 197. Are ye scared! 197. Are ye scared! 198. I lie (fell a —). 199. Thou liest.	ku-ga-luk-pa- ku-ga-luk-pi-né, teuk a-lu-ru-ñ-ñ, teuk-a-lu-ru-lin.	Adv	
200. He lies, 201, Ye lie, 202. They lie, 203. When, because, he lied, 204. I do not lie, 205. I steal, 206. Thou stealest, 207. He steale,	tenka-hisusä, tenka-hisusso, tenka-hisusso, tenka-homit, * tenka-homit, * tenka-homit, * tenka-homit, * tenka-homit, *	1. Not. 2. Up. 3. Upwards. 4. Down. 5. Downwards.	pi'djûk, pi'côk, pi-teo, pid la, pi ia pôŭ mä, puù ma'n-ä, su'm-m'ä sim-mu'ā ä,
208. To steat. 209. They steat. 210. I will not steat. 211. I so.	tig-a-li'k-tu ä. tig-a-li'k-tu-so.	5. Downwards. 6. Underneath. 7. Yonder. 8. Indoors. 9. This way! 10. Thus.	sumant a. a. tasú n mä. Vá-mä (in sight). Vai'n'ä (out of sight) tat-ka-mä. ta-math'a-lu. tar mä-nä.
213. I went.	n-lûk-tá-mě-růñ-ñ.	11. Here, in the house.	ta mā-ni Ig-iù-mi.

<sup>1</sup> Future subjunctive.

<sup>2</sup> Past subjunctive.

#### VOCABULARY COLLECTED FROM THE ESKIMOS, &c .- Continued.

English.	Eskimo.	English.	Eskimo.
Inter	jectiona.	Conje	inctions.
1. Yes, here, take it, come (to a dog), 2. No. 3. Where's?	ná gá, nau, nau — -mi, nau — - I m na i ki ta il	1. And, also (cuclitic). 2. More, again (enclitic). 3. Thus, ther, so. 4. Only.	$\begin{array}{l} -\ln_{i} - \ln_{i} + \min_{j} - \min_{j} g \cdot \ln_{i} + \min_{j} g \cdot \ln_{i} \\ - \sup_{i \in \mathcal{N}_{i}} \ln_{i} \cdot \ln_{i} \\ k! \cdot \sin_{i} \cdot m_{i} \cdot L \end{array}$
4. Come on! 5. Get out! Go on!	n tat! n-taisiá.	Prepositio	ns (enclitic.)
6. Step! Stay! 7. Hark! 8. Get on! 9. Come! 10. Encove! 11. Hloss me! (surprise, &c.) 12. Hollon! 13. What! 14. Indeed, das! 15. Don't know! 16. Don't know, perhaps! 17. Make haste! 18. Oh!	à kun! a-ku-jà a tu. ku! kh ½ tu l la.½ ki. kh ½ ti. kl ; i à-ku-jh! kwan! eu! eu.i! natuna.3 an-ten.4 a-kh-i! a ku-nó.4 kè-l-im-i! u na nai.4	1. In, on, with, 2. To, for (motion, purpose,  Intensive, diminute  1. Big. 2. Verv. 3. Little, 4. Bad. 5. Terminations of emphasis.	- mun, nun. <sup>7</sup> ire, &c., terminations.  - puk, -puh. <sup>8</sup> - pal.yi <sup>9</sup> - pal.u, - ka.lu. <sup>10</sup> - pil.u.
French, "allons." Driving and leading dogs, With a negative idea freque Exchanation of ignorance or Cry of pain. Example, sl-kô ml, "on the Example, ig-lâ-man, "to the'	possibility.	"Caressing, example, "ki'm- "One or both appended to goam!!" "How many, pri many, indeed."	ip." Ku púň, "Great river." It is very good." nil-pa-lu!!" "Dear little puppy!" a word for emphasis, "kapsin ny l" "Amadráktungo," "Verj

### IV.

## CATALOGUE OF ETHNOLOGICAL SPECIMENS COLLECTED BY THE POINT BARROW EXPEDITION.

Prepared by John Murdoch, A. M., Sergeant Signal Corps, U. S. Army.

[Arranged according to the plan given in Prof. Ctis T. Mason's "Ethnological Directions Relative to the Indian Tribes of the United States." The collection is in the United States National Maseum.]

#### III.-CULTURE.

(1) FOOD OR ALIMENT IN GENERAL.

C. Narcotics.

Tobacco (tau-wak, "ti- $b\acute{a}$ ").—One specimen. Prepared for smoking—cut up and mixed with willow bark.

	The state of the s	
1	Collectors' number	889 89803
- 0		1

E. Drugs, &c.

MEDICINE.—One specimen. Apparently earth from the cemetery—administered internally.(1)

	W. A. Philippines and M.					
Collectors' number Maseum number	•	• • • • • • • • • • • • • • • • • • • •	• • •	••••	 202 56723	

(3) VESSELS AND OTHER UTENSILS OF HOUSEHOLD USE.

A. For holding and carrying water, food, &c.

MEAT BOWL  $(p\tilde{v}'t\cdot t\hat{u}\tilde{u}\cdot o)$ .—Four specimens. Large round bowl, carved from one block.

	* *			
Collectors' numbers		1321 F9865	1322 89×64	1320 898 <b>6</b> 3

WOODEN BUCKET ( $k\dot{u}$ - $t\dot{u}u$ -a).—Three specimens. With ivory "ears" for attaching handle of wire, thong, &c. Used for water, &c.

Collectors' numbers	369 56763	370 56764	1753 89890	

BUCKET "EAR."-One specimen. Made of ivory, for attaching the handle.

-	The state of the s		
	Collectors' number	880 89448	

WOODEN TUB  $(il \cdot u \cdot li'k \cdot p\hat{u}\hat{n})$ .—One specimen. Made of bent wood.

1,	 	 
Collectors' number Museum number	 •	 1735 89891

#### B. For serving and cating food, &c.

STONE VESSEL ( $\dot{m}tkuzm$ ).—Four specimens. Broken oblong vessels of soapstone, obsolete, and superseded by iron or tin pots, which are called by the same name.

POTTERY.—Three specimens. Pieces of a pot said to be made of clay, feathers, and blood, and baked. Obsolete.

ho

for

shap

and

stuc

 Collectors' number
 1589

 Museum number
 89697

C.

MEAT TRAY (i.li-bi-a, im-o-si-a' rv).—Five specimens. Shallow tray, made of one piece of wood for carrying and holding food.

 Collectors' numbers
 223
 392
 1323
 1376
 1377

 Museum numbers
 73575
 73576
 89867
 89868
 89868

WHALEBONE CUP.—Six specimens. Cups and dippers of various sizes, made by bending a strip of whalebone round a wooden bottom.

 Collectors' numbers
 C54
 1199
 1309
 1301
 1302
 1303

 Museum numbers
 50500
 89850
 89851
 898.2
 89833
 89854

IVORY FORK .- One specimer. Small and two-pronged.

 Collectors' number
 325

 Museum number
 56731

STONE MAUL (kaú-tù).—Twenty eight specimens. Head, a cylinder of stone, generally massivo pectolite: when hafted, lashed to a wooden or bone handle with thong.

Bone maul.  $(kah\cdot th)$ .—Five specimens. Head, oblong piece of hard bone, secured by lashings on the end of a short haft.

Collectors' numbers. ' 1045 1046 1047 1048 1049 Museum numbers 89848 89847 59849 89846 89845

Wooden spoon.—One specimen. Large spoon, or ladle, neatly carved from soft wood.

 Collectors' number
 1352

 Museum number
 89739

Bone dipper (kil-i-yú-tú).—Seven specimens. Ublong shallow dipper, or ladle, for water, &c.

Ivory dippers (i-mo-syn, ki-lig-pn,	$kil \cdot ig \cdot w \hat{u}'g \cdot a \cdot ro)$ .—Three	specimens. Large dipper, with
handle, made of one piece of fossil ivory.	One from each village,	Nuwük, Utkiávwiñ, and Sidáru.

Collectors numbers. 371 933 1259 Museum numbers. 3853 89833 89830

WATER DIPPER  $(im \cdot o \cdot syn)$ .—Three specimens. Made of a single piece of mountain-sheep horn.

| Collectors numbers | 28 | 1293 | 1577 | Museum numbers | 59534 | 808-31 | 808-32

PIPE (ku-i'n-ya).—Eleven specimens. Wooden stem, with metal, bone, ivory, or stone bowl, for smoking tobacco, sometimes mixed with willow bark.

 Collectors' numbors
 10
 '170
 705
 834
 864
 915

 Masseum numbers
 50737
 70652
 80288
 80291
 80200
 80280

 Collectors' numbers
 9054
 1120
 1385
 1582
 1752

 Museum numbers
 80265
 80278
 80284
 80280
 80202

Unfinshed stone bowl.

PIPE-CASE,—One specimen. Long pouch of white ermine skins for holding tobacco-pipe.

TOBACCO-POUCH,-Three specimens. Made of deer-skin trimmed with fur and worsted.

| Collectors' numbers | \$89 | 1341 | 135 | Museum numbers | \$90.03 | \$9804 | \$980

TOBACCO-BOX OF ANTLER,-One specimen. Carved into the shape of a sleeping reindeer.

#### D. Ornamental and miscellaneous.

Lamp  $(k\phi \cdot dl\ddot{v})$ .—Six specimens. Shallow dish of soapstone or sandstone, nearly half-moon shaped, for burning oil, with a wick of moss. Large for hopen use; small for traveling.

 Collectors' numbers
 133
 872
 1208
 a)
 1208
 1731

 Museum numbers
 56673
 89879
 8984
 60881
 8082
 8982

HOLDER FOR LAMP BLUBBER-STICK.—One specimen. Rude wooden effigy of a human head and body, made to fasten upon the wall over the lamp, with a hole in the middle, in which can be stuck the pointed stick for holding the lump of blubber to feed the flame.

 Collectors' number
 108

 Museum number
 56492

#### (4) CLOTHING.

#### A. Raw material.

HARE-SKINS.—Five specimens. Native dressed skins—raw material for clothes.

| 17.34 | 17.35 | 17.35 | 17.35 | 17.35 | 17.35 | 17.35 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.37 | 17.3

#### C. Suits of clothing.

TOY CLOTHES .- One specimen. Models of Eskimo garments.

90	 	 ٠.			 		 			 	 	 	 	 mbei	nun	ctors	'ollee
898	 	 		٠.		 	 	٠.	 	 0 1	 	 	 	 ber	umb	um a	duscu

Dolls.-Four specimens.-Faces, heads, and whole men and women, made of wood and dressed.

Collectors' pumbers	1123	1138	1304	1358
	89724	89727	89728	89726

#### D. Head clothing.

WOODEN MASK (ki'-nau).-Fourteen specimens. Worn in ceremonial dances.

Collectors' numbers	56469	73	235	258	762	773	856
Museum numbers .		56498	56497	5 <b>649</b> 6	89810	89809	89817
Collectors' numbers	1037	1050	1056	1057	1003	1074	1583
Museum numbers .	89811	89815	89814	80819	89812	89813	89816

Dancing cap  $(k\hat{a}'b\cdot r\hat{a})$ .—One specimen. Conical skin cap trimmed with rows of teeth of the mountain sheep. Worn in ceremonial dances.

Collectors'	number	 863
Museum nu	mber	 89820

#### E. Body clothing.

Man's Jacket (a-ti'-yè).—Three specimens. Hooded frock of fur, worn with the hair out (called "parka" in those parts of Alaska occupied by the Russians).

Specimena.	Collectors' numbers.	Museum numbers.
Ermine skins	11	56757
Mountain-sheep skins	87	56759
Deerskin	184	56751

MAN'S CLOAK.—One specimen. "Circular" cloak of deer-skin, worn as an outside wrap.

Collectors' namber	94 56760

#### F. Arm clothing.

Gloves (á-drì-gûd-rì'n).—Two specimens. Made of deer-skin—hair in.

i			
	Collectors' numbers	128 50747	974 89829

hole

MITTENS (ai't-kăt-i).—One specimen. Made of deer-skin.

Collectors' number.	. 973
Museum number	. 89828

#### G. Leg and foot clothing.

MAN'S FUR BOOTS  $(k\hat{u}'m\cdot m\hat{u}\hat{n})$ .—Four specimens. Boots reaching to the knee, made of some short-haired skin; hair out; soles of white-dressed seal-skin.

Collectors' numbers	91 56759	110 56749	56750	770 8983 <b>4</b>	

TOY BOOTS	One specimen. Made of seal-skin, in miniature.
	Collectors' number
MAN'S BREE fur out or in.	CHES $(k\hat{u}'k\cdot a\cdot lix)$ .—One specimen. Knee breeches of fur, generally deer-skin; worn
	Collector number. 91 Museum number. 56739
	ROUSERS $(k\hat{u}'m\cdot m\hat{u}\hat{u})$ .—One specimen.—Tight-fitting trousers, ending in shoes with made of short-haired skin.
	Collectors' number         126           Museum number         50748
	11. Parts of dress.
EAGLES' FE	ATHERS.—One specimen. Worn in bunches as ornaments to the fur jacket.
	Collectors number         1150°           Muse (a number)         895.0°
Выл-вескі	E.—One specimen. Oblong piece of ivory, perforated with a large hole.
	Collectors' number 10% Museum number 80718
	$(t \dot d p  s l)$ —Two specimens. Neatly woven of feather-shatts, black and white, in and bound with leather.
	Collectors' numbers         1419         1420           Muse um numbers         89544         89543
	LIT (táp.st).—One specimen. Made of pieces of skin of wolverines' toes, with claws Fashionable and highly prized.
	Collectors mumber.
	(5) Personal adornments.
	A. Skin orne mentation.
	CET—Two specimens.—Little slate blade, shaped like a lance-head, for cutting the ets; sometimes put up in a little wooden case.
	Collectors' numbers         1153         1200           Museum numbers         80721         80729
	B. Head ornaments.
EAR-RINGS (	nó-go-lo).—Two specimens. Ivory hooks to fit into the holes in the ears.
	Collectors' number
П. Ех. 44	Two pairs.

the

out

LABRETS  $(tii\cdot tii)$ .—Sixteen specimens. Stone, ivory, or bone studs, worn by men in the corners of the month.

Collectors' numbers 1197 Museum numbers 56716	89705	1031 #0717	1042 89716	1142 89711	1163 H9706	89719
Collectors' numbers	1169	1187	1207	1210	91215	3783
Museum numbers	89712	M19710	и9713	10714	\$16707 14970A 14970B	

TThree specimens

LABRIT PLUGS,—Two specimens. Small plugs for enlarging and keeping open the labretholes when first made; bone or ivory.

Pair.

#### E. Ornaments of the limbs.

BRACELETS.—One specimen. Leather thong sewed into a ring and ornamented with a bend of scapatone.

1	Collectors' number Museum number	t		11355 80388
i		-		
			Pair,	

#### F. Toilet articles.

IVORY HAIR-COMB  $(id\text{-}lai\text{-}u\text{-}tt\hat{n})$ .—Ten specimens. Small, with a hole at the top for the fore-finger.

			-	
Collectors' numbers	174	1182	183 °	1194
	36368	06566	53567	56569
Collectors' numbers	210	238	1006	1242
	56572	56576	89785	89385

# Two specimens. G. Other personal ornaments.

AMBER BEADS (aú-mú). One specimen. Made by natives.

Collectors number	1716
Museum number	<b>P9700</b>

Dentalium shells  $(p\hat{u}'t\cdot t\hat{u})$ .—Five specimens. Used for ornaments.

-		 4
Collectors number	Pr	 1337 89330

(6) IMPLEMENTS OF GENERAL USE, OF WAR AND THE CHASE, AND OF SPECIAL CRAFTS.

#### (I) FOR GENERAL USE.

IRON KNIFE  $(s\hat{a}\cdot vik)$ .—Seven specimens. Straight knives, of various shapes and sizes, with wood, bone, or ivory hafts, used by the men.

				 	-
Collectors' numbers Museum numbers	810 89295	991 89294	978   1056 89296   89821	1162 89298	1336 89293

Knife-blade.—Twenty-four specimens. Made of slate, ground, sometimes fastened by lashings to a wooden baft.

-	Collectors' numbers	368 34693	226 56712	929 34694	067 06719	774 10401	874 HD604
,	Collectora' numbers	994 19090	1002 -	1000 #0000	HOUSE.	1016 800#4	1005
	Collectors' numbers	105% #0697	1033	1084 89589	1000 HIS60	1081 89097	1107 89391
	Collectors numbers	316H 895H8	1180	\$195 #9580	1397 #0587	1710 10585	3714 H900H

WHALEBONE BLADED KNIFE.—One specimen. Aucient knife, made of a bit of antier, with a deep groove cut in it, into which a piece of whalebone is let for a blade, said to have been used for cutting fat.

Collectors' unmber	1422
Measure consider	20A77

CURYED KNIFE (sav.i.xrón,  $mi'd-li\hat{n}$ ).—Thirty specimens. Short curved steel or stone blade in bone or ivory handle—long, for working on wood ( $mi'd-li\hat{n}$ ); short, for working on ivory, &c. (sav.l.crón).

Collectors' numbers 145 Museum numbers 56616	152 56618	2#8 38551	787 ,627%	#1# #F274	827 80002	802 80280	
Collectors' numbers	882 80276	883 89279	967 89283	892 80080	1004d 80780	1061 895#6	-
Collectors' numbers	1062 80580	1076 89281	1083 89271	1180 80272	1172 80277	1183 80275	
Collectors' numbers	1196 89673	1198 89273	1212 80636	1218 89242	1231 99635	1234 80639	
Collectors' numbers	1235	1248 890.8	1254 89634	1255 89643	1256 59641	1297 89644	

Whalebone Knife  $(s\vec{u}\cdot ri\cdot x\vec{u})$ .—Ten specimens. Like a little spokeshave, blade of steel or stone, handle of bone or ivory, used for scraping whalebone.

 Collectors' numbers	885 89306	896 99305	1677 89367	1213 ° 89649	1219 89630	A comment of
Collectors' numbers	$\frac{1325}{89652}$	1226 89847	1236 80648	1237 89645	1238 89646	

WHALEBONE-SCRAPER.—One specimen. Small oblong flint chipping, used for scraping whalsbone, without a handle.

Collectors' number	 1176
Museum number	 89616

Woman's Kniff (u-lú-ra).—Twenty-six specimens. Half-moon-shaped blade, of iron, flint, or slate, rarely jade, mounted like a chopping-knife, in a handle of wood, bone, or ivory; used by the women for cutting everything.

Collectors' numbers	56600	14 : 56646	129 56660	$\frac{191}{56672}$	1871 : 89693	886 89684	894 89681
Collectors' numbers Museum numbers	957	958 :	971	89689	1057	1078	1093
	89687	89682 :	89679	68868	89383	89677	89 <b>67</b> 4
Collectors' numbers	1094	1106	1121	1122	1170	1178	
Museum numbers	89688	89680	89683	89 <b>6</b> 86	8 <b>96</b> 75	89692	
Collectors' numbers	1291	1311	13 <b>6</b> 0	1584	1585	1586	
Musoum numbers	89384	89690	89691	89078	89 <b>68</b> 5	89676	

I Handle

Addle (id-li-mau),—Eighteen specimens. Head made of iron (sometimes a hatchet-head), bono with an iron or stone blade let in. When hafted, lashed with thong to a short handle,

					-	
Collectors' unmbers Museum ran bet collection	$^{-244}_{56642}$	260 56040	286 73573	200 26648	696 89876	F19977
Collectors' purchers	769 89839	785 27803	50870	869 89871	878 89869	895 89878
Collectus must ets	1961	59573	1072 89653	1100	1195 89051	1317

STONE ADZE-BLADE (iid-li-man).—Twenty-three specimens. Made of jadeite, black or dark green, partially ground.

						,
Collectors' numbers	(2)					185
Mass in annibers	56675	56078	566-5	20003	Street,	56(65)
Collectors' numbers	211	215	219	246	247	248
Maseana numbers	56628	56667	2000	56070	56CF8	7,6674
Collectors number a control	251	261	79.2	[1(1)	1931	1.52
Mascum nursbets	50670	56656	5.06750	5.0062	States	8:60
Collectors' numbers	1155	1181	1.62	1363	1423	
Massam nambras	≥9661	87976.7	- 9671	5 9672	F0673	:

BONE ADZE-HANDLE.—One specimen.

Collectors 1 to Minness and a contract the contract to the con	3
Museum and a ser.	50044

Chisel,  $(ki\bar{n}\cdot nu\cdot sa)$ .—Nine specimens. Short square blade wedged in ivory handle for working on antier.

Collectors' pumbers		10.18 89360	16.10
Collectors nombers		1.90 850.55	

Saw (u lu à'k tuu).—One specimen. Made by filing teeth on the edge of a common case-knife.

```
        Collector's number.
        15

        Muse us number.
        56559
```

Bone saw  $(u \cdot lu \cdot a'k \cdot tuu)$ .—One specimen, Made of a reindeer's scapula (ki'asia). Newly made on the ancient pattern.

Hawven.—One specimen. An oblong green pebble  $(kan'\cdot d'lo)$  has been used as a hammer without a handle.

FLANT HAND-DRILL (i'-taun, i-tûg-it-saû),—Four specimens. Long chipped flint mounted in a wooden shaft, for boring out whale-harpoon heads.

Collectors numbers	570 . 896.26	912 85628	937 89627	1068
			,	

Bow-drill (ni- $\alpha'k$ -tun).—Fifteen specimens. Drill of steel or bone, mounted in a wooden shaft.

Collectors' numbers	819		1880		853	875	956	860
Museum numbers	89497	ł	89501 89493 89494	5	89496	89495	80488 }	89029
Collectors numbers	268					1182	1258	31217
$M \operatorname{useum numbers}$	89499	1	89779 89778	3	89516	89520	89519	89625
								Į.
1.1 have anordinated	2	TEN	on smerit		11%	AWHILL	hout't	

Drill-Bow (pi-zl/k-su-a).—Sixteen specimens. Flat bow of ivory or bone, often carved or engraved, with a string of rawhide.

Collectors numbers	72 56515	298 56506	4	183 <b>6</b> 89512 89514	4861 89513 - 8 89515 - 5	914 89509	920 8951 <b>6</b>
Collectors' numbers	211	9,56		1961	10047	1260	11732
Museum numbers	89517	89503	1	80510 8	89777	89421	89422

1 Pwo specimens

DRILL-MOUTHPIECE  $(\hbar i'\bar{n}\cdot mi\cdot a)$ .—Seven specimens.—Made of wood, to be held in the teeth with a socket of stone or metal let into it for the drill to work in.

Collectors numbers	5-00	876	E01	892	903	956	10010
Margarith nombars	×9500	89504	#44 Text 1	50505	80507	80706	20727

SHEATH FOR DRILL.—One specimen. Ivory scabbard with a loop ca one side for fastening it by a thong to the handle of the drill.

Collectors' mamber	1112
Museum number	89417

DRILL-CORD HANDLES.—One specimen. Small bones, used for handles to the drill-cord instead of a bow,

Collectors' number	 	1022
Museum number		73571

Whetstone (i'-pik-saun).—Ten specimens.—Slender tapering rod of jadeite.

Collector's unmbets	186	229	393	757	801	1537	865	951	1262
Museum number	56682	56663	50602	59621	59618	( 89619	89620	596(20)	89617

Two specimen

SMALL WHETSTONE.—Two specimens. Small oblong bit of stone (slate).

Collectors' number	 	 	 	 	 	11(11)4
Museum number						237786

l Two spectmens

SLATE TOOLS,-Three specimens, Broken.

	1728 3572
--	--------------

· Three specimens.

MARLINSPIKE(?).—One specimine Slender rod of hard bone, with a point like a graver Perhaps a marlinspike for working lashings.

Collectors number	1282
Museum number	89459

TOOL-BOX.—Six specimens. Long narrow box hollowed out of a single block, with cover fastened on by study and strings.

Collectors' numbers ... 1144 1151 1152 1318 1319 1593 Museum numbers ... 89858 89861 89860 89859 89858 89862

TOOL-BAG  $(i'k\cdot cug'\cdot bwiu)$ .—Four specimens. Made of wolvevine-skin or the heads of wolves and foxes, with an ivory handle  $(nix\cdot o\cdot mi'\cdot a\cdot bwi)$ .

 Collectors numbers
 1004
 1018
 1118
 130

 Museum numbers
 89770
 88794
 89796
 8979.

BUCKET OR BAG HANDLE (nix-o-mi'-a-hwi).—Three specimens. Arched bar of antler or ivory for carrying bucket or bag.

 Collectors numbers
 43
 996
 1111

 Museum numbers
 56513
 89423
 89426

WORKBAG.-One specimen. Made of leather.

Collectors number 1075 Museum number 89798

BAG (i-pi-á-ru).—One specimen. Made of a bear's stomach.

 Collectors' number
 1325

 Museum number
 8979

#### (2.) WEAPONS OF WAR AND THE CHASE.

#### A. Striking.

 $\label{thm:local_trans} \textbf{HAND-CLUB} \ (ti'g\text{-}a\text{-}lun). \textbf{—One specimen.} \ \ \textbf{Short blunt-pointed piece of bone held in clenehed hand for striking a blow,}$ 

Collectors'number 1310 Museum number 80492

SLUNGSHOT  $(t\hat{u}'b\cdot lu\cdot k\hat{u}\hat{u})$ .—One specimen. Lump of bone, with a loop of thong through it. Weapon (t).

#### B. Throwing weapons,

HANDBOARD.—Three specimens. Narrow grooved board with hole for foreinger, for throwing javelins.

 Collectors' numbers
 528
 1925
 1926

 Museum numbers
 892.4
 8906
 89962

Knob of Bird-sling (kë-lau-i-tai-tin).—Five specimens. Oval or round knobs of ivory or deer's ankle bones, to be tied together with strings and make a "bolas" for catching ducks.

 Collectors' numbers
 1251
 \*1342
 \*1348

 Museum numbers
 80537
 80491
 80490

<sup>1</sup>Two specimens.

#### D. Thrusting.

WHALE LANCE.—One specimen. Long shaft and large flint head.

 Collectors' number
 597

 Museum number
 56763

BEAR LANCE  $(p\hat{u}'n\cdot n\hat{u})$ .—One specimen. Stout lance, larger than deer lance  $(k\hat{u}'\cdot pun)$ , with chipped flint head.

 Collectors' number
 1230

 Museum number
 89895

DEER SPEAR  $(k\hat{a}'p\text{-}un)$ .—Six specimens. Spear about 6 feet long, with metal or stone head for stabbing deer from the kaiak.

 Collectors numbers
 524
 525
 1117
 1324

 Museum numbers
 73183
 89247
 \$ 89808
 89808

1 Two specimens.

HEAD OF WHALE LANCE (kal·u·i'·a).—Eleven specimens. Chipped black flint, used for killing whales.

 Collectors' numbers.
 5
 49
 209
 239
 394
 913

 Museum numbers.
 560x1
 560x1
 560x7
 560x3
 560x1
 560x0
 560x1
 560x1

And part of shaft.

Polished stone lance. Head  $(i's\cdot i\vec{u}\cdot n\vec{u})$ .—One specimen. Beautiful head of polished jade for a deer lance.

Collectors' number 115 Museum number 8901

Stone Lance-head  $(\delta n \cdot ma)$ .—Seven specimens. Chipped flint, of two sizes, for deer and bear lances.

 Collectors numbers
 '114
 648
 1034

 Museum numbers
 56708
 58711
 80611

Five specimens.

Bronze lance-head  $(k\hat{a}'p\cdot un)$ .—Two specimens. For deer lance.

Collectors' number 166 Museum number 56699

BIRD TRIDENT (nu-yā'k pai).—Nine specimens. Light wooden shaft, with one, two, or three ivory prongs on the end, and usually three in the middle, darted at ducks, &c., with a hand board.

 Collectors'numbers
 63
 106
 526
 527
 529
 530
 379
 1225
 1326

 Museum numbers
 72794
 56587
 89242
 72800
 72832
 89213
 89380
 89244
 89900

<sup>1</sup> Prongs only. <sup>2</sup> Fragment of head.

Spear-head  $(nu\cdot y\check{a}^{\prime}k\cdot p\check{u}k,\,n\check{u}t\cdot k\check{u}\check{u})$ .—Nine specimens. Long, barbed, ivory point for bird or fish javelin.

Whale Harpoon (đị-yiài).—One specimen. Reduced model (size of a wairus harpoon) of a whale harpoon, complete, with pole, head, and short line for attaching floats. Made for sale.

 Collectors number
 402

 Museam number
 5900

WALRUS HARPOON, COMPLETE (#nak-pik).—Six specimens. Heavy harpoon, with short "loose-shaft" and detaclable "toggle-head," for harpooning walrus from the boat.

 Collectors numbers
 531
 532
 533
 534
 535
 536

 Museum numbers
 56767
 50768
 58769
 56770
 50771
 56772

THROWING SPEAR (nai-li-gii).—Two specimens.—Long shaft, with ivory ice-pick on one end and heavy knob on the other, fitted with a short "loose-shaft," head and line, for securing seals which have been shot in the water.

 Collectors' numbers
 1058
 1c95

 Museum numbers
 89908
 89907

**SEAL SPEAR**  $(\vec{u} \cdot n \vec{u})$ .—Two specimens. For stabbing seals at their breathing-holes.

 Collectors' numbers
 1
 40.4

 Museum numbers
 72833
 89910

SEAL DARTS AND THROWING-BOARD (kii-ki-gii).—Three specimens. Light ivory-headed darts, head detachable, and attached to shaft by short line so that shaft acts as a float. In sets of three, with a grooved hand-board for throwing them.

 Collectors' mindees
 60
 522
 523

 Museum numbers
 { 727.02
 89248
 { 727.03

 Museum numbers
 { 889.55
 727.03
 892.45

toard

FORE-SHAFT OF WHALE HARPOON,-One specimen. Ivory, for connecting head with pole.

Collectors' mumber 99 Misseum number 50555

Harpoon fore-shaft (u(ku)-mii(lu)-ta).—Two specimens. Bone or ivory cap for end of pole, with socket for "loose-shaft."

 Collectors' numbers
 98
 406

 Museum numbers
 5659
 650

. Por scal spear

"Loose-shaft" of seal spear  $(i'\cdot gi\cdot mi)$ .—One specimen. Bone.

Cofficient (1997) - 2 Museum maches 89489

NARWHAL IVORY SHALESPEAR SHAFT.—Three specimens.—Three long "loose-shafts" (i'-gi-mû) for the stabbing seal spear (i'-nû), made of twisted narwhal ivory.

HEAD OF WHALE HARPOON (ki'-a-drun).—Eleven specimens. Detachable head, with barb of ivery, and blade of metal, slate, or chipped flint.

Collectors numbers		157	1807	2888	927
Museum numbers	56601	50602	$\begin{cases} \frac{89751}{89752} \\ 89755 \end{cases}$	\$89753	×9746
Collectors' numbers	928	00u	199~	11011	1065
Museum numbers	89744	29711	89754	€ 89745 € 89747	$\frac{1}{5}89749$
Three barbs only. One bar	di.	Barb.	Two	pecimen	

Walrus-Harpoon Head  $(t\hat{u}\cdot k\hat{u})$ .—Forty-four specimens.—Detachable harpoon head, made of ivory and iron or brass, like seal harpoon but larger.

Collectors' numbers Museum numbers	56613	1123 56616	2192 56517	193 56623	199 50020	<sup>2</sup> 211 56618	$\frac{283}{56621}$
Collectors' numbers .	9873 ( 89771	1940	943	4917	1038	1149	
Museum numbers .	89774 89789 89789 89791 89793	89760 89763	/ s9790	\ 89756 \ 89759	\$89750	59770	

<sup>4</sup> Ten specimens. <sup>2</sup> Two specimens. <sup>3</sup> Nine specimens. <sup>4</sup> Four specimens.

Seal-spear head  $(na\dot{u}\cdot l\dot{u})$ .—Six specimens. Detachable harpoon head, made of ivory and steel.

Collectors numbers	39 56614	<sup>180</sup>	*21 <b>6</b> 56012	1008 :
		, ,		

Two specimens

IVORY SEAL-HARPOON HEAD  $(\dot{a}'k\cdot qli\cdot g\dot{a}k)$ .—Six specimens.—Detachable barbed harpoon head, wholly of ivory or bone. Ancient,

HARPOON BLADES.—Twenty-five specimens. Triangular blades of ground slate, jadeite, or brass to be wedged into ivory barb. Different sizes for whales, &c.

Collectors' number Museum number	$^{1}139$ $56709$	*141 56689	2144 56706	4169 56698	7188 56697	265 26702
Collectors' number	316 56718	775 89607	1981 89730		${389623}$	1729 89606
Four species	P114.		r Ewo sp	me imen-		

Brass harpoon blade.—Two specimens.—Triangular blade of brass for wedging into ivory barb.

Two unfinished

BOX FOR HARPOON BLADES (iid-luu).—Twelve specimens. Wooden box, with cover attached by strings, for holding spare state blades for harpoons. Made in shape of whale, walrus, or large scal.

<sup>1</sup>Two specimens.

H. Ex. 44--10

Bone dagger.—Six specimens. Made of split leg-bone of a bear. Ancient. Said to have been a weapon.

Collectors numbers 767 965 988 1141 1175 1700

#### E. Projectile weapons.

Bow  $(pi\cdot z)^i / si)$  And arrows  $(k\tilde{u}^i / k \cdot a \cdot ru)$ .—Fifty-five specimens. Bow of spruce reinforced with sinew. Arrows, shafts of (generally) soft wood; heads of iron, flint, bone, or ivory, sharp pointed for killing large game, blunt for birds.

Collectors'numbers	195 268 489245	*74	4119	*162	*163	4164	4165	623‡	4241	7786	
Museum numbers	*89248 *89241 *72774 *72775 *72775 *72778 *72778 *72776 *72767	72768	₹89209 , ₹ ₹89241 - }	89238 89241	89236 {	►923 <b>7</b> 727 <b>6</b> 3	{ 72766   } 72764	{ 72771 { 72787	\$ 89236 { 72770	89904	
4 Two art	i twelve arrows. ows, i two arrows.		* Three a * Nine a * Bow.				arrow, and sixtenses	Fen arre	W W.		

Stone arrow-head  $(k\dot{u}\cdot kin)$ ,—Twenty-four specimens. Chipped flint and jasper of various colors and patterns, some ancient and some newly made for trade; used for bears or any dangerous game.

Museum numbers	aucen			hree spe		.0092		specime		€ 56762 ₹ 56762	89014
Collectors' numbers'		62	164 ,	267 ,	1113	143 -	230	232	1240		3817

BONE ARROW-HEAD  $(n\hat{\psi}/t\cdot k\hat{a}\hat{n})$ ,—Three specimens. Detachable head for deer-arrow,

** * *			-
Collectors', 'umbers	115	1147	1263
	56599	89376	89460

QUIVER AND BOW-CASE (pi zi'k-si-zax).— One specimen. Made of black-dressed sealskin; sometimes together, sometimes separate.

fixit

hool mad

with bead

Collectors' numbers	25	234
Museum numbers	89245	72788

QUIVER ROD.—One specimen. Rod of wood or antler, sometimes carved; fastened into the quiver or bow-case to keep it stiff after the bow or arrows are withdrawn.

Collectors' number	231
Museum number	36305

"BRACES"  $(m\dot{w}'n\text{-}gid\text{-}zi\ddot{u})$ .—Three specimens. Small curved oval disks of bone or horn, with holes for strapping on the deft forearm or wrist to protect it from being hurt by the string in shooting the bow.

Collectors' number Museum numbers	٠.	 			 	 	 		 				23 410	1383 8 <b>9</b> 550	

<sup>&</sup>lt;sup>1</sup>Two specimens.

#### (3) IMPLEMENTS OF SPECIAL USE.

#### A. Flint and other stone-working.

FLINT-FLAKER (kt'g-lix).—Nine specimens. Short rod of metal, boné or stone, in ivory handle, for chipping flints.

and the second s					
Collectors' numbers	77 56551	794 89260 .	796 89261	1979 89265	1001 89264
Collectors' numbers		1004e 89265 -	1216 89782	1223 89262	11380 89259

#### B. Fire-making and utilizing.

FIRE-DRILL  $(ni\text{-}o\text{-}o\text{-}ti\bar{n})$ .—One specimen. A stick like a drill-shaft, made to revolve on the flat surface of a cleft soft wood stick, by means of a thong. A deer's ankle-bone held in the teeth serves to steady the drill. Newly made, but of the pattern with which fire used to be obtained.

Collectors' number	1080 8 <b>98</b> 22
Willow Catkins (kim-mi-n-rn).—Two specimens.—Used for tinde	r.
Collectors' numbers. 1133 Museum numbers. 89825	1722 89825
WILLOW-TWIGS (&*/k-pik).—One specimen. Used for kindlings.	
Collectors' number	1725

#### C. Bow and arrow-making.

SINEW TOOLS,-Two specimens. Flat ivory pins for working the sinew reinforcements on a bow.

Collectors' number Museum number	 	 •		11021 89460
			1	

Arrow-tool (i'g-u-gxau).—One specimen. Slender, flat rod of ivory, with wedge-point, for fixing feathers on arrows.

Collectors' number	1285
Museum number	89486

#### D. Fishing implements other than weapons.

FISH-HOOK (iak-qluñ).—Seven specimens. Oblong, narrow, flat piece of ivory, with a metal hook (either a regular barbed white man's fish-hook, or a barbless hook of iron or copper, native made) at broader end; used for catching burbot in rivers.

Collectors' numbers		149 56504	167 56304	764	780 89550	841 887 89552 89549
atuseum monocis	* 16313514	4,0004	00004	6-11-11-11-11	60000	90005 . 90040

SMALL FISH-HOOKS (ni'ksin).—Thirteen specimens. Small piece of ivory, generally discolored, with a barbless book, forming a rough imitation of a shrimp or minnow; sometimes inlaid with beads.

Collectors' numbers' Museum numbers	1150 56705	*153 56609	158 56700	<sup>2</sup> 160 56610	950 89554	$^{1007}_{89783}$	
Three speci	mens.	2 F	our spec	imens.			١

#### EXPEDITION TO POINT BARROW, ALASKA.

FISH "JIGGERS" (nt'k-sin).—Two specimens.	Little pear-shaped piece of white ivory, with
four barbless, generally copper, hooks at large end,	for "jigging" polar cod without bait.

ca

OB

inte

dra

wate

long.

with

FISH-LINE COMPLETE.—Ten specimens. Lines of whalebone strips, knotted together of different lengths, provided with hooks and jigs of different sorts, for large or small fish.

Collecters' nambers	93 5654 3		171	157 5670)
Collectors rapiders	150		-916	
Museum machines		56714	89545 (	27547

1 Two specimens, baited - Two specimens,

HAIR-LINE (à'k-qlu-ua').—One specimen. Long fish-line of braided human hair.

 Collectors number
 110

 Museum number
 56545

FLIPPER "TOGGLES" (kå'g-o-tiå).—Two specimens. Two ivory whales, perforated so as to be fastened together by a stout thong. Said to be buttoned through holes in a whale's flippers to keep them in place while towing.

 Collectors' numbers
 1.27
 407

 Museum numbers
 2
 50580
 10598

IVORY SINKER (kia-bi-ca).-Five specimens. For burbot-lines,

 Collectors numbers
 52
 149
 2.59
 887

 Muscum numbers
 76794
 76591
 76777
 89549

Premiation of the Co.

NET-SINKER.—One specimen. An ancient black stone adze-blade, rigged for a net-sinker, with  $\epsilon$  whalebone lashing around it, making a becker

 Collectors' number
 208

 Museum number
 5068

Whaling float (a-po-tů/k-půů).—One specimen. Seal-skin to be inflated and attached to harpoon-line.

 Collectors' number
 538

 Museum ramber
 7358

FISH "GRAINS" (kāk-i'-bu-a).—One specimen. Three-pronged, of whalebone, wood, and iron. Short handle for striking fish in shallow water.

Collectors' number 1:27 Mascum namber 59901

Fish-net (kú-bra).—Four specimens. Made of whalebone strips or twisted sinew.

 Collectors analyrs
 147
 171
 112
 350

 Museum numbers
 56751
 56752
 56754
 56755

Semi-net  $(k\acute{a}\text{-}bra)$ .—One specimen. Made of scal-thong, about 15 feet long; usually set under the ice.

 Cellector : pendo y.
 160

 Mascara numba i.
 56756

SEAL DETECTOR.—Three specimens. Slender rod of ivory, placed in breathing-hole to indicate the approach of the scal.

Collectors' numbers | 104 | 1114 | 1581 Misseum numbers | 50507 | 89454 | 89453

SEAL DECOY (\$\delta \cdot dr \cdot -gau \cdot t \cdot a').—Six specimens. Seal claws mounted on a wooden handle, for scratching on the ice to attract seals.

SEAL RATTLE.—Two specimens. Piece of wood cut roughly in shape of scal's head, with a becket of thong in one end and a staple in the other, with three padlock-shaped pieces of iron hung on it. Lattle to attract scals into ice-nets.

SEAL-DRAG (iik-si-u-tiii).—Seven specimens. Thoug, with knobs for hauling dead seals.

Collectors numbers ... | 36 | 44 | 45 | 81 | 212 | 755 | 1237 Museum numbers ... | 56922 | 56624 | 56627 | 56625 | 56926 | 59469 | 89470

SEAL-DRAG KNOBS (uk-si'-u),—Seven specimens. Perforated knobs of ivory, generally carved into the heads of animals (bears, seals, &c.), for confining the two parts of raw-hide line used for dragging in dead seals, &c.

 Collecters' numbers
 418
 544
 5949

 Museum numbers
 565,5
 56600
 86450

 (Three specimens)
 7 Two specimens.

Handle for drag-line  $(k\dot{u}^i\hat{u}\cdot i)$ .—Six specimens. Ivory bar, ornamented with carving (heads of seals, &c.).

Collectors' numbers 23 86 835 925 929 930 Museum numbers 56527 56526 89488 89457 89455 89457

THREE-LEGGED STOOL (nìk-a-waú-o-tìn).—Two specimens. Made of wood, to stand on when watching seal holes.

to

 Collectors' numbers
 1411
 1412

 Museu, i numbers
 8987
 8988

#### E. Hunting implements, other than weapons.

Wolf-killers (b-i/b-ru).—Nineteen specimens. Pointed rods of whalebone, about 6 inches long. They are doubled up, wrapped in fat, and frozen. When swallowed by a wolf or bear the fat melts and the whalebone straightens out, piercing the coat of the stomach and causing death.

 Collectors' numbers.
 11220
 21232
 21316
 21584

 Museura numbers.
 89338
 89541
 89540
 89339

 <sup>1</sup> Seven specimens.
 <sup>2</sup> Four specimens.

Snow Goggles  $(id\cdot yi\cdot yuu)$ .—Four specimens. Cover for the eyes, made of wood or antler, with long, narrow, horizontal slits, to protect the eyes from the glare of the snow.

 Collectors' numbers
 754
 763
 1296
 1 708

 Mass um numbers
 89703
 89701
 89702
 89894

MARK FOR CÁCHE  $(t\hat{w}^{\prime}k|u.u.a)$ .—One specimen. Rod of ivory, with bunch of feathers at the top. Stuck in the snow to indicate where meat is buried.

															1	-
Collectors' number	 	 	 	 	 	0.0						 				9
Museum number																895
WI DAG HIN BUILDING							٠.		• •	 ٠.		 		• •		990

#### F. Leather-working tools.

SKIN-SCRAPER (i'-kun).—Nineteen specimens. A chipped flint or ground stone blade, mounted in a handle of wood or ivory, used for dressing skins.

Collectors' numbers 4	20	14H	184	1748	9820	1858	
Museum numbers 58550		56549	56548	29317	89612	80021	
Collectors' numbers	955	1071	1079	1135	1156	1171	
	89313	80310	80311	893 <b>09</b>	89316	80320	
Collectors numbers	1177 .	1336	1364	1365	1426	11780	
	89316	80312 ·	80319	80315	89322	89314	

Hamile. <sup>2</sup> Blad

BONE SCRAPER.—One specimen. Made of a piece of long bone, with faces carved on the condyles.

	Collectors' number	1578
1	Museum number	89488

IVORY OIL-CUTS ( $\acute{o}$ -ho-rwii),—Ten specimens. Small oblong ivory cups, with sharp edges, used for scraping blubber from skins to save it.

Collectors' numbers	38 156603	1088 89257	1090 39258	1190 H0234	1287 89251	
Collectors' numbers		1288	1289	1416	1417	

Two specimens.

DEERSKIN COMBS  $(k\acute{u} \cdot mo \cdot tin)$ .—Nine specimens.—Short cylindrical hollow piece of antler, with comb-teeth cut on one or both ends. Used for combing loose hair out of deer-skin.

Collectors' numbers	34 - 56585	897 89360	962 89358	903 89337	993 89359	
Collectors' numbers		1005 89781	1017 89336	1029 89355	1579 : 89354 :	

for c

bone

#### G. Builders' tools.

MATTOCK.—Six specimens. Made of whale-rib, lashed to haft. Used for digging in the gravel.

Collectors' numbers	285	297	768	879	1043	1315
Museum numbers	56494	73574				
			49842	3/9#4T	9994411	115608

PICK-AXE  $(si\cdot kl\dot{u})$ .—Two specimens. Made of a piece of walrus-tusk, following the natural curve of the tusk. When hafted, attached to a wooden handle like an adze by lashings of sealthong.

	*	
Collectors' numbers Museum numbers	 	17 : 496 56542 56539
	necimens.	

Snow-knife (\*av-i-ú-ra).—Two specimens. Long, flat, curved knife of ivory, for cutting snow.

ì	A T TABLE SAME THE TABLE AND AND ADDRESS OF THE PARTY OF		
į	Collectors' number	82	759
į	Museum number	36508	89478

EXPEDITION TO POINT RARROW, ALASKA. 79
Bone snow-pick.—One specimen. Small drill-like tool of bone, set into a handle of anticr just large enough to grasp conveniently in the hand. Ancient.
Collectors' number 1240 Museum number 80521
Snow-shovel edge.—One specimen. Made of ivory, and grooved on upper edge for attachment to edge of wooden snow-shovel.
Collectors' number 16 Museum number 55341
Snow-shovel $(pi'k\cdot sun)$ .—Two specimens. Short, broad blade and short handle made or wood; either one piece or several spliced together with whalebone withes; edge of ivory.
Collectors' numbers         27         30           Museum numbers         56738         56739
Snowshovel, bone $(p\tilde{r}'k\cdot sun)$ .—One specimen. Made of a whale's scapula painted and soiled to look old.
Collectors' number
ICE-PICK $(t\acute{u}\cdot u)$ .—One specimen. Bayonet-shaped blade of bone or ivory, to be attached to seal harpoon or to a pole.
Collectors number 1313 Museum number 494×3
ICE-DRILL (kůk-aí-ya-xi-on).—One specimen. Of antier, to be mounted on a long pole.
Collectors' number 1064 Muzeum number 59479
ICE-SCOOP.—One specimen. Made of antier netted with whalebone mounted on long pole, for dipping up fragments of ice in cutting a hole.
Collectors' number . 1896 Mussum number . 80003
K. Procuring and manufacturing food,
SLATE WHALE-SPADE $(\vec{u} \cdot y \vec{u}m \cdot i \cdot g \vec{u})$ .—Two specimens. Broad blade of slate, to be attached to bone haft, which is fastened to a long pole, for "cutting in" a whale.
Collectors numbers         803         1081           Museum numbers         89602         89631
FISH-SCALER.—One specimen. Little ivory knife.
Collectors' number 1270 Museum number 89461

SLATE BLUBBER-KNIFE.—One specimen. Long, broad blade, double-edged.

ELUBBER-HOOK (ni'k st-gai).—Three specimens. Wooden handle with bone or ivory barb at end, for pulling around pieces of blubber, &c., long-handled to use from a boat in "entting in" a whale, and short handled to use in the storchouses ashore.

 Collectors modeles
 126
 1203
 1 77

 Marco Process
 56760
 80806
 80807

N. Making and working fiber.

NETTING NEEDLE (Parma creing).—Twelve specimens.—Of ivory or antier.—Different sizes, for making fish and seal netc.

 Collectives numbered.
 Jon. 8
 14
 42
 164
 169

 Messicon numbers
 965 (1374) 5074
 1031 (256) 7564

 Colastres numbers
 942 (90) (153) 1266
 1266 (153) 134
 134

 Massicon cumbors
 1431 (291) (2802) 28030
 80100 (802) 2045

Two spendences

MESH-STICK  $(k\delta(kr)n)$ .—Five specimens. Of ivory or untler. Various sizes, for fish or seal nets.

| College | Coll

NETTING WITGHT'S (nep + lar ra).— Eleven specimens.—Little is any fish hung on to meshes of net to make it hang properly while netting.

Collect es no bessent to the Collect established to the Museum monares to the Collect established to t

· i'...

SINEW SHUTTLE.—One specimen. Short shuttle of bone or ivory for twisting and holding sinew thread.

 $We aving \text{-} tools. \textbf{—} One \text{ specimen.} \quad Bone \text{ shuttle, spatula, and mesh-stick for weaving feather belts.}$ 

Bone-needles  $(mi'k \circ nn)$ .—Fifty-one specimens. Made of reindeer's fibula  $(a \cdot mi'l \ gn \ r \hat{u} \hat{n})$ . Obsolete.

 Collectors remakers
 91191
 1195
 1201
 1202
 1203

 Museum a, and e, s
 89389
 89392
 89360
 89360
 89361
 89397

 Collectors numbers
 41205
 1214
 41220
 1221
 1212

 Museum numbers
 89398
 89390
 8940
 80500
 89500

 Collectors numbers
 41228
 1230
 41240
 41245
 71240

 Museum numbers
 89401
 89361
 89301
 89305
 89305
 89306

Two specimens.
Three specimens.
Four specimens.

4 Five specimens.

8 Six specimens.

<sup>6</sup> Thirteen specimens <sup>7</sup> Seven specimens. of

pad

boa

NEEDLE-CASE (il-ga-mi).—Thirteen specimens. Hollow cylinder of ivory or bone, with a strip of raw-hide in which the needles are stuck, run through it, and held by an ivory knob at the end. Fastened to the belt by an ivory hook.

Collectors' numbers		1033 (037)	10=0	1105 >9493	\$1017 8110645	1:01 5:01
Collectors unsubstra	1222	1239	1244	1270	1277	1.030

THIMBLE (B'k-k)(l).—Ten specimens. Of three patterns, viz: a simple rather broad band of walrus-hide sewed into a ring to fit the tip of the finger; a ring and lappet cut out of one piece of seal skin; and a ring of anther with a broad piece on one side.

Collectors numbers	1101	11194	1105	1202	1240	#1245	1246
Mircum numbers	PBGeD	89393	+0092	89301	80404	#8665	e6666
Physics str	o o imagen	10	Cran.	tier ittee	l		

THREAD-CASE.—Nine specimens. Tube of auther with wooden ends for holding thread, &c., cometimes engraved with pictures or patterns.

Collectors' numbers	41	47	29	112H	1139
	56615	56006	2001.3	F1FEG #	89406
Collectors' numbers	1158	1335	1359	1371	

IVORY BOX .- Three specimens. Used for holding beads, needles, and trinkets.

Collectors' numbers	37	1 172	1425
Massama combets	56589	16 D D D D D	551107

WICKER-BOX  $(i\cdot pi\cdot d\cdot ru)$ .—Four specimens. Little round basket of woven osier, with Lag-top of black dressed seal-skin  $(yvka^ikyla\hat{u})$  and a draw-string, for holding tobacco or trinkets.

Collectors' numbers	114	135	1366	14 '7
Museum tumburs	17/564	56565	80-01	8594.2

#### (7) MEANS OF LOCOMOTION AND TRANSPORTATION.

#### A. Traveling by water.

CANCE AND FADDLE (kai'-ak).—One specimen. Full-sized single canoe and double bladed paddle.

Collectors number	 	509
Museum numbers	 	\$ 207773
		,

Paddle, 2 Cape

Model canoe (kai'-ak).—One specimen. Small model of man's single canoe with paddle

Codecte's number	
Mu cara marder	

Model. Skin boat  $(n \cdot mil \cdot a(k))$ .—One specimen.—Small model of the large traveling and whaling boat, with paddles.

Pelle ters number 2.5 Museum number 5056

H. Ex. 44 11

ROWLOCK FOR UMLAK.—One specimen. A long straight piece of anther lashed on the gauwale of the boat. The oar plays on it in a loop of thong.

Collectors' mumber 1195 Museum number 8669

Bailing dipper for umlak (sá-nai un?).—Two specimens. Long, slender, curved dipper of ivory or anther.

 Collectors' numbers
 40
 1010

 Museum ambers
 56536
 89335

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atta

Toy.

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padd

Crotch for whaling harpoon (kå'n-nå).—Five specimens. Made of ivery or walrus lower jaw, in shape of a large row-lock, usually carved and engraved. Fastened in the bow of the whaling umiak to rest the harpoon in.

 Collectors numbers
 116
 117
 926
 1104
 1224

 Museum numbers
 56511
 56510
 9919
 89417
 8948

D. Land conveyances and other means of locomotion.

MEAT-SLED.—One specimen. Little flat sled of wood, with ivory runners, for dragging provisions.

Collectors number 114

Museum number 8988

Whalebone sled,—One specimen. Little sled made of strips of whalebone placed side by side lengthwise, and sewed together with whalebone withes.

 Collectors' number
 772

 Museum number
 89875

C. Traveling on foot.

Snowshops  $(t\hat{a}\hat{g}^* \cdot lu)$ .—Three specimens. Wooden frame netted with raw hide.

 Collectors' numbers
 1736
 4737
 4738

 Museum numbers
 89012
 89013
 89014

(10) GAMES AND PASTIMES.

A. Gambling implements.

PLAYE: C-STICKS (ka-pú-tii).—Nine specimens. Two ivory pegs and a bundle of ivory sticks for playing a game.

 Collectors' numbers
 9
 \*1249
 \*2842
 \*3662

 Museum numbers
 56532
 56521
 89464
 \*9465

<sup>1</sup>Two sticks, <sup>2</sup>Two sticks and peg. <sup>3</sup>Four sticks.

IVORY CARVINGS.—Twenty five specimens. Twenty-five little ivory carvings, representing a fox and twenty-four geese, made by the Asiatic Eskimos ("Tuski," "Sedentary Chu';ches") of Plover Bay, Eastern Siberia. Said to be a game like "jack-straws."

 Collectors number
 21

 Museus number
 50531

#### B. Games and pastimes.

WOODEN GORGET  $(s\hat{u}^{\prime}k)\cdot mu\hat{u})$ .—Three specimens. Half-moon shaped piece of flat board, serrated on the curved edge, and painted with figures of men, whales, &c. Suspended round the neck with strings in ceremonial dances.

 Collectors' numbers
 265
 855
 1133

 Museum numbers
 56405
 89817
 89818

MOUNTED FOX-SKIN.—One specimen. Skin of an Arctic fox stuffed and mounted on a board, with a whalebone spring in him, and worked by strings so that he darts his head at a bunch of fur made to represent a lemming; and made, by means of strings, to run in and out of two holes in the board. For theatrical performances.

Collectors' mouber 1375 Museum number 8889

#### C. Sports and toys for children.

\*Snapper" (mi-tig-b-gaun).—One specimen. Rod of whalebone with a hollow on one end, for "snapping" little pebbles or shot at people. Boy's toy.

 Collectors number
 181

 Museum number
 56687

"Whirligis," or tor (kaip-sa),—Two specimens. A large conical piece of wood or horn, with a slender axis of bone at the base thrust through a hollow cylinder of antler. The top is made to spin by a string passing through a hole in the side of the cylinder to the axis. Toy.

 Collectors'numbers
 1198
 135

 Museum numbers
 89806
 89807

WHIZZING STICK (im-iy-bik-ta).—One specimen. Oval piece of flat board, with serrated edges, attached to a stick by a string. Makes a lond whizzing sound when swung around.

 Collectors' number
 1331

 Museum number
 80800

The totum  $(kraip\cdot sa)$ .—One specimen. Disk of wood, with a short stick through the middle. Toy.

Collectors' number 46 Museum number 56491

"BUZZ" TOY.—One specimen. Square flat piece of wood, with serrated edges, made to spin by two pieces of string.

Collectors' number 1087 Museum number 80722

Toy man in Kaiak.—Two specimens. Kaiak carved from a block of wood; man sitting in it paddling; arms worked by strings.

 Collectors' numbers
 1783
 1351

 Museum numbers
 89856
 89856

<sup>1</sup> Unfinished.

TOY DRUM AND STICK .- One specimen. Small model of the ordinary drum.

 Collectors number
 118

 Museum number
 8970;

#### EXPEDITION TO POINT BARROW, ALASKA.

Toy spear (kap ú-ra).—One specimen.	Miniature deer-lance	(kà/n-un)	made of antler.
101 SPEAR (kap a-ra),—One specimen.	Miniature activance	(ne penn)	made of antici-

Model whale harpoon  $(a'j\cdot y\hat{u}\hat{u})$ .—One specimen. Small model made of wood and ivery of a complete whaling harpoon, rigged, with line and two floats, or "pokes"  $(a'\cdot po\cdot t\hat{u}'k\cdot p\hat{u}\hat{u})$ .

Collectors manher 233

Toy  $spear(u\cdot nd\cdot ra?)$ .—One specimen. Miniature model of seal-harpoon, made of wood and ivory.

#### (11) Music.

#### A. Instruments for beating.

DRUM (kë'l-yau).—Four specimens. A large hoop of wood, with a short ivory handle, and parchment (walrus intestine) stretched over it. Held by handle in left hand and struck on rim with a stick held in right hand.

 Collectors' numbers
 51
 79
 80
 514

 Museum numbers
 56743
 5741
 56740
 56742

DRUM HANDLE.—Seven specimens. Carved from walrus ivory.

 Collectors numbers
 65
 76
 784
 881
 898
 911
 975

 Museum numbers
 58514
 58515
 89266
 89270
 89267
 89268
 89269

#### (12) ART.

#### A. Art materials.

Fossil ivory  $(k\vec{u}\cdot l'y\cdot w\vec{u})$ .—One specimen. Section of a large tusk from interior.

Collectors' number 1773 Museum number 8989

#### B. Works of art.

IVORY CARVINGS.—Thirty-seven specimens. Small images, human figures, seals.  $\circ$  &c. Works of art or amulets.

Collectors' numbers Museum numbers					1173 56582	201	
Collectors numbers Muscum numbers	220 56530	254 56520	444 567:12	953 8934 <b>0</b>	980 89549	989 89342	
Collectors' numbers			192 89311	999 89330	11024 x893207 789324x	1007 89004	
Collectors' numbers Museum numbers				1099 89339	1100 89352	1101 89329	
Collectors numbers							

Two specimens.

IVORY BUTTONS.—Two specimens. C | ved in shape of "bowhead" whale.

 Collectors' number
 \*166

 Museum number
 50619

<sup>1</sup> Two specimens,

1

80

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W

Old

WOO

eart

IVORY CARVINGS.—Four specimens. Walrus teeth carved into human faces, seal and bear heads, &c.

 Collectors' numbers
 152
 15

 Museum numbers
 56523
 56523

<sup>1</sup> Two specimen

CRUCIFIX (?).—Two specimens. Slender *crux ansata* of ivory surmounted by a human head of soapstone or bone, neatly secured by lashings. Made for sale, probably a mere "curio," perhaps suggested by a crucifix which the maker may have seen.

 Collectors' mashers
 1012
 109

 Museum numbers
 0541
 8953

ıd

im

ENGRAVINGS ON IVORY.—Six specimens. Pieces of flat walrus ivory, o 1 shovel edges, &c., on which are scratched various pictures, hunting records, &c., colored with soot or red ochre.

 Collectors numbers
 20
 121
 890
 1026
 1334
 1349

 Museum numbers
 56509
 56517
 89424
 89137
 89174
 89473

BONE CARVINGS (saú-nii=bone).—Eleven specimens. Small images, seals, human figures, &c. Works of art or amulets.

 Collectors numbers
 75
 997
 1025
 466
 1127
 1143

 Museum numbers
 5559
 89471
 8933
 89499
 89348
 8933

 Collectors' aumbers
 1160
 1167
 1272
 1275
 1369

 Museum numbers
 89035
 89348
 89344
 89335
 8946

WOODEN WHALES, &c.—Five specimens. Seals, whales, and walruses carved in soft wood. Old and probably for good luck.

 Collectors numbers
 J857
 987
 1036
 1290

 Museum numbers
 89736 / 89734
 89735
 89734
 89735
 89524

Two specimens

WOODEN IMAGES.—Six specimens. Men or women, more or less roughly whittled out of wood. Work of art or toys.

 Collectors numbers
 1203
 655
 1185
 1192
 1196

 Museum numbers
 56495
 56490
 89725
 89726
 89726

<sup>1</sup>Two specimens.

Gypsum carvings.—Three specimens. Man, beluga, and bear. Made for sale.

 Collectors' numbers
 1014
 1015
 1027

 Museum numbers
 89575
 89573
 89574

Soarstone carvings,—Seventeen specimens. Little images, men, beasts, and monsters, earved in soarstone  $(tu\text{-}n\hat{a}'k\text{-}t\hat{u})$ .

| Collectors' numbers | 904 | 906 | 986 | 10.55 | 1108 | Museum numbers | 9.567 | 89576 | 89576 | 89566 | 89566 | 89566 | 89566 | 89566 | 89566 | 1108 | 1108 | 1252 | 1253 | 1266 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 1260 | 126

<sup>1</sup>Two specimers

BUAR'S JAWS -- One specimen. Mounted in seal-skin for sale by a native taxidermist.

Carbo tors number 1130
Museron number 89823

FRESH-WATER SCULPTN.—One specimen. Carefully put up dry in a little wooden case by a native and brought in for sale.

Collectors number 1145 Museum number 89536

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#### (17.) Religion.

STONE AMULETS.—Seven specimens. Flint, jasper, crystal, or thick glass, flaked into a rude image of a whale or bear.

 Collectors' numbers
 61
 150
 208
 771
 909
 4051
 1247

 Masseum numbers
 56683
 56767
 56763
 89610
 89577
 89578
 89533

Charms.—Thirteen specimens. Dried birds, bits of antler, fawns' feet, bits of earth, pebbles, feathers, teeth, &c., worn or carried in the boat, &c., for good luck, each generally with some specific purpose.

 Collectors numbers
 656
 770
 1110
 1148
 1173
 1244
 1306

 Museum numbers
 36547
 89699
 89743
 89462
 89522
 89553
 89534

 Collectors numbers
 1307
 1308
 1314
 1327
 1328
 1580
 ...

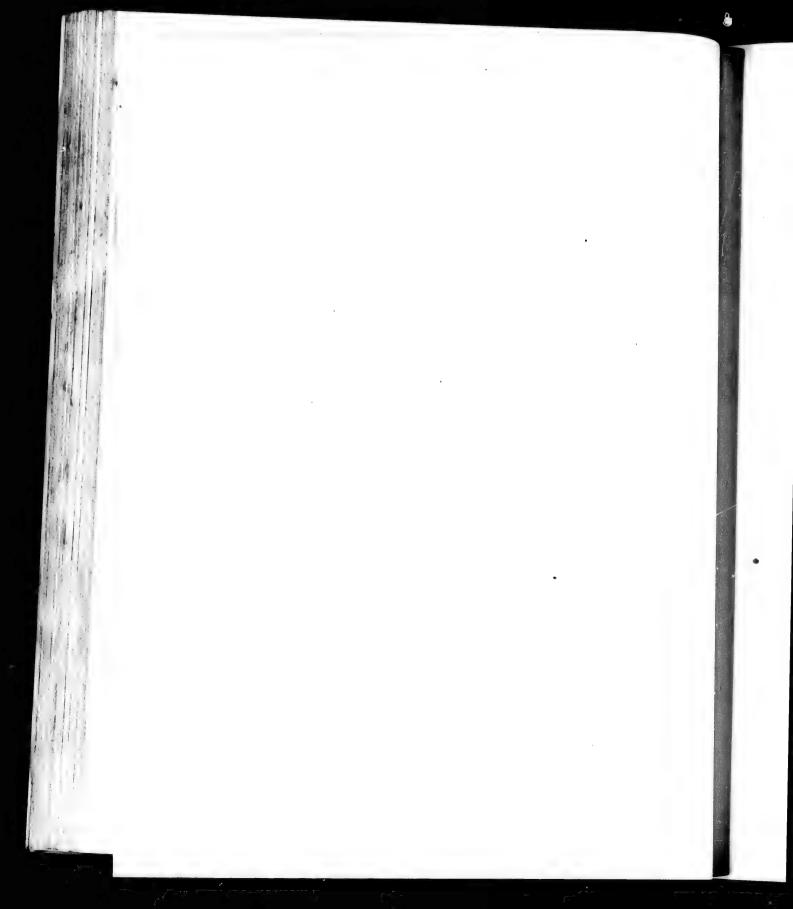
 Museum numbers
 89532
 89525
 89526
 89526
 89526
 89526
 89526
 89527
 89526
 89527

"ICE-MEDICINE."—One specimen. Indurated sand, probably from some special (sacred?) place. Small particles thrown, with ceremony, from the village bank will make the ice go away.

| Collectors' number | 27 | Museum number | 5672|

#### ALPHABET.

- a. as in far, farther; Gm. haben; Sp. ramo.
- d. nearly as in what, not: Gm. man: as of in Fr. lol.
- ä. as in hat, man.
- d. as in law, all, lord: Fr. or.
- ai, as in aisle, as i in pine, find; Gm. Hain.
- di, as of in boil, soil; Sp. oyendo, coyole.
- an, as on in out, as ow in how; Gm. Haus; Sp. auto.
- b, as in blab; Gm. beben; Fr. belle; Sp. bajar.
- c. as sh in shall; Gm. schellen; Fr. charmer.
- c, as the in thin, forth.
- ¢, as th in then, though,
- d, as in dread; Gm. das; Fr. de; Sp. dedo.
- e, as in they; Gm. Dehnung; Fr. de; Sp. qué.
- č. as in then; Gm. denn; Fr. sienne; Sp. comen.
- f, as in fife; Gm. Fener; Fr. fen; Sp. fumar.
- g, as in gig; Gm. geben: Fr. goût: Sp. gozar.
- h. as in ha, he: Cim. haben.
- i, as in pique; Gm. ihn; Fr. île; Sp. hijo.
- i, as in pick; (im. will,
- j, as z in azure; j, in Fr. Jacques: Portuguese Joan.
- k, as in kick; Gm. Kind; Fr. quart; Sp. querir.
- 1, as in lull; Gm. lallen; Fr. lourd; Sp. lento.
- m, as in mum; Gm. Mutter; Fr. me; Sp. menos.
- n, as in nun; Gm. Nonne; Fr. ne; Sp. nada.
- u, as ng in sing, singer; Sp. luengo.
- e. as in note: Gm. Bogen: Fr. nos.
- b. nearly as in (N. E.) home; Gm. soll: Tr. sotte; It. solto, Sp. sol.
- p, as in pipe; Gm. Puppe: Fr. poupe; Sp. popa.
- q, as ch in Gm, ich, or ch in ach, if the former is not found.
- r, as in roaring; Gm. rühren; Fr. rare; Sp. razgar.
- s, as in sauce; Gm. Sack: Fr. sauce; Sp. sordo.
- t. as in touch; Gm. Tag; Fr. tater; Sp. tomar. u, as in rule; Gm. du: Fr. doux. Sp. uno.
- ù, as in pull, full ; Gm. und.
- ii. as in Gm. kühl: Fr. tu.
- ú. as in but: Fr. pleuvoir.
- v, as in valve : Fr. rene : Sp. volver ; and as w in Gm. wenn.
- w, as in wish; nearly as ou in Fr. odi.
- $x_i$  nearly as the Arabic ghain (the sonant of q).
- y, as in you; Sp. ya: as j in Gm. ja.
- z, as z and s in zones: Gm. Hase: Fr. zèle: Sp. roza.
- dj, as i in judge.
- hw, as wh in when: Sp. huerta.
- hy, as in hue
- ly, as lli in million; as ll in Fr. brilliant; Sp. Hano; and as gl in It. moglic.
- ng, as in finger, langer
- ny, as ni in onton : as ñ in cañon : Fr. agueau ; Sp. maraña.
- te, as ch in church, and c in It, ciclo; Sp. achaque,
  - Excessive prolongation of a vowel should be marked thus: a+,  $\dot{a}+$ ,  $\ddot{a}+$ ,
  - Nasalized vowels should be written with a superior  $u_i$  thus:  $e^{u_i}$ ,  $\hat{u}^{u_i}$ ,  $\hat{u}^{u_i}$
  - An aspirated sound should be marked by an inverted comma, thus:  $b^i$ ,  $d^i$ ,
- An exploded sound or hiatus should be marked by an apostrophe, thus: U, d'.
- Synthetic sounds should be written with the letter which represents the sound which seems to be most commonly emitted.
  - Syllables should be separated by hyphens. In connected texts hyphens should be omitted,
  - The accented syllable of every word should be marked by an acute accent, thus: ten-ar'-u-um-pu run-kant.





#### ETHNOLOGY.

#### PLATE I.

#### PIPES, ETC. POINT BARROW ESKIMOS.

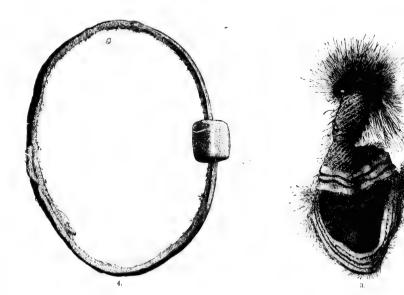
- Tobacco-pipe with bowl of brass, inlaid with copper: stem of wood in two sections, held together by sealthong. Steel picker attached by a thong. \(\frac{1}{2}\). No. 89288.
   Similar pipe with bowl of antier, wound with twine of braided sinew. \(\frac{1}{2}\). No. 89291.

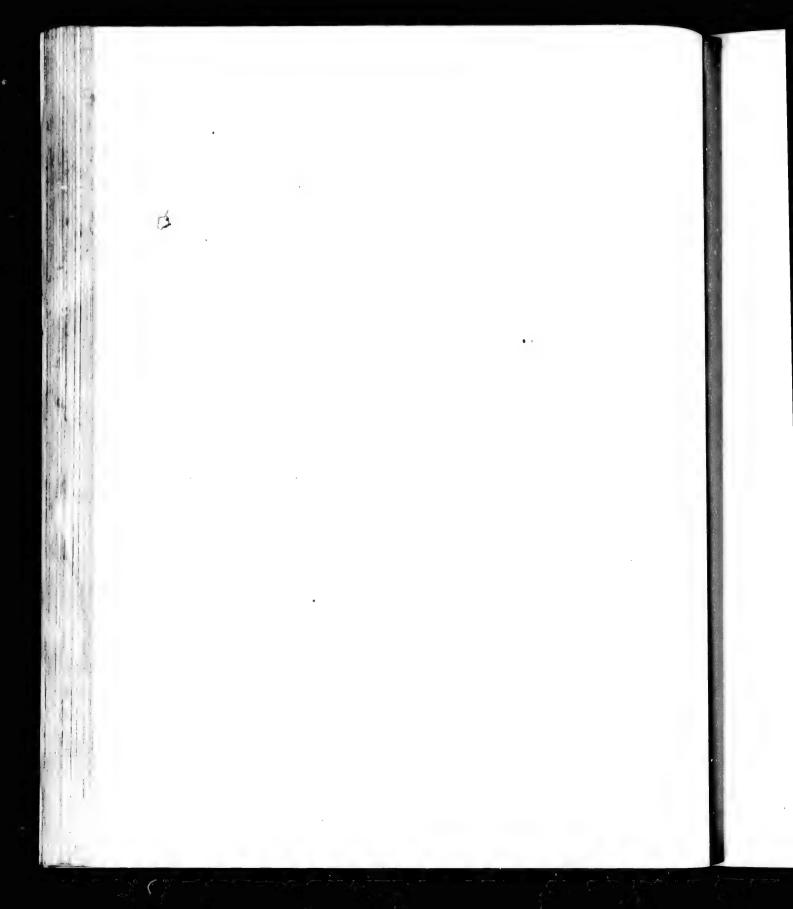
- 2. Similar pipe with bow to fairly, would with turn 4. No. 89895.
  4. Man's bracelet of walrus-hide, ornamented with a bead of soapstone. Natural size. No. 89388.

(Drawn by C. F. Trill.)









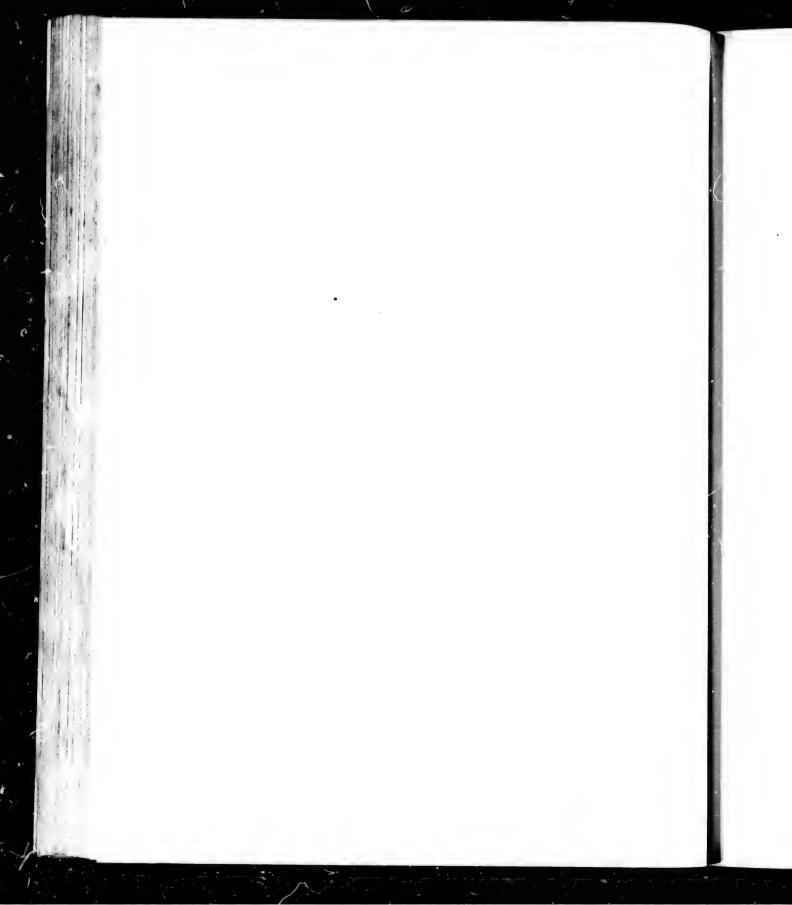


### PLATE II.

### TOOLS. POINT BARROW ESKIMOS.

- Steel-pointed bow-drill, with ivory sheath. ½. Nos. 89502 and 89447.
   Ivory drill-bow. ½. No. 89545.
   Wooden mouth-piece, with stone socket for drill. ½. No. 89500.
   Flint-pointed hand-drill. ½. No. 89626.
   Ground adze-head of jade. ½. No. 56667.
   Stone maul, with wooden haft. Head of light greenish, massive pectolite. ½. No. 56635.





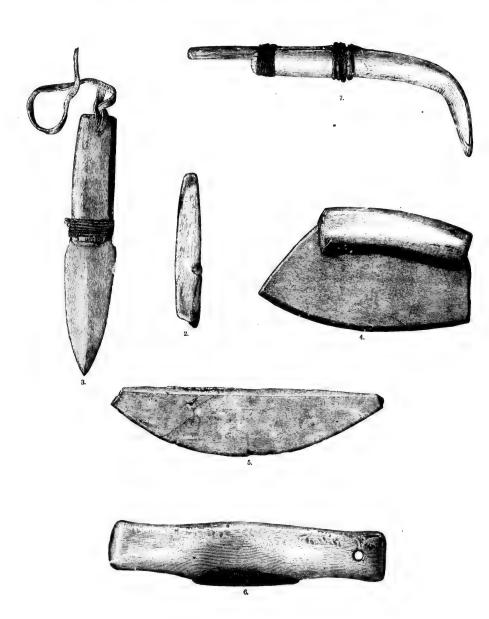


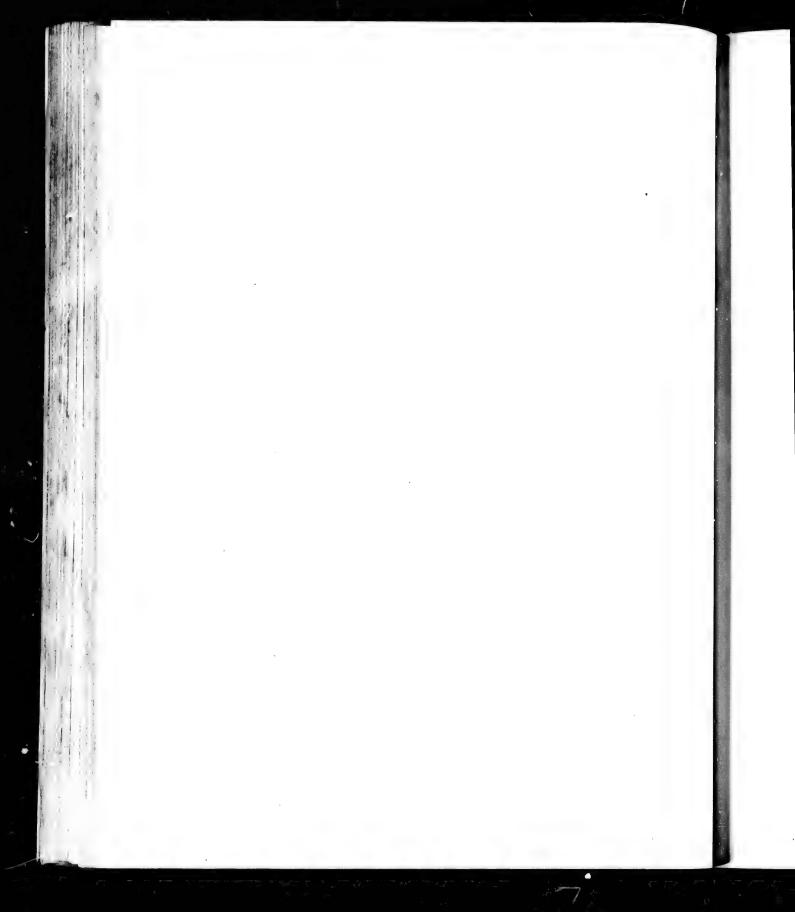
### PLATE III.

### TOOLS. POINT BARROW ESKIMOS.

- Large "crooked knife" for wood-working. Steel blade, antler handle. Left-handed. 1. No. 89283.
   Small "crooked knife" for cutting bone or ivory. 1. No. 89632.
   Man's knife of slate, with wooden handle. Antique. 1. No. 89584.
   Woman's knife of black slate, handle of antler. 1. No. 89584.
   Woman's knife of polished light green jade. 1. No. 56660.
   Slade of a similar knife of polished light green jade. 1. No. 56660.
   Shave" for scraping whalebone, with steel blade and ivory handle. Natural size. No. 89306.
   Tool for flaking flints. A rod of hard bone, mounted in an ivory handle. 1. No. 89262.







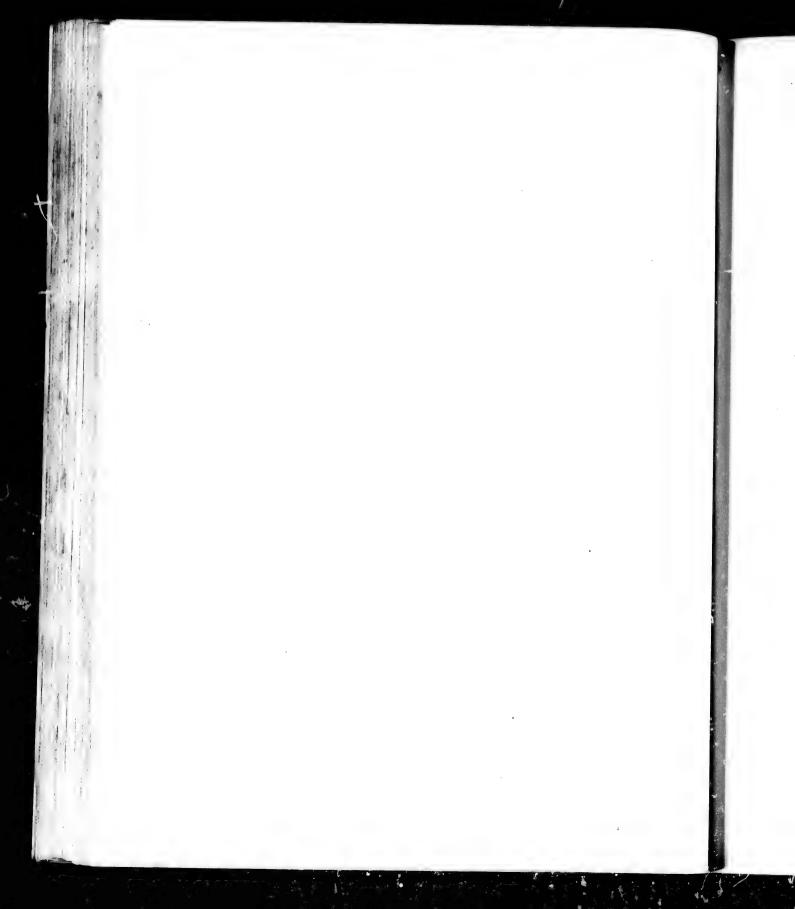


### PLATE IV.

### SPEAR-HEADS, ETC. POINT BARROW ESKIMOS.

- Black flint whale-lance head. ½. No. 56679.

- Similar head with part of shaft. ½. No. 89506
   Similar head with part of shaft. ½. No. 89506
   Head for deer-lance, of polished olive-green jade. ½. No. 89610.
   Ground slate blade for whaling harpoon. ½. No. 89606.
   Antique bone toggle-head for seal harpoon. Back and side view. ½. No. 89378.
   Drinking-cup of fossil ivory. ½. No. 89830.





### PLATE V.

### LABRETS AND WORKS OF ART, POINT BARROW ESKIMOS.

- Antique single labret of polished light green jade. Back and side view. Natural size. No. 89705.
   Sienite labret, one of a pair. Back and side view. Natural size. No. 56716.
   Plug labret of bright green stone (jade?). Freet and side view. Natural size. No. 89706.
- 4. Slate lancet for cutting labret-holes, with wooden case. Natural size. No. 89721.
- Polar bear cutved in soapstone. \(\frac{1}{2}\). No. \(\frac{4}{9}\)566.
- 6. Ivory carving, dead seaf with drag-line, ½, No. 89330.
  7. Ivory carving, grotesque figure, "walrus-man." ½. No. 89332.

Ethnology.

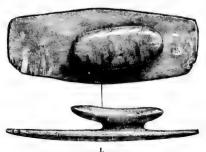
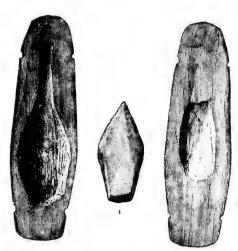


PLATE V.



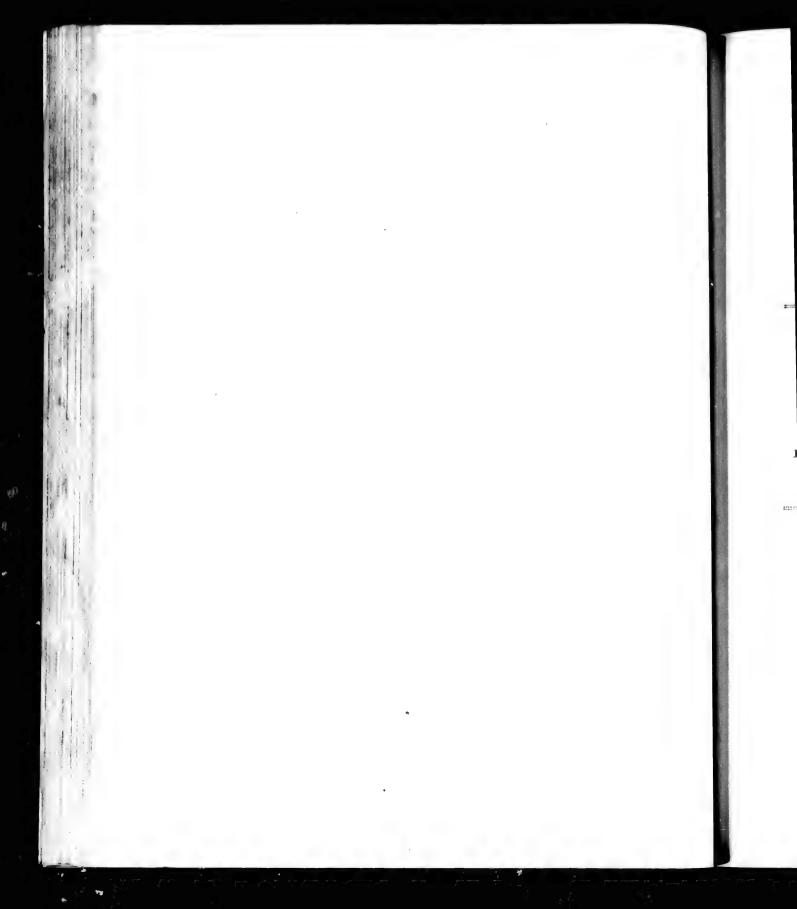












## PART IV.

# NATURAL HISTORY.

By JOHN MURDOCH, A. M., Sergeant Signal Corps, U. S. Army.

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# NATURAL HISTORY.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

#### INTRODUCTORY.

The following report on the Natural History of the Point-Barrow Expedition is presented by the writer, to whose charge the collections and notes were intrusted. Part of the material has been turned over to specialists for study, and part has been worked up by the writer himself.

The writer desires to express his thanks to Prof. S. F. Baird, director of the United States National Museum, for affording him every possible convenience in the way of laboratory accommodation at the Smithsonian Institution, and access to the libraries of the Institution, as well as for much valuable assistance and advice. He is indebted to the curators and assistants of the Museum, especially to Messes, Robert Ridgway, Richard Rathbun, W. H. Dall, and T. H. Bean, for much willing and valuable assistance and advice. To Mr. Dall he is also particularly indebted for access to his valuable library.

He desires especially to acknowledge the assistance rendered him by Mr. James E. Benedict, naturalist of the U. S. Fish Commission steamer Albatross, who placed his books and his time at the writer's disposal, for the identification of the collection of Worms,

Prof. Asa Gray, of Cambridge, Prof. C. V. Riley, of the Department of Agriculture, Mr. W. H. Dall, of Washington, and Mr. J. W. Fewkes, of Cambridge (the last as a personal favor to the writer), have kindly prepared special reports on the Plants, Insects, Mollusks and Acalephs, respectively.

Professors A. E. Verrill and O. Harger, of Yale College, and A. S. Packard, jr., of Brown University, and the Bon. Theodore Lyman, of Massachusetts, have kindly furnished the writer with valuable assistance and many suggestions.

The Eskimo name of each animal has been appended wherever it was possible to obtain it. The report consists of the following divisions:

- L - Mammals
- II. Birds.
- III.- Fishes.
- IV. ... Insects.
- V. -Marine Invertebrates, exclusive of Mollusks
- VI. Mollusks.
- VII. Collecting-localities and dredging-stations.
- VIII. Plants

#### APPENDIX

- A.- Notes on Surface Life under the Seasice.
- E.—Notes on Surface Life, observed during the voyage from San Francisco to Point Barrow, and during the season of open water at Point Barrow.
- C. List of Bird's noticed at Ployer Bay, Eastern Siberia

### I.-MAMMALS.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

The following report contains all the information we were able to gather concerning the mammals inhabiting that portion of Northwestern Alaska traveled over by the Eskimos of Point Barrow in their hunting and trading expeditions.

From the character of the country and the necessarily confining nature of our duties at the station, much of it was obtained by hearsay from the natives, though the exploring and hunting expeditions made by Lieutenant Ray and Captain Herendeen added considerably to our knowledge

Marine mammals, of course, predominated in the immediate vicinity of the station, the Arctic Fox and the two species of Lemming being the only land mammals that were at all abundant. Of the larger mammals the most abundant are the Reindeer and the Ringed Seal, which form the staple food of the natives.

### LIST OF MAMMALS.

- 1 Canis occidentalis grisco-albus Bd. Wolf (Amázo).
- Vulpes fulvus (Desm.) DeKay. | Rud Fox (Kaià/ktūk, Kanā ktua).
- Vulpes fulvus argentatus Aud. A. Bach. BLACK Fox (Kaià ktûk).
- Vulpes lagopus (Linn. : And. & Bach. Arctic Fox (Teri gânia).
- Gulo luscus (Linn.) J. Sab. WOLVERINE (Ka bwin).
- Putorius erminea (Linn.) Griff. | ERMINE (Teria).
- Ursus arctos? Barren-Grot No Bear (A kqlak).
- Ursus maritimus Linn. Potar Bran (Nd nu).
- Phoca vitulina Lian. HARBOR SEAL (Kasigi'a).
- Phoca feetida Fabricius, Ringlib Seal (Ne'tyi).
- Erignathus barbatus Fabricius Gill. BEARDED SEAL (Ug'ru).
- Histriophoca fasciata (Zimm. Gill. RIBBON SEAL (Kaixóliñ). 11.
- Odobænus obesus (III. Allen Paciffic Walkus (A ibicik), 12
- Ovibos moschatus (Gnall) Blancy. MUSK OX (Umam.tu).
- Ovis montana 7 · Cuv. Mountain Sheer; Bighorn (I minea). 14.
- Rangifer tarandus grænlandious (Kerr.) REINDEER (Ticktu), 15
- 16. Elephas? sp. MAMMOIN Kelegway.
- Beluga sp. White Whater Kelelyne
- Orea sp. Killithia 1 18.
- Monodon monoccios Lina. Narwhall (Tunt ) -19.
- 20. Balana mysticetus Linn. Poran Whale: Bownead (Akbuák).
- Sorez forsteni Rich. Tousinu's Smanw Mouse (Ug'ru nû),
- 22. Myodes obensis Brants. TAWNY LEMMING (A rwifeld).
- 23. Cuniculus (erquatus Pall.) Cones, HUDSON'S BAY LEMMING.
- Spermophilus empetra (Pall.) Allen. PARRY'S SPERMOPHILE (Schsin).
- 25. Lepus timidus arcticus Allen. POLAR HARE.

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#### 1. CANIS OCCIDENTALIS GRISEO ALBUS Bd.

Wolf (Amáxo).

The Wolf never appears to come near the coast in the vicinity of Point Barrow. The natives, however, have a good many of their skins and prize them very highly for trimming their deer skin clothes, especially for making the frill round the hood of the jacket.

The skulls also are highly valued as amulets or fetishes, and no whaling umuk is regarded as properly fitted out unless provided with one or more wolf-skulls.

The natives speak of them as rather plenty inland along the rivers where the reindeer abound, and say they chase the deer in packs.

Our hunting and exploring parties which went inland in the spring of 1882 and 1883 saw wolves several times but were unable to secure any specimens. The only skin we obtained, a very large male, was shot by a native hunter near Meade River in the spring of 1883.

One of the Eskimo trading parties which went east in the summer of 1882 succeeded in catching a couple of male cubs alive. These were brought home early in September, and carefully fed till late in December, at which time their fur was supposed to be fit for use. They were then killed with much ceremony, with a stone-headed arrow.

The natives appear to regard the Wolf with a certain amount of superstitious reverence. A man who has killed a Wolf must sleep out of doors in a tent or snow ight, for one "moon" from that time.

We obtained one skin and six skulls.

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### 2. VULPES FULVUS (Desm.) DeKay.

RED FOX (Kaiāktūk, Kanā'ktua).

#### 2b. VULPES FULVUS ARGENTATUS Aud. & Bach.

Black or Silver Fox (Kaia'ktuk).

A few skins of Black and Red Foxes came in among the furs obtained by the trader at the station. They were all, however, said to have been obtained by trade from the tribes further to the east.

One of our native deer-hunters last spring (1883), however, came in with a report that he had seen and wounded a Black Fox near the hill Nuasū'knan, which is close to the upper Meade River. No skins of the cross fox (V. fulvus decussatus) were found among the trade fox-skins.

### 3. VULPES LAGOPUS (Linn.) And. & Bach.

ARCTIC FOX (Teritgânia.)

The White fox is quite abundant near the station, especially in winter, when their tracks are to be seen in the snow all over the tundra. They are, however, so exceedingly shy, and so well protected by their white covering that the animals themselves are seldom seen at this season.

During the egg season, that is, through June, they may be frequently seen "quartering" the tundra in search o' eggs and sitting birds, particularly at night, and are occasionally found running along the beach. Their speed when alarmed is very great. They seem almost to fly over the ground instead of running.

Though usually very wild, hunger sometimes renders them quite bold and familiar. In the spring of 1882, one of the women at the hunting camp on Meade River found one in the meat house and easily killed him with a stick.

They are, in general, pretty widely scattered over the country, but sometimes gather in large numbers where there is any particular supply of food.

The Eskimos reported in February 1882, that there were great numbers of them one day's journey to the east feeding on the carcass of a whale that had been washed ashore. Any game

that is left out over night must be carefully covered up with slabs of snow or it will be soon caten by the foxes.

A good many of them are caught by the Eskimos, either with steel traps or "figure-of-four" traps of their own construction. In using a steel trap they do not bait the trap itself, but place the bait in a little house made of slabs of snow. The trap is set and carefully buried in the snow at the doorway of the house so that the fox must step on it in his endeavors to reach the bait.

They build a similar house for their "deadfall" or "figure-of-four" trap, and arrange the log above the door of the house so the fox brings it down across his back when he reaches in for the meat.

The trader obtained a large number of White Fox skins, mostly in fine condition with very acayy thick fur. Out of the number there were two or three in the "blue" condition, also heavy winter skins.

The summer pelage seems to be completely assumed by the middle of July. A female shot close to the station, July 8, 1882, had the brown summer coat very short and thin, with bunches of white fur still adhering to it, and a few scattered white hairs still remaining. She was very thin and dirty, and about as miserable a looking creature as could well be imagined.

In 1883, a female in nearly the same pelage was taken at Woody Inlet with her two blind cubs, about the size of new born kittens. They were the color of a Maltese cat.

They were very rarely seen after the middle of July until well into October, when they became quite plenty and by that time had again become completely white.

Their tracks were occasionally seen out on the sea-ice, where they had wandered, perhaps in the hopes of pickings of seal offal, after some bear, or perhaps in pursuit of stray lemmings or ptarmigans, that every now and then get out upon the ice.

### 4. GULO LUSCUS (Linn.) J. Sab.

### WOLVERINE (Kathwin).

The Wolverine was never seen by any of our parties nor reported by the natives. Wolverine-skins, however, are very plenty among the Eskimos, and highly valued for trimmings. The tail is especially sought for as an ornament to be worn at the back of the belt.

All these skins are brought from the interior, and are generally obtained by trading.

### 5. PUTORIUS ERMINEA (Linn.) Griff.

### ERMINE (Téria).

Skins of Ermines, both in summer and winter pelage, are common among the natives, and are occasionally worn as trimmings or anulets. During the winter their tracks and droppings were occasionally to be seen on the tundra. An adult male in full summer pelage was shot close to the station early on the morning of July 16, 1883.

### 6. URSUS ARCTOS ?

### BARREN-GROUND BEAR ? (Å/kglak).

There is a brown bear in the interior, of which we were unable to secure a specimen, and which is probably Richardson's "Barren-Ground Bear". The natives had several more or less mutilated skins, which in color closely resembled the cinnamon bear

The Eskimos say that the "land bear" is abundant during the summer in the neighborhood of Meade River.

### 7. URSUS MARITIMUS Linn

#### POLAR BEAR (Nä'nu).

Polar Bears are by no means so abundant about Point Barrow as might be expected, and they appear to confine themselves almost entirely to the ice-field at some distance from the shore, only coming in to the land when driven by hunger. During the whole of our stay at the station

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we knew of not more than eleven or twelve being taken, and they were killed by the Eskimos. Our party frequently saw bear-tracks on the ice, but nobody as much as saw a living bear except Lieutenant Ray, who had the good fortune to catch a glimpse of one as he made his escape into the moving ice pursued by all the dogs and half the men and women of the village.

The bears seemed generally anxious to escape when they encountered men and dogs. Only

one or two showed fight or came to bay.

Bears were wandering about the ice all the year round, as the natives occasionally reported them, and twice during the winter of 1882-83, impelled by hunger, they came holdly into the village, once at night and once in broad daylight, and made an attack on somebody's storehouse of seal-meat. Of course the natives immediately turned out and killed the bear.

Towards the end of April, 1883, a native who belonged at the Point Barrow village, when returning from the spring deer-hunt, met a she-bear and her cub, some 20 miles inland, at the point where the Eskimo trail crosses the river Kuaru, and killed them both. We obtained their

skins by purchase

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The bears killed in winter were beautifully clean and white, but in summer they become exceedingly brown and dirty. One killed in August, 1883, was so dirty as to be almost black about the legs.

### 8. PHOCA VITULINA Linn.

### HARBOR SEAL. (Kasigia).

The Harbor Seal is well known to the Eskimos, who have several skins of this species among their "pokes" or floats for whaling. They said that they occasionally captured it at Pergniak in Elson Bay, and down the coast at Wainwright's Inlet, where it is said to "haul out" on land.

This species is represented in our collection by a single skull brought in for sale by a native, by did not know where it came from.

### 9. PHOCA FŒTIDA Fabricius.

### RINGED SEAL (Nětuř).

Từ xgiữi, old stinking male: Ninhq, temale: Netyia ru, young of the year.

This is the only seal that is at all common at Point Barrow, and is the main staple of food of the Eskimos. It remains the whole year through, and is to be found anywhere in the icefield that there are sufficient cracks for it to find a breathing place.

They especially affect the ice, and consequently are rarely to be seen in summer, when the sea is clear of ice. When, however, there is much loose ice running, seals are always to be found in plenty, and are captured by the Eskimos from their *umiaks* with rifle and harpoon. They occasionally come into the shoal water of Elson Bay in the summer, and are taken in nets set along the shoare.

When the ice comes in and the sea begins to freeze over in October they become quite abundant, haunting the open pools in the pack and making breathing-holes (adlu) in the "young ice." At this season the natives take them entirely with the rifle and harpoon, either shooting them as they swim in the open pools, and darting a harpoon into them before they sink, or else watching at the breathing-hole with the rifle and stabbing-harpoon.

As the season advasces into November and December and the sun disappears, so that there are only a few hours of daylight, the seal-netting begins. This can only be carried on in the darkest nights when there is no moon. The natives say that even a bright aurora interferes with their success.

At this season of the year there are very often large temporary cracks in the ice-field a mile or two from the shore, which remain open for several days at a time, and are a great haunt of the seals. When such a crack is discovered the hunters from the village turn out in force, and skirt along the edge of the crack till they find a suitable place for setting their nets.

They select a place where the ice is level and not too thick for about a hundred yards from the edge of the crack and then proceed with their ice-picks to cut three holes parallel to the crack. The middle hole is large enough to admit the passage of a seal, and the other two are smaller and serve to allow the stretching lines of the net to pass through. They are about five yards, the length of the net, apart. The stretching lines are let down through these holes, and grappled and drawn up through the center hole with a long slender hooked pole. They are then attached to the upper corners of the net, which is thus drawn down through the middle hole and hangs like a curtain underneath the ice. The end-lines are loosely fastened to lumps of ice, and the hunter sitting down near the net begins to rattle on the ice with the butt of his pick, scratch with a little tool made of seals' claws mounted on a wooden handle, whistle softly, or make some continuous gentle noise which excites the curiosity of the seals, who are swimming round in the open water.

These come swimming in under the ice in the direction of the sound and of course come in contact with the net, which, hanging loosely, soon completely entangles them. The running out of the end-lines warns the hunter that there is a sea! in the net, and when he thinks it is sufficiently entangled, he banks it up through the middle hole by means of a line attached to the middle of the net. The seal is frequently drowned by the time it is hauled up, but sometimes has to be killed by bending the head back sharply so as to break the neck.

After disentangling his catch, the hunter sets his net again and waits for another seal. I have known a single hunter to catch as many as thirty seals in the course of one night. The dead seals of course freeze stiff very rapidly, and if there is snow enough on the surface of the ice, they are stacked up, by sticking them up on their tails in the snow to prevent their being snowed over, until they can be brought in by the dog-sleds.

When there is no suitable water for netting on a large scale, the natives are constantly on the watch for small cracks and breathing-holes, where the scals come regularly. Two or three men will surround such a place with four or five nets, so that every scal that comes to the hole is sure to be caught. These nets are kept permanently set and are visited every day or two.

Later in the season when the sun has returned, and the hunters find regularly established breathing-holes in the ice-field, the nets are stretched that across the holes by cutting four holes round the *adla*, and stretching the corners of the net out to these. Each hunter will have several nets set in this way and will yisit them every day or two.

When the "leads" of water open off shore in April, seals are always quite abundant there and the whaling umiuks usually catch a good many. They continue abundant all through the whaling season. Towards the end of June and through the month of July, when the ice, especially the level ice inshore, is growing rotten and wearing into holes, they begin to come up through these holes to sleep on the ice. They sleep however with extreme caution, waking up and raising their heads to see if all is safe every four or five minutes. They are so exceedingly shy at this season of the year that none of us ever succeeded in getting within decent rifle shot of one of them.

There is considerable variation in the color of this species. Individuals were seen which were almost white, being quite unspotted on the belly, and there was a complete gradation from these to specimens like one noted on January 7, 1883, of which the following is a description:

Ground color, black, belly no lighter than the back. Marked all over with ring-like, sometimes 8-shaped spots, white, numerous on the back, large and scattered on the belly, small and thickly crowded on the upper breast and throat. Flippers and claws very black.

### 10. ERIGNATHUS DARBATUS (Fabricius) Gill.

### BEARDED SEAL (U'g'ru.)

This species is far less common than the preceding (P. fatida), but is by no means rare, occurning even during the winter when the ice is broken.

They are also occasionally killed at the "leads" of open water during the spring whaling, but are most abundant during the summa, and autumn when the loose ice is running with the current, swimming around among the broken floes, and occasionally crawling out upon a cake to sleep. They almost invariably sink when shot at this season. Early in the season they are frequently

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seen close in shore, especially where there is open water between the shore and the "land floe" or "barrier."

The Eskimos pursue them in their *umiaks* with the rifle and walrus-harpoon provided with a short line and scal-skin floats, but did not capture many during our stay at the station. The skins are very highly prized for making *umiak*-covers, as they make a very fine and durable hide which is beautifully white. It takes six good-sized ug'ru-sking to cover one *umiak*. The Eide is also used for making walrus-lines and also for boot-soles when whitewhale skin cannot be obtained.

#### 11. HISTRIOPHOCA FASCIATA (Zimm.) Gill.

### RIBBON SEAL (Kaixo'lĭñ).

This is the first record of this species north of Bering Strait, but it can hardly be considered as anything more than a straggler of somewhat regular occurrence at Point Barrow.

It is, however, well known to the natives, who call it by a name which bears a striking resemblance to the names "Karoluk" and "Kioluk," which the natives of Pond's Bay and Cumberland Inlet apply to *Phoca granlandica*, which animal would hardly be distinguished from this species by the Eskimos.

The only individual we saw was a finely marked male, taken in a seal-net close to the villago at Cape Smythe, November 21, 1881. Unfortunately, we knew nothing of the capture until several days afterward, when the hunter brought the skin over for sale. He had mutilated it by cutting off the nose and flippers, and we were unable to procure the skull.

We heard of no more till the end of November, 1882, when a native reported that he had killed one at a breathing hole, but that it was carried away by the current. None were seen at any of the great catches of *Phoca factida* during the winter of 1882, although all the natives, both at Cape Smythe and Point Barrow, were especially on the lookout for them.

This species must be more abundant than is generally supposed on the Siberian coast of Bering Sea. Their skins are frequently to be seen among the seal-skin clothing worn by the American whalemen, which is procured at Plover Bay, Indian Point, and other places on the Siberian coast.

### 12. ODOBÆNUS OBESUS (III.) Allen.

#### PACIFIC WALRUS (Albreûk).

Walruses are of rather frequent occurrence off Point Barrow during the season of open or partially open water, but are never very abundant.

In the spring of 1882, one or two were reported by the natives as early as the end of May, out at the "lead" of open water, but in 1883 they were very much later. We heard of none antil July 3, when many old bulls were reported to be traveling up to the northeast at the "lead."

During the summer herds are occasionally seen swimming among the broken ice outside of the barrier, or asleep on a large cake.

They were quite plenty during the month of September, 1882, when there was much heavy loose ice from one to three miles off shore, moving rapidly with the current to the northeast. Many herds and solitary walruses floated up past the station on cakes of ice. We saw none returning, and none were seen or reported after September 28.

They were rather more plenty outside the land-floe in 1883 than they had been the preceding season, and the Eskimos had taken about a dozen up to the middle of August, pursuing them with the rifle and harpoon in their umiaks.

During the autumn of 1881 the ice was a very long distance off from the shore, and consequently there were no walruses. On October 17, while the sea was still open, three walruses came swimming in towards the land close to the station. They appeared fatigued, as if they had come a long distance, and evidently wished to land on the beach, but were frightened away by the natives.

The whalemen complain very much of the increasing scarcity of walrus on their usual walrus-hunting grounds, the ice-field just north of Bering Strait. Where they were formerly accustomed to get a hundred walrus a day by shooting on the ice, they now consider eighteen a good day's

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work. Not only have the walruses been killed off by the indiscriminate slaughter which has been the custom, but they have grown cautious, and have learned to withdraw to inaccessible parts of the ice fields, where they cannot be reached with a boat. This habit will go a good way towards preserving the species from utter extinction.

There seems to be some diversity of opinion as to the ferocity of the Pacific Walrus. Capt. E. P. Herendeen, who has killed a great many walruses, especially when "hauled out" on the land, insists that he never saw one show fight, that they are only anxious to escape from their pursuers, and that the chase is attended with no danger, except sometimes from the blundering efforts of the animals to escape.

Capt. L. C. Owen, on the other hand, one of the veterans of the whaling fleet, who commanded the first steam whaler in the Arctic, and who has probably had as much experience as any one in shooting walruses on the ice, asserts that he has frequently been attacked by wounded walruses, and that his "dinghy" or walrus-bout has often he in reat danger from their "pecking" at it, as he expressed it, with their tush.

### 13. OVIBOS MCSOSATUA (Cmel.) Blainv.

### MUSK Ox (Umiñ man)

A skull of this animal was brought in by one of the trading parties from the eastward, just as we were getting ready to abandon the station. In the hurry and excitement of the time, we neglected to find out more accurately the locality from which it came. The party had been as far east as the mouth of the Colville, and the skull may have been brought from there.

The natives knew the animal well, and called it by nearly the same name as the eastern Eskimos, but none had ever seen it alive.

The skull obtained appeared very old and much weathered.

### 14. OVIS MONTANA (?) Cuv

### MOUNTAIN SHEEP; BIGHORN (I'mnea).

The Eskimos had many implements, especially water dippers, made of Mountain Sheep horn, and there were a good many garments made of the skin which is especially used for trimming decreakin clothes.

Most of the horns and the skins were obtained by trade from the natives to the east and south. The Point Barrow natives were, however, well acquainted with the animal, and several of them said that they had killed them, a great way off to the eastward, in very high broken land (Romanzoff Mountains?).

I have called the species Ovis montana (!), because there is a question as to the species of Mountain Sheep inhabiting Alaska, and we obtained no specimen that could be identified.

### 15. RANGIFER TARANDUS GRŒNLANDICUS (Kerr).

### REINDEER (Tù'ktu).

 $P\hat{a}^*$ änää, duck with large antlers;  $Na^*la$ , yearling buck;  $K\hat{a}^*lanää$ , don: Ainää, etc. pornels: doe; Noxa, faws.

Reindeer do not come down to the coast near Point Barrow in any large numbers. Straggling individuals and small parties are occasionally to be seen during the summer, wandering around the tundra and sometimes come down to the beach and the lagoons, especially on calm, sunny days when the flies are troublesome.

Large berds have been seen down the coast, 25 or 30 miles from the station, and near the mouths of the rivers at the east, but only stragglers reach the Point.

During the rutting season, in the latter part of October, a good many are to be seen roaming round a few miles inland, though they are very wild. The rutting backs, however, are rather inclined to be curious and to come towards a man if he keeps perfectly still. Later in the winter,

from January on, they were continually seen and reported, and their tracks and the places where they had scraped away the snow to get at the moss were frequently seen.

The natives from the village go out on snow-shoes to hunt them, and when a herd of deer is seen the hunter moves straight towards them at a rapid pace. When the deer begin to run the hunter runs after them as fast as he can, trying to keep them in sight. His pertinacity is generally too much for the curiosity of the deer, and in a short time one or more of them will usually swerve from the line of flight and gradually circle back to see what this is that is following them.

The hunter generally opens fire as soon as the deer gets within five or six hundred yards and keeps it up till be either kills the deer or frightens it out of range. Strange as it may seem, a good many deer are obtained in this way. The natives are very lavish of their ammunition, and by their reckless shooting have rendered the deer very wild.

Most of the deer obtained by the natives, however, are killed along the valleys of the large rivers, Kuaru, Meade River, and Ikpikpung, which empty into the Arctic Ocean east of Point Barrow.

Many of the natives go in to these rivers, 50 to 100 miles to the south and southeast, as soon as eneigh snow has fallen to make sledging practicable, and there is easin camped in snow huts until the days grow too short for hunting. At this season the deer are quite plenty in this region, and go in large herds. Captain Herendeen describes the alluvial rists of Sicade River as "looking like a cattle-yard" from their tracks.

The Eskimos seem to be of the opinion that most of the decodes, each this region and go further inland when the winter night sets in returning about the first of Patagary.

The great season for deer hunting is in the months of February and March. With the return of the sun, about the last week in January, most of the native of both villages start off for the rivers, and are to be found camped in small parties, consisting of two or three families, over a large extent of country. They stay until the end of March, or sometimes as late as the middle of April, and secure a good many deer.

Two men who were hunting for the station in the spring of 1883 killed upwards of ninety, while they were out. Most of these deer are shot with the rifle, but a few are still taken in pitfalls dug in the snow-drifts, as described by Captain Maguire, of the English depot-ship Plover, in his report of his first winter at Point Barrow, 1852-253.

A female killed January 30, 1883, contained a focus about six inches long. Large numbers of well-developed embryos are brought in from the spring deer-hunt by the natives, who consider them a great delicacy. They are also very fond of the contents of the rectum.

#### 16. ELEPHAS ! sp.

### MAMMOTH (Kili'g'wa).

Much fossil ivory in a badly decayed condition is found on the sandbars of Meade River, and the natives have a good many implements of a much better quality of ivory. This, however, was probably obtained from the Nunatangment.

The natives had many stories about bones of the Kiligra, "the great dead reindeer"; "there are no longer any more on earth, only their bones remain." We endeavored to get some of the hunting parties to bring us in some of these bones, but we did not succeed in obtaining any.

### 17. BELUGA sp.

### WHITE WHALE (Kilëlyua).

White Whales were never very plenty near the station, but large schools occasionally passed up within sight of the shore during the season of open water.

A school of a hundred or more passed up within 200 yards of the beach September 28, 1881, and then turned and weat back again. There were many gray individuals in this school.

The whaling umiaks captured one or two each season we were at the station, and each year as soon as there was open water between the land-floe and the beach a large herd passed up to the northeast.

About a week or ten days later another large herd of several hundred passed up each season, and these were all that were seen.

The last herd in 1882 came close to the beach, and one was killed with a rifle. There was no opportunity to make a careful study of it or to obtain its complete skeleton, as it was immediately cut up for meat. The skull was unfortunately destroyed by the ice while being cleaned in the water by the sand-fleas.

The following are the measurements of this specimen:

#### ADULT REMALE.

From fork of tail to tip of lower jaw		Inches.
Girth behind dippers		4
Breadth of tail		$6\frac{1}{3}$
Breadth between angle of lower jaw	. 1	0
Length of head from ear	. 1	4
Length of vulva		10
Length of Supper		3

Color, white, grayish on flukes and flippers, with a yellowish tinge on the back; mamma opposite the lower third of the genital sulcus, which includes the anus; mammary sulcus about two inches long; blubber thick.

These animals are much prized by the natives, who value the skin very highly for making the finest quality of water-proof soles for their seal-skin boots. They are also sometimes used for making very fine walrus or whale lines.

The flesh is quite palatable, though rather tasteless.

### 18. MONODON MONOCEROS Linn.

### NARWHAL (Tugáliñ).

No living Narwhals were seen during our stay at Point Barrow, but we found the ivory in the possession of the natives. They recognized drawings of the anime's, and said that they were occasionally seen and killed. The name is essentially the same as one of those applied by the Greenlanders and eastern Eskimos to this animal.

#### 19. ORCA sp.

#### KILLER (A'alo).

The natives described a whale which they sometimes saw, and which was "bad" and had large teeth. From the resemblance of the name to the ordinary Eskimo word for "Killer" I am inclined to believe that a species of *Orca* was meant. None were seen during our stay at the station.

### 20. BALÆNA MYSTICETUS Linn

### POLAR WHALE, "BOWHEAD" (A'k' bicûk).

Whales' jawbones, skulls, and vertebre are plenty—scattered along the shore and in the villages, where jawbones and ribs are used for staging timbers, and they are also sometimes found buried in the turf, indicating considerable age. There is also much decaying whalebone in the ruined iglus which have been laid open by the sea at Cape Smythe, pointing to the time when whalebone had no commercial value, and more was obtained than could be used for ordinary purposes in the village.

About the middle of April, when the "leads" of open water begin to form off shore, the whales appear—a few stragglers at first, but gradually increasing in numbers—all traveling to the northeast even when the lead is much clogged with loose ice. Indeed, the whales seem to have learned that they are much safer in the ice than in the open water, and may be heard "blowing" in the loose pack when there is plenty of open water for them to travel in.

The "run" lasts until about the 1st of July, after which, during the season of open water, there are no whales until about the middle or end of August, when they begin to "come out," as the whalemen say, generally moving back at some distance from the shore.

The whaling fleet generally eatch a few whales in Bering Strait and outside of the ice early in the season, when they first come into the Arctic. They then endeavor to reach Point Barrow

by the middle or end of July so as to meet the whales when they come out.

Some ships work as far to the eastward of the point as the ice will permit and follow the whales out. Many whales were taken in 1882 between Point Barrow and Return Reef. Other ships, if the whales do not appear soon after their reaching the point, turn back and go off to the western whaling in the neighborhood of Herald Island. The fall whaling is carried on as late as the ice will permit. In 1882 some of the ships staid in the neighborhood of Point Barrow until nearly the end of September.

The season of 1883 was very unfavorable for the whaling fleet. The ships were unable to get any distance cast of the point, and although whales had been plenty in the spring migrations they did not begin to come out till the end of August, and then in comparatively small numbers.

None of the ships accomplished much.

The natives pursue the whales during the spring migrations, hauling their boats on sleds across the rough ice to the open water. About twenty unitaks, carrying each a crew of from eight to ten men, are fitted out for whaling from the two villages, and when there is open water and any prospect of whales they spend all the time out at the edge of the "lead" on the lookout for whales while the women travel backwards and forwards with their food.

Each boat is supplied with several harpoons, to each of which is attached a short line and a pair of floats made of inflated seal-skins, and they endeavor to get so many of these floats fastened to the whale that he can no longer sink, when they paddle up and dispatch him. They formerly used stone-headed lances for this purpose, but are all now provided with regular steel whale lances, and many of them also have bomb-guns which they have bought of the whalemen or obtained from wrecks.

They have also plenty of iron harpoons of the best pattern, but it was decided in 1883 that they would have no luck in whaling unless the first harpoon darted at the whales was of the old-fashioned stone-headed kind, such as their grandfathers killed so many whales with.

When the "lead" of water is narrow the whales are sometimes shot with a bomb-gun from the edge of the ice.

As soon as a whale is killed it is towed to the edge of the solid ice-floe, and there all hands—men, women, and children—go to work at once with "spades" and knives to cut off all the blubber and meat they can get at. The whale frequently sinks or is carried off by the current under the ice before they have succeeded in saving more than a portion of the blubber. Every one is entitled to all he can get of the blubber and "blackskin," but the whalebone (shukuk), which is the great staple of trade with the white men, is portioned out according to a regular rule. The crews of all the umiaks that were in sight at the time the whale was struck have an equal share of the whalebone.

The "blackskin" mentioned above, which is the epidermis of the whale, and has been very often described, is considered as great a delicacy by these natives as it is by the eastern Eskimos. They would go anywhere or do anything to secure a feast of "muktuk," as they call it.

It is the custom on most whaleships, when "boiling out" near shore, to allow the natives to come on board and cut off the blackskin, provided they do not take off too much blubber with it, and I have seen boat-loads carried off from one ship. They are also very fond of the tough, white gum round the roots of the whalebone, which goes by the name of "mum-ma." These are almost invariably eaten raw, for very few Eskimos would be able to wait for their muktuk to be cooked.

They are not very expert or very bold in their whaling, and consequently do not capture many whales. Only three were killed in the two seasons we were there. Capt. L. C. Owen, however, informs me that one season ten whales were taken by the boats of the two villages.

In speaking of whales to the white men the Eskimos call them Pw'ahi, which is an attempt to pronounce the word "Bowhead."

The stripped curense of a female which drifted ashore September 1, 1882, was found to contain a feetus about three feet long.

#### 21. SOREX PORSTERI Rich.

FORSTER'S SHREW MOUSE (Ug'ru'nû).

A little Shrew which was brought home in alcohol and identified as this species was brought in by a native who had been off to Meade River on the spring deer hant. This was the only one observed.

### 22. MYODES OBENSIS Brants.

TAWNY LEMMING (A'richād).

This species, like the succeeding, though abundant around Point Barrow, is not equally plenty every season. We saw none in 1882, and none were brought in by the natives, who were in the habit of bringing in all sorts of birds and animals for sale.

None were obtained until June 11, 1883, when a good sized young one, probably born the year before, in full summer pelage, was picked up dead on the tundra. During the rest of June and in July they were often seen, and many were caught. Early in the season they were often found running in tunnels under snow-banks.

This species and the next make shallow burrows and galleries in the tussocks of turf on the tundra, and spend a good deal of time under ground.

A mother and seven blind young were taken June 27.

#### 23. CUNICULUS TORQUATUS (Pall.) Coues.

Hudson's Bay Lemming  $(A'rrit\bar{n}\hat{u})$ .

Like the last, this Lemming, though abundant, is not equally plenty every season. During the whole year of 1882 we did not see a single Lemming, although signs of them were very plenty. The tundra was completely riddled with their galleries and burrows, and we occasionally saw tracks on the snow or mud. Their droppings, besides, were very thick in many places on the tundra, and the numerous owl's castings scattered over the tundra were made up almost wholly of Lemmings' skulls, bones, and hair.

In 1883, the natives began to bring them in early in January, and all the rest of that season they were quite abundant. Their habits are quite the same as those of the Tawny Lemmings. In summer they are only to be seen when running from one gallery to another, and in winter their tracks generally lead to a burrow in the snow-bank.

They are seldom seen in winter, except during drifting snowstorms, when the snow over their tunnels is probably blown away. This has given rise to a curious fancy among the Eskimos, who say that in stormy weather they come down from the sky, whirling around and running around in spirals as soon as they touch the ground. The first one we obtained was brought in, during a violent snowstorm, by a native, who informed us, "There are none here on the land. As it was bad weather he fell down from above." This superstition is interesting in connection with the notion of the Norwegians that the great hordes of Norway Lemmings come down from the clouds,

They appeared to be spread over a pretty wide extent of country in 1883, as we obtained specimens from near the station and from various deer-hunters' camps in the interior.

Up to April all the specimens taken were in winter pelage, but none of them were completely whit—all showing faint rufous spots indicating the position of the ears, and usually more or less rufous suffusion on the back. The white, moreover, has a grayish cast, due to the fact, probably, that the tips of the hairs only are white, while the rest is a slaty gray. One specimen, taken in February, and, from its size, probably a young one of the preceding year, is much marked with gray and brownish on the back of the head and nape and between the shoulders. It has well-marked rufous car-spots. A specimen taken in April can hardly be distinguished from this, though a little larger.

Specimens taken towards the end of April and in May show considerable darkening on the back and much rufous on the sides, but we obtained none like those in the National Muscum, which show the winter-coat partly shed, exposing the shorter bright-colored summer dress.

All June specimens were in full summer pelage.

### 24. SPEPMOPHILUS EMPETRA (Pall.) Allen.

PARRY'S SPERMOPHILE (SPhsin).

This is only a straggler anywhere near the station, though the whalemen, who are in the habit of landing at Woody Inlet for wood and water, report it abundant in the neighborhood. The natives are well acquainted with it.

We first noticed its tracks in the snow in May, 1883, and a single rutting male was killed running about on the high banks below Cape Smythe.

### 25. LEPUS TIMIDUS ARCTICUS Allen.

POLAR HARE.

There were absolutely none near the station, and the natives were unacquainted with the animals. Capt. E. P. Herendeen, however, reports seeing traces of hares among the willows on Meade River in March, 1882.

Just as we were on the point of abandoning the station in August, 1883, a party of Nunatangmeun Eskimos brought in half a dozen roughly-prepared skins of this species, showing the occurrence of the animals somewhere in the Colville region.

### II.-BIRDS.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

The birds and eggs brought home by the expedition were collected, with a few exceptions, within a circle of fifteen miles from the station, and, it is believed, give a tolerably complete representation of the bird-fauna of this limited region. This it will be seen is arctic in its character, with the addition of a few species like *Somateria v-nigra*, peculiar to the western parts of the continent. The range of a few species heretofore recorded only from the eastern part of the continent has been found to extend to this point.

The country in this region is a low slightly rolling tundra, interspersed with higher and drier patches, and covered with lakes and ponds of all sizes, sometimes connected by insignificant streams. The lower portions of the tundra are wet and marshy, and thickly covered with grass. On the higher portions the covering of grass is more scanty and the ground often bare, muddy, and black, partly covered with black and white mosses and lichens.

This we were in the habit of calling the "black tundra," and it was the special breeding-ground of certain species of birds, for example the Golden Plover, while others were to be sought for in the marshy lowlands, and others again on the dry grassy banks.

The birds breeding in this region are two or three species of land-birds and most of the waders. The great majority of the water-birds, the ducks, gulls, &c., pass on to more favorable breeding-sites on the sandy islands fringing the northern shore of the continent, and on the banks of the great rivers running into the Arctic Ocean east of Point Barrow.

Most of the birds and eggs were collected by the writer and Sergeant Middleton Smith, though valuable additions to the collections were made by Lieutenant Ray, Captain Herendeen, and other members of the party.

The nomenclature employed is that of Ridgway's Catalogue (Bull, U. S. Nat. Museum, No. 21, 1881), to which the numbers refer, and the Eskimo names have been appended wherever possible.

### [21.] SAXICOLA CENANTHE (Linn.) Bechst.

#### STONECHAT (Sú'ksaxia).

As Mr. Nelson remarks, this species appears to be very erratic in its occurrence in Northern Alaska, being quite common some seasons and wholly absent the next.

Early in the spring migrations of 1882 we had these birds in comparative abundance near the station for a few days, but none remained to breed, and in the season of 1883, though a careful lookout was kept for them, not a single one was noticed.

Curiously enough, this alternation of seasons appears to have held good for the two preceding years. In 1880 Dr. Bean found them not uncommon from Kotzebue Sound to Cape Lisburne, while Mr. Nelson, visiting the same region the following season, failed to find a single individual.

The first one seen was taken May 19, 1882, when very little of the snow had melted and there were but a few patches of bare ground near the coast. It was a male, and feeding on the bare grassy spots near the house, and was very shy. The stomach contained truch digested material.

For three days they were with us in considerable numbers, scattered along the edge of the tundra, not going far inland, and exceedingly shy. They appeared to be traveling towards the northeast. The sexual organs of the only female taken showed no signs of development, but a male was shot on the 22d with testes well enlarged.

After this date they disappeared completely, and were not seen again during the season, or in the return migrations.

The natives appeared unfamiliar with the bird, and gave it the name which we afterward found them to apply to the Redpolls, and, in fact, to all the little passerine birds, except the Snow-buntings and Lapland Longspurs.

#### 157. COTILE RIPARIA (Linn.) Boie.

#### BANK SWALLOW.

On the evening of July 29, 1882, we were surprised to see a swallow flying round the station, but unfortunately failed to secure it, and it went off up the beach.

Swallows were seen again on the 31st and on August 10 flying round the station and going off up the beach. The last time they were pretty well recognized as this species,

No more were seen alive, but early in September one was picked up on the beach dead and frozen, but unfortunately too much dried up for skinning. It was, however, preserved in alcohol and is the only representative of the species in our collection.

A party of natives, who were with us when the bird was picked up, failed to recognize it as anything they had ever seen before.

These birds were undoubtedly stragglers from the Yukon region, where they breed in great numbers, which, after the cares of raising their brood were over, had drifted carelessly further and further north, following the flies and the sunshine till they reached this extreme point.

### 178a. ÆGIOTHUS CANESCENS EXILIPES (Coues) Ridgw.

### WHITE-RUMPED REDPOLL (Sú'ksaxia).

This species appears to be not common, and rather irregular in its occurrence at Point Barrow. Early in June, 1882, the natives spoke of seeing Súksaxia and promised to secure them for us. Accordingly on the 13th a lad brought in three eggs with the female, snared on the nest.

These were the only eggs secured, and we obtained or saw very few birds. Those that were seen appeared to have a preference for the muddy banks and gullies of the "black tundra," and the neighborhood of the village. None were noticed after July 3, and none were seen or reported in the season of 1883.

The season of 1881 must have been one of unusual abundance for this bird, as Mr. Nelson (Arctic Cruise of the Revenue Steamer Corwin, 1881) speaks of finding it one of the commonest birds at Point Barrow. It certainly was not common in 1882. Nor did \*\*Legiothus linaria\*, which he speaks of finding in the same localities, occur at all in either of the two seasons that our station was occupied.

#### 186. PLECTROPHANES NIVALIS (Linn.) Meyer.

#### Snow-bunting (Amau'liga).

This and the next species were our commonest passerine birds; in fact, the only ones which could be said to be at all common.

Our first warning of spring, before the snow had fairly begun to show signs of melting, was always the appearance of the little *Amauliga* hopping and twittering around the wind-blown spots and the cook's refuse heap, a little explorer, come on to spy out the land far ahead of the main body of the migration.

In 1882 the first Snow-bunting and the first bird of the year, a male in full breeding plumage, appeared on Easter Sunday, April 9, a pleasant and warm day for the season. The snow had not really begun to melt, but the ground had blown bare near the house and there had perhaps been a little melting on the sunny side of the hillocks, where the little fellow was running and picking.

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They were a little later the next season. The natives reported seeing one or two at Point Barrow April 16, but we saw none near the station till the 19th. Stragglers continued to arrive through April and May, but they were not really plenty either season till about May 20.

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They began to sing about the middle of May, and by the 23d or 24th were well established and in full song.

Three or four pairs made their home near the station, and several more in the village, while the rest were scattered along the edge of the tundra, but few going any distance inland. They especially affected the broken muddy banks and gullies below the village and along the shore of the lagoons, and the cook's refuse heap was from the first a great attraction.

The males spend a great deal of time singing perched on the highest point they can find. The ridge-poles of our buildings and the wind-vane were favorite resorts for these jolly little singers. They continued singing until about the first week in July.

Early in June they begin to build in holes and erevices in the banks, where the nest is always completely concealed, vaising occasionally, at any rate; two broads in the season. The full complement of eggs appears to be six, though I found one nest containing seven eggs in 1883.

In 1882 one pair established themselves in a hogshead of bricks close to the station, unfortunately too much exposed to the curiosity of the Eskimo children, who caught and killed the male bird just as the female had completed her full set of eggs. Of course under the circumstances the nest and eggs were added to our collection. Nothing daunted, the female immediately secured another mate and went to work on a new nest, but was again doomed to disappointment, for when she had finished her second nest and laid two eggs she was again robbed by the natives. We succeeded, however, in protecting the third nest, and the young hatched and were beginning to fly by the end of July, by which time earlier broods were already pretty well grown. During the early part of July, after the males have ceased singing, they keep together in broods, and keep pretty well out of sight, as they are beginning to moult and take on the fall plumage. About July 25, however, they appear in considerable numbers, mostly young of the year in the gray plamage, associating with the young Longspurs around the empty village and about the native camps. They continue quite abundant in large loose flocks, generally through August, gradually becoming scarcer in September. The last one was seen in 1882, on September 20. We left them still comparatively plenty when we abandoned the station in 1883.

### 187. CENTROPF ANES LAPPONICUS (Linn.) Caban.

### LAPLAND LONGSPUR (Nessaúdliga).

The Longspurs, though, if anything, more abundant than the last species, arrive later and depart earlier. They arrived both seasons at very nearly the same date, and were equally abundant.

On May 20, 1882, which was a comparatively warm day with a fresh southwest wind, they suddenly appeared in considerable numbers, having probably arrived during the night, apparently all males, in full song.

They were to be found on all the bare spots on the tundra, near the station, along the coast, and near the cemetery at the head of the lagoon. Several were secured, and their stomachs were found to contain beetles. The sexual organs were fully developed. They were rather less abundant tarly in the season of 1883, as there was much less bare ground than the year before at the time of their arrival, May 21.

Though abundant a short distance inland, these birds were seldom seen around the station or along the edges of the beach and the lagoons, like the Snow-buntings. In accordance with what appears to be their general hubit elsewhere, they are specially to be looked for on the higher and drier parts of the tundra, where the nest is built in the grass, and not concealed in holes or crevices, like those of the snow-buntings.

During the breeding season, that is, from the time of their arrival till July 1, the males keep up a continual song, frequently soaring up and singing in the air like a bobolink. Their note at other times is a metallic chirp, not unlike that of the Titlark.

Notwithstanding the lateness of the season in 1883, a complete set of six eggs, already showing signs of incubation, was found on June 6, a week earlier than in 1882. This nest was the only one

found on a mud-bank, and partially concealed by a clod, though not so completely as a Snow-hunting's nest would have been. They appear to raise sometimes two broads in a season, as a nest has been found as late as Jane 21 containing only two eggs. We never found more than six eggs in any nest of this species, and sets of five were frequently found far advanced in incubation.

The first newly-hatched young were noticed about the middle of June. Like the Snow-buntings they keep themselves pretty well out of sight during the first half of July, but from then through August appear in considerable numbers, congregating with the Snow-buntings round the village and native camps. The young, seme of which are fully fledged by the middle of July, gather in large loose flocks, and appear to remain later than the adults. They go off gradually near the latter part of August, and were last seen in 1882 on the 4th of September. We left them still quite abundant in 1883, when we abandoned the station.

### 207a. ZONOTRICHIA GAMBELI INTERMEDIA Ridgy.

#### INTERMEDIATE WHITE-CROWNED SPARROW.

This bird, which is common in the Yukon region and on the lower Mackenzie, occurs at Poinz Barrow only as a straggler. A single individual, which Mr. Ridgway has identified as the young of the year of this species, was caught in one of the tents at the station September 11, 1883, a solitary instance to be compared with the northward autumnal wanderings of the Bank-swallows.

### 217. JUNCO HYEMALIS (Linn.) Sci

BLACK Snowbird (Sû'ksaria).

This is another straggler from the Yukon region and the wooded interior of Alaska, where Mr. Dall found it not uncommon during his stay at Nulato.

The solitary instance of its occurrence near Point Barrow was on May 24, 1883, when a male, apparently ready to breed, was taken not far from our station.

#### 406. NYCTEA SCANDIACA (Linn.) Newt,

SNOWY OWL (Ukpik).

This bird may be fairly considered a resident of these regions, although in the depths of the winter it recreats with the ptarmigan back to the "deer country," that is, the valleys of the large rivers running into the Arctic Ocean east of Point Barrow.

Its abundance in the spring and summer near the coast appears to depend on the presence or absence of its favorite food, the Lemming, as has been noted elsewhere by Mr. Nelson.

During the season of 1882 we saw no Lemmings, though signs of their presence in the shape of droppings, and their skulls and skeletons in owl's castings, were numerous all over the tundra. During that season we saw but very few owls. On the other hand, in 1883, Lemmings were exceedingly plenty all round the station, and owls were proportionately abundant; scarcely a day passed without one or more being seen sitting on the tundra, generally on the top of a bank or small knoll, on the lookout for Lemmings.

They were exceedingly shy and watchful, and, though seen and pursued nearly every day, only two were taken.

One of these made a regular habit of coming every afternoon at about the same time and settling himself in plain sight of the station on the opposite bank of the lagoon. For nine days he came regularly, and afforded much sport to several members of our party, who would go out regularly to capture him with rifle or shotgun, and as regularly return bailled. He was at last secured by two men, one of whom attracted his attention while the other managed to creep up within gunshot under cover of a bank.

These birds showed no signs of breeding while in our neighborhood. Some of the Eskimos said they could get the eggs from a camping-ground towards the southwest, but they failed to do so.

### 412b. HIEROFALCO GYRFALCO SACER (Forst.) Ridgw.

McFarlane's Gyrfalcon (Ki'drigim)i).

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The only hawk obtained by the expedition has been identified by Mr. Ridgway as this form, and was taken at the station, where he had alighted on the flagstaff, in the autumn of 1882. Hawks were occasionally seen during both seasons, 1882 and 1883, but were always very wild and difficult to approach. Occasionally they were seen close enough to be recognized as Gy'' lcon<sub>2</sub>, probably of the same form as the one captured.

The natives say that they are abundant on the rivers flowing into the Arctic Ocean, where they feed on young wild-fowl and ptarmigan. They say they breed "umasiksu," "a long way off," One man said that he had seen the nest and eggs.

## 449. AQUILA CHRYSÆTUS CANADENSIS (Linn.) Ridgw.

GOLDEN EAGLE (Timminkpuk).

We never saw this bird alive during our stay at Point Barrow, and it is only included in this list because we obtained a native-made skin from some natives who went last summer to the east-ward of the Colville River, where they secured the bird.

There were one or two other skins in the two villages, where they were in great repute as talismans or charms for securing good luck in whaling. There were also many wing and tail feathers among the natives, who use them as ornaments to their fur jackets.

## 474. LAGOPUS ALBUS (Gm.) Aud

WILLOW PTARMIGAN (Aki'dagin).

This species is resident but never very plentiful. Tracks were always to be seen on the snow during the winter, but the birds themselves were less often seen, while they were frequently seen in pairs during the breeding season, though the nest was never found.

They were always wild and difficult of approach, so that comparatively few were obtained. They were found to be quite abundant among the willow shrubs inland along the rivers, and Lieutenant Ray found them numerous at the mouth of Meade River, May 1.

An occasional male begins to show traces of brown feathers about the head and neck as early as the first week in April, and the change is very gradual.

The last that was seen (July 10) still showed a considerable amount of white in the plumage, and it is possible that the change is never complete. The females taken all appeared more completely changed than the males.

We found the meat as tasteless and insipid as other observers have found it.

These birds in the fall were occasionally seen sitting on the broken ice along the beach.

## 475. LAGOPUS RUPESTRIS (Gm.) Leach.

ROCK PTARMIGAN (Akiddanin).

The Rock Ptarmigan is a much less plentiful resident than the foregoing, from which the natives do not distinguish it.

As far as we could judge its habits are the same. One or two were obtained, one a female, which had evidently bred not far from the station, though the nest was not found.

## 509. STREPSILAS INTERPRES (Linn.) Illig.

TURNSTONE (Tûlliqua).

This species was found to be decidedly scarce, both years, during the spring migrations and the breeding scasch. We occasionally saw one or two inland, but were unable to secure any till about the 10th or 12th of 2th; at which they appeared at Pergniak, straggling adults, who had finished breeding and were beginning to molt. Early in August, the young appeared in considerable

numbers along the coast, near the station and round the muddy puddles in the village, and were quite abundant for two or three weeks.

They were exceedingly tame, and for several nights in the middle of August, 1882, three or four came round the back door and the cook's refuse heap, making themselves perfectly at home, and allowing one to approach within a few feet of them before they took flight.

Towards the end of August they grew scarcer, and finally disappeared, in 1882, about the 30th. As the Black Turnstone (S. mclanocephala) is such a common bird in the Yukon region and south of Bering Strait generally, one would naturally expect to find it at Point Barrow, particularly as Mr. Nelson reports it from Wrangel Island. Nevertheless, during the two seasons of our stay at Point Barrow, we did not obtain the slightest evidence of its occurrence in the region.

### 513. SQUATAROLA HELVETICA (Linn.) Cuv.

BLACK-BELLIED PLOYER (Ki-raion),

This plover is quite rare. It was occasionally seen and heard in the season of 1882, but none were noticed the next summer, and none were secured.

The natives are perfectly familiar with the bird, and use the dried skins as amulets or talismans to secure good luck in deer-hunting.

Two such skins tied to a stick represent the species in our collection. The natives told us this bird would arrive later than the Golden Plovers, and this appeared to be the case.

### 515. CHARADRIUS DOMINICUS Mull.

AMERICAN GOLDEN PLOYER (Tu'dliñ.)

A large series of Golden Plovers collected at Point Barrow, where they are among the commonest waders, all proved upon careful examination, to belong to this species. It is probable that *C. dominicus fulcus* does not range so far north on the American coast.

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Indeed, Mr. Nelson's note of the occurrence of this form on Wrangel Island seems to me to be rather doubtful, as from his account the bird was only seen and not captured, rendering identification amost impossible.

They are among the earlier waders to arrive, as stragglers generally appear about the 20th to the 25th of May, before there is much bare ground. In 1882 a small party in full breeding plumage, and apparently all males, arrived May 21, but no more arrived until June 11. The fundra was at this time bare only along the edge of the beach, and the ice and snow was not yet gone from the lagoous.

This party remained in nearly the same place for a couple of week—feeding on small red worms which they found in marshy spots, and all but two of them were taken.—hough they were very wild.

Along through the first and second week in June they continue—arrive in small parties, and from that time on are quite plenty scattered in pairs and threes an over the tundra. They are very wild and difficult to approach, and very noisy. In addition to their ordinary well-known callnote, they have in the breeding season a loud but very melodious—y of "Tad'ling!" many times repeated, uttered as the bird flies along rather high, with long slow strokes of the wings.

They were evidently nesting both seasons before June 20, int neither season were we able to find the nest before the 22d or 23d. The nest is exceedingly hand to find, although it is not concealed at all, but is simply a depression in the bare black clayey tundra lined with a little dry moss. The only vegetation on this part of the tundra is white and grayish moss, which harmonizes so extraordinarily with the peculiar blotching of the eggs that it is almost impossible to see them unless one knows exactly where to look. A favorite nesting site is on the high banks of the gullies or small streams. No nests were ever found in the grass or in swampy ground.

The sitting birds show great solicitude when disturbed, feigning lameness, and trying to attract one away from the nest. They are shrewd enough always to keep quite a distance from the nest, as long as the collector is anywhere in the vicinity of it, and it is singly time wasted to attempt to find the nest by looking for it, as I know by hard experience. The only way to make sure of the

eggs is to withdraw some distance, and sit down patiently and wait for the bird to go back to her eggs, watching her if necessary with a field-glass. Having marked her on to the nest, one must walk towards it in a straight line, looking neither to the right nor the left and keeping his eyes fixed upon the spot she rises from. He is then pretty sure of the eggs. However, the surface of the tundra is so uniform that a careless glance to one side or the other after the bird is flushed may throw the collector wholly off the track, and then he has to go back and wait for the bird to return again.

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Both males and females take a share in the incubation. In 1882 the sitting bird was frequently secured with the eggs, and in every case turned out to be a male; but in 1883 a number of sitting females were taken, and finally, in one or two cases, both parents were taken with the eggs, and both males and females had their breasts bare, as if incubating.

The nesting season continues till the first or middle of July, about which time the adults begin to collect in flocks, feeding together around the poads on the higher tundra, associated sometimes with a few Knots or a straggling Curlew.

The old birds leave for the south about the end of July, and no more Plovers are to be seen till about the middle of Angust, when the young, who heretofore have been keeping out of sight, scattered over the tundra, gather into flocks, and for several days are quite plenty on the dryer hills and banks, after which they depart. Stragglers may be seen up to the end of August.

## 528 a. MACRORHAMPHUS GRISEUS SCOLOPACEUS (Say) Coues.

## RED-BELLIED SNIPE; GREATER GRAY-BACK.

A few of these birds bred near the station, but they are decidedly rare during the breeding season. The young of the year, however, appear in large tlocks about the middle of August and stay for a few days about the small ponds on the tundra, especially on the high land below Cape Smythe.

At this season they are rather plenty, and when feeding associate with the young Dunlins and Grass-birds. They were much less abundant in 1883 than they were the previous season.

The nest was never found, although a pair were taken June 28, 1883, that were evidently nesting, as both had their breasts plucked and bare, showing that, as in the case of the Golden Plover, the male does his share of the work of incubation.

In the spring of 4882 a native boy brought in a female of this species, and what, he said, were the eggs. This was accepted without question at the time, although the eggs seemed rather small for the size of the bird.

A further acquaintance with the eggs of some of the smaller waders led to considerable doubt, which was justified by comparison of the set with authentic eggs of this species in the National Museum.

The eggs are certainly not those of this species, but closely resemble those of the Dunlin.

The bird appears but little known to the natives, and as usual in such cases we had various names applied to it. Many thought it was a Northern Phalarope (Sabrañna).

### 529. TRINGA CANUTUS Linn.

## KNOT; ROBIN SNIPE (Tha wia).

The Knot appears to be quite rare about Point Barrow. Only a few of the natives to whom one was shown recognized it and had a name for it.

In the season of 1883 only one was seen, appearing with a rather large flight of small waders. They were rather more abundant during the preceding season, and evidently bred somewhere in the vicinity, as a female was taken on July 11, with full-sized yolks in her ovaries. The nest, however, was never found.

The adults were not seen after July 5, and not one of the young appeared in the fleeks of young waders in the fall.

## 534. ACTODROMAS MACULATA (Vicil.) Coucs.

Pectoral Sandpiper (Aibwûkia = Walrus-bird).

Though this species is very common over the whole continent, and in fact over the greater part of the world, its eggs and breeding habits have hitherto been undescribed.\* We had the good fortune to find them breeding in considerable abundance in the neighborhood of the station, and were able to bring home a good series of authentic eggs.

It is one of the commonest of our waders, occurring all over the tundra in all sorts of situa-

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There is frequently a great disparity of size between the two sexes. A comparison of the large series we collected shows that the average length of the female is about three-quarters of an inch less than that of the male, but that the smallest adult female was fully an inch and a half shorter than the largest male. The difference in size is so marked that the natives noticed it and insisted that the small females were not Aibwükia, but Nivilivilik (Ercunetes pusillus).

They arrive about the end of May or early in June, and frequent the small ponds and marshy portions of the tundra along the shore, sometimes associated with other small waders, especially with the Buff-breasted Sandpipers on the high banks of Nunava. Early in the season they are frequently in large-sized flocks feeding together around and in the Eskimo village at Cape Smythe,

but later become thoroughly scattered all over the tundra.

They begin pairing soon after their arrival, and are frequently to be seen chasing each other in the air with a loud chatter. The male has a curious habit at this season of the year. The skin of the throat is much distended and loaded with slimy fat, and can be puffed out like the throat of a ponter pigeon. During the breeding season, that is from the first of June to the first of July, the male may frequently be seen taking short, low flights, with the wings held high and beaten stiffly, while the throat is puffed out to its fullest extent, and the bird utters a most peculiar muffled hoot "hoo, hoo, hoo," many times repeated. There is something ventriloquial about the sound, which makes it seem as if uttered by some creata is a long distance off, and it was some time before we could be certain that it was the Pectoral Sandpipers that were making the noise. This hoot is only uttered on the wing as far as I was able to observe, though the males may be often seen to puff out their throats as they sit on the little knolls.

They get their native name "Aibicúkia," the "walrus bird," from this habit of swelling out their

throats, like "Aibwik," the walrus.

After the breeding season, they keep very quiet and retired, like the rest of the waders, and the adults appear to slip quietly away without collecting into flocks, as soon as the young are able to take care of themselves.

As soon as the young have assumed the complete fall plumage, that is about the 10th of August, they gather in large flocks with the other young waders, especially about the small ponds on the high land below Cape Smythe, and stay for several days before they take their departure for the south. Stray birds remain as late as the first week of September.

The nest is always built in the grass, with a decided preference for high and dry localities like the banks of gulleys and streams. It was sometimes placed at the edge of a small pool, but always in grass and in a dry place, never in the black clay and moss, like the Plover and Buff-breasted Scalpipers, or in the marsh, like the Phalaropes. The nest was like that of the other waders, a depression in the ground lined with a little dry grass.

All the complete sets of eggs we found contained four. The following is a description of the eggs, obtained from the examination of eighteen sets. They are pointedly pyriform like those of the other small waders.

\*Since the above was written, Mr. E. W. Nelson, formerly United States Signal Service observer at Saint Muchael's, Alaska, has published (Arck, Vol. I, No. 3, pp. 218-224) an excellent detailed account of the breeding habits of this species, as observed by him in the delta of the Yukon. His observations agree very onedy with our except that he observed the male bird "hooting" while on the ground. The observations of Dr. Adams, quoted by Mr. Nelson, had escaped my notice as well as his. The note, however, merely states that drawings made by Dr. Adams, and representing the male bird with his throat puffed out, were exhibited at a meeting of the Zoölogical Society, so that to Mr. Nelson belongs the credit of first making and publishing complete observations on the subject

The following measurements, in inches, indicate the size, shape, and limits of variation: 1.58 by 1.06; 1.44 by 1.11; 1.42 by 1.08; 1.54 by 1.02.

In color and markings they closely resemble the eggs of the other small waders. The ground color is drab, sometimes with a greenish tinge, though never so green as in the egg of P, alpina umericana and sometimes a pale bistre-brown. The markings are blotchings of clear umber brown, varying in intensity, thickest and sometimes confluent around the larger end, smaller and more scattered at the smaller end. Some of the eggs with brown ground are thickly blotched all over. A single egg in one set of four has the markings almost as fine as in A, hairdi, but the egg is larger and has not the characteristic ruddy line. All the eggs have the usual shell markings of pale purplish gray and light neutral tint.

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The eggs may be distinguished from those of the Buff-breasted Sandpiper, which they closely resemble, by their warmer color.

Most of the eggs obtained were collected in 1883. The first nest was taken on June 20, a full set of eggs slightly incubated. Although eggs were found to contain large emoryos as early as June 28, perfectly fresh eggs were found July 6, and the last eggs brought in, July 12, contained only small embryos.

## 536. ACTODROMAS FUSCICOLLIS (Vieill.) Kidgw.

## Bonaparte's Sandpiper (Kai'aialu).

This is the first record of the occurrence of this species west of the Mackenzie River region, where McFarlane found it breeding, and it appears to be hardly more than a straggler at Point Barrow.

It was not observed in the spring of 1882, and an accident revealed its presence in 1883. A cust fired June 6 into a flock of Pectoral Sandpipers brought down one of these birds along with four or five of the other species.

After this, of course, a careful lookout was kept for this species, but only one other was seen, just a month later, alone on the tundra. The bird was also secured. Both were males and apparently breeding birds.

### 537. ACTODROMAS BAIRDI Coues.

## BAIRD'S SANDPIPER (Ai'bicâkia).

Though this little sandpiper is by no means uncommon, the natives seem to make no distinction between it and A. maculata, calling both by the same name.

They arrive about May 30, while there is still a good deal of snow remaining on the tundra, and are usually to be found along the edges of the pools at the top of the beach. After the tundra becomes clear of snow, they retreat back from the beach and are especially to be looked for on dry grassy portions of the tundra, particularly along the shores of our lagoon.

They are never very common and always solitary or in pairs, a quiet retiring little bird that never indulges in any of the conspicuous breeding antics noticed among the other waders,

The nest was always well hidden in the grass, and never placed in marshy ground or on the bare black parts of tundra, and consists merely of a slight depression in the ground thinly lined with dried grass. All the eggs we found were obtained from the last week in June to the first week of July, a trifle later than the other waders.

The sitting female when disturbed exhibits the greatest solicitude, running about with drooping outspread wings, and loud outcry, and uses every possible wile to attract the intruder from the eggs.

The nest is so well concealed, and forms so inconspicuous an object that the only practical way to secure the eggs is to withdraw to one side and allow the sitting bird to return, carefully marking where she alights. Having done this on one occasion and failing to find the eggs, after flushing the bird two or three times, I discovered that I had walked on the eggs, though I had been looking for them most carefully.

They leave after the breeding season in the same unobtrusive way that they have conducted themselves during all their stay, never collecting into flocks. We saw them occasionally during July.

### 539a PELIDNA ALPINA AMERICANA Cass.

## REDBACKED SANDPIPER (Mč'a-kapiā).

This species is common and breeds abundantly, although the nest is exceedingly hard to find, as the nesting birds are very wary and use every possible strategem to mislead one while looking for the eggs.

They arrive about the end of May. In 1882 they first appeared above the station in small flocks associating with the Golden Plovers, but the next spring the snow was slow in going off from this part of the tundra, and they were first noted below the village.

Some of them, perhaps, arrive paired, but the majority are pairing soon after their arrival, to judge by their actions. They scatter in pairs and threes all over the tundra, where there is still at this time a good deal of snow, and chase each other with much noise, taking wing suddenly without cause for alarm.

One will occasionally "set" his wings while in the air and soar for some distance, uttering a note quite different from the usual hoarse, rolling call.

As the tundra gradually clears of snow, they become more scattered and spread farther inland, deserting the shores of the beach lagoous, although they hardly confine themselves as much to the dry portions of the tundra as the Baird's Sandpipers are in the habit of doing.

Their rolling call through June is to be heard all day and every day, and reminds one of the notes of the frogs in New England in spring. In fact, some members of the party came home the first spring convinced that they had heard the frogs piping.

The nest, which is like that of all the rest of the waders, is always placed in the grass, sometimes in dry and sometimes in rather swampy places, but never on the black tundra or on the isthmuses between the ponds like the Phalaropes.

The eggs were first described from the Mackenzie region, by Richardson (Fauna Boreali-Americana, II, 383), but appear to be still little known in collections.

Both parents share in the work of incubation, though we happered to obtain more males than females with the eggs.

The young are pretty generally hatched by the first week in July, and both adults and young keep pretty well out of sight till the first of August, when they begin to show about the lagoons and occasionally about the beach, many of the young birds still downy about the head.

The autumn flight of young birds appears about the middle of August, associating with the young A. maculata and M. griscus scolopaceus, in good-sized flocks, particularly about the pools on the high tundra below Cape Smythe.

They continue plenty in these localities, sometimes appearing along the beach, for about a week, when the greater part of them depart, leaving only a few stragglers that stay till the first few days of September.

### 540. PELIDNA SUBARQUATA (Guld.) Cuv.

## CURLEW SANDPIPER.

The Curlew Sandpiper has never been before noted as occurring anywhere in America except upon the Atlantic coast, where it is a rare straggler.

I had the good fortune to capture a male in full breeding plumage, the only one seen, on June 6, 1883. It was in company with a good-sized flock of Actodromas maculata.

### 541. EREUNETES PUSILLUS (Linn.) Cass.

## SEMIPALMATED SANDPIPER (Niviliwiliak).

This species is a regular and fairly abundant fall visitor at Point Barrow, coming apparently from the east in large flocks.

None were seen either season during the spring migrations or the breeding season, but about the end of July they appeared in large numbers, arriving at Pergniak first and spreading down the coast.

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They were then quite abundant for two or three days about the village ponds and in the village itself, and a few stragglers staid on until the middle of August.

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Though a great many of them were shot, no adults were found either season.

## 544. LIMOSA LAPPONICA NOVÆ-ZEALANDIÆ Gray

## PACIFIC GODWIT.

This species, which is an abundant summer resident at the Yukon mouth and Saint Michael's, where it breeds, only occurs at Point Barrow as a straggler after the breeding season, appearing in August with the flocks of young Macrorhamphus, Pelidna, &c.

It is probably a quite regular though rare visitor, as we saw a few both in 1882 and 1883. Nevertheless, the natives appeared not well acquainted with the bird. Some called it "Tenstura" (Numerius barcalia), while others thought it was "Sabrana" (Lobipes hyperbores).

The two that were obtained were both young of the year.

This bird has not been previously recorded from the American coast north of Bering Strait,

## 356. TRYMGITES RUFESCENS (Vieill.) Caban.

# BUFF-BREASTED SANDPIPER (Núdluayu).

This is an abundant summer resident, and was more plenty in the season of 1883 than it was the year before.

They arrived both seasons in a body at about the same date (June 6 to 8), and were first seen on the dry banks below the village feeding greedily on the flies and beetles which were out sunning transcrives.

By the middle of June they had spread pretty well over the dryer parts of the tundra, both above and below the station. They were never seen on the lower marshy portions of the tundra, but always confined themselves to the high and dry banks, or what we called the black tundra.

The eggs, as might be inferred from their colors, are laid in the latter locality, as a rule, where they harmonize very well with the black and white of the ground and moss. We were unable to find the nest in 1882, but the next spring we collected the eggs in considerable abundance. Like the rest of the waders they build no nest, but deposit the four eggs, small end down, in a shallow depression in the ground lined with a little moss. Four is the usual number of eggs in a complete set, though we collected one set of five.

During the greater part of the breeding season, that is, from the time they arrive till the end of June, the males indulge in curious anties, which we had frequent opportunity of observing.

A favorite trick is to walk along with one wing stretched to its fullest extent and held high in the air. I have frequently seen solitary birds doing this apparently for their own amusement, when they had no spectators of their own kind. Two will occasionally meet and "spar" like fighting cocks for a few minutes and then rise together like "towering" birds, with legs hanging loose, for about thirty feet, then drifting off to leeward. A single bird will sometimes stretch himself up to his full height, spread his wings forward, and puff out his throat, making a sort of clucking noise, while one or two others stand by and apparently admire him. They are very silent, even during the breeding season. When they first arrive they are to be found associating with Actodromas maculata for a few days. After the breeding season they disappear gradually, never gathering into flocks, but quietly slipping away, and none are to be seen after the first week in August.

# 160. NUMENIUS BOREALIS (Forst.) Lath

### Eskimo Curlew (Turá turá),

This is a rather irregular summer visitor and by no means common, although well known to the natives. In the spring of 1882 it was the first wader to arrive, but in 1883 we saw none at all.

Two flocks of about twelve each arrived on May 20, when there was still much snow on the tundra and in the lagoons, moving up the beach towards the northeast.

No others were seen till the first week in July, when two were noticed, one associating with a flock of Golden Plovers and Knots. One taken at the time was already molting.

## 563. PHALAROPUS FULICARIUS (Linn.) Bp.

RED PHALAROPE (Salra).

One of the commonest birds, remaining till late in October, when the sea begins to close, They arrive early in June in considerable numbers, and already paired, in full breeding planage. As with Phalaropes generally, the female is the larger and brighter bird of the pair. We found it hard to make the natives believe that she was not the male. Dissection, actually showing the eggs in the ovary, was necessary before they would admit the fact.

The whole duty of raising and taking care of the broad after the eggs are laid, falls upon the males, who hatch the eggs and take care of the young broad, while the female spends her time away feeding. We never found a female sitting on eggs, or took one with her breast plucked. It

was invariably the male bird that was started off the eggs.

When these birds first arrive the sea is still closed, and the birds make themselves at home especially round the small ponds. As the snow melts away, they spread out over a greater extent of country, but never go far from the sea, and are always to be found in the wetter grassy portions of the tundra, particularly back of the beach lagoons, where they nest in large numbers.

The nest is always in the grass, never in the black or mossy portions of the tundra, and usually in a pretty wet situation, though a nest was occasionally found high and dry, in a place where the nest of the Pectoral Sandpiper would be looked for. A favorite nesting site was a narrow grassy isthmus between two of the shallow ponds. The nest is a very slight affair of dried grass and always well concealed.

Some of the pairs have their full complement of eggs laid by the middle of June, but others are much later, as fresh eggs were obtained as late as June 29, in 1882. Four is the usual num-

ber of eggs in a complete set, although sets of three incubated eggs are to be found.

They are exceedingly tame and attractive little birds during the breeding season, paddling about the little ponds on the tundra in their peculiarly graceful manner, having apparently no fear of man or beast, and keeping up a continual twittering, as if of conversation among themselves. They are at all times a noisy bird, especially when gathered into flocks.

They begin to collect in flocks, flying and lighting round the ponds, about the end of June, and continue in flocks through July, though as the sea opens they grow scarce, apparently roaming off inland, and out to sea. Late in July, when there were hardly any to be seen near the shore, I have found them 7 or 8 miles inland around the lakes in very large flocks, which were gradually assuming the gray winter plumage. The natives said that the Phalaropes went "south," which means "inland," and they would be plenty by and by. The adults appear to leave about the end of July, as the great flocks which stay so late in the fall seem to be all the young of the year.

These flocks come off the land about the first week in August, and are to be found along the shore and beach, occasionally feeding and swimming in the ponds back of the beach. Their abundance varies a great deal on different days, as they are apparently wandering back and forth a good deal from one feeding ground to another. They are apt to be specially abundant on days when there is much loose ice on and near the shore.

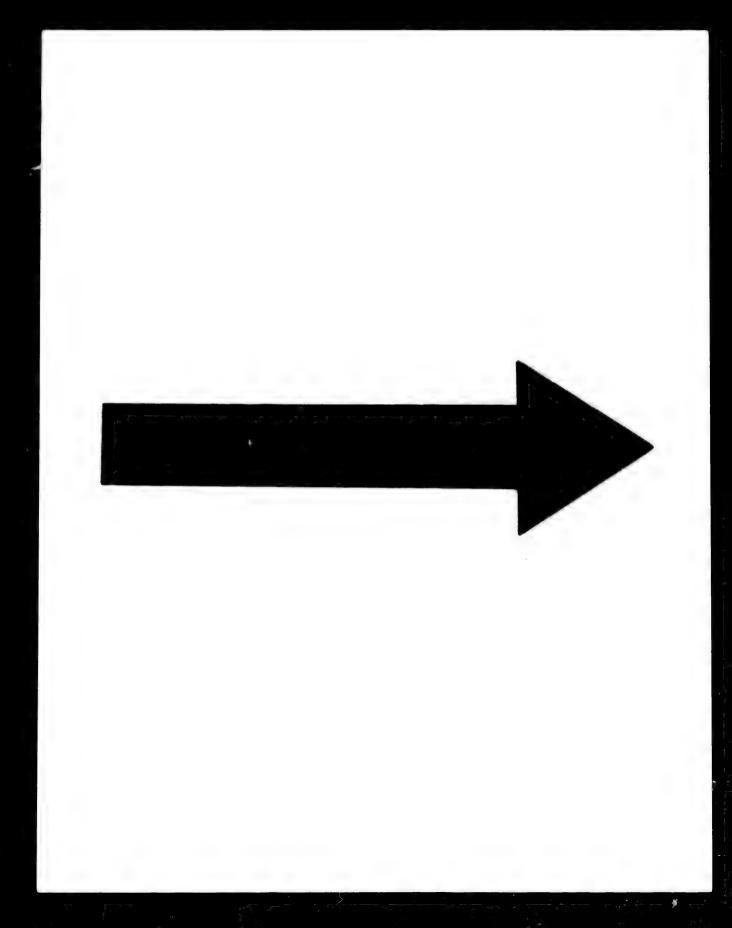
When in the fall plumage and collected into flocks, they spend most of the time floating and feeding with their peculiarly graceful dipping motion a few yards from the beach, while a flock will occasionally rise with a sharp twitter and move a few hundred yards to a new feeding ground.

They are exceedingly tame and unsuspicious at all seasons, and the Eskimo boys, although their archery is none of the best, succeed in killing a good many of them with their bows and arrows.

### 564. LOBIPES HYPERBOREUS (Linn.) Cuv.

NORTHERN PHALAROPE (Sabra'ñna).

Mr. Nelson has already noted the increasing rarity of this species as we proceed towards the north in the Arctic Ocean, although it is the more abundant of the two Phalaropes on the shores



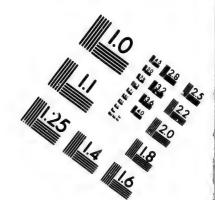
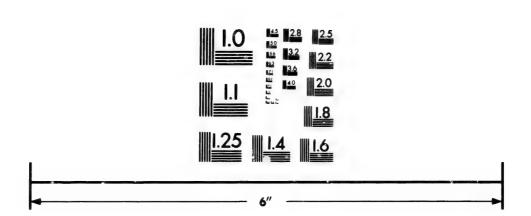
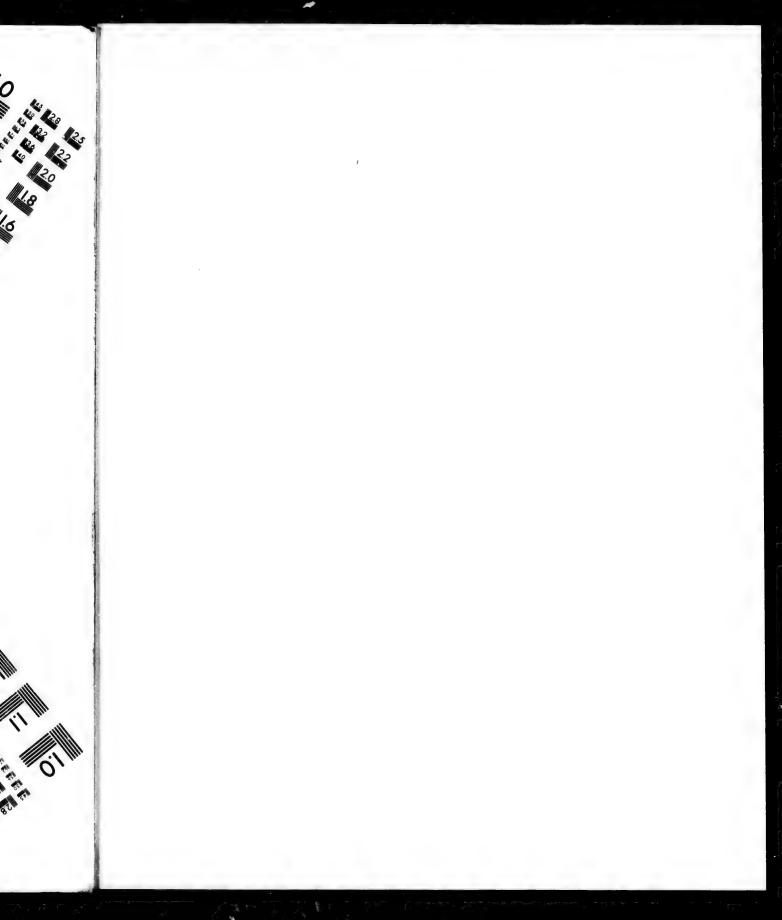


IMAGE EVALUATION TEST TARGET (MT-3)



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of Bering Sea. When we reach Point Barrow it has become merely a rare straggler, although the natives know it well, having become familiar with it during their summer wanderings to the Colville.

It was only seen alive on one occasion, June 11, 1883, when a single pair was taken in one of the small tundra pools, such as are frequented by the Red Phalaropes. As usual the female was the larger and more brightly colored bird.

We also secured a native skin from a man who said he had shot the bird in the country of the Kûngmûdling people, east of the Colville River, where they are very plenty.

## 584. GRUS CANADENSIS (Linn.) Temm.

LITTLE CRANE (Tût-tř'd-rř-qû).

Though abundant about Norton Sound and even as far north as Kotzebue Sound, the Little Crane reaches Point Barrow only as a rare straggler. It was not observed at all during the season of 1882, but two pairs were seen in 1883 and one of each pair secured. Both of these occurrences were between the middle and end of June, and none were seen in the autumn.

The bird was well known to the natives, who say they find them very abundant at the mouth of the Colville.

### 588. OLOR AMERICANUS (Sharpless) Bp.

Whistling Swan (Ku'a' ru).

The swans occasionally seen and frequently spoken of by the natives are probably of this species, as the large Trumpeter Swan is not known west of Fort Yukon (teste Nelson, "Arctic Cruise of the Revenue Steamer Corwin, 1881").

They were only noticed once or twice each spring, and the natives say they are uncommon at the sea-coast.

They say, however, that they are very plenty "pani" "south," by which they mean 75 or 100 miles inland on the rivers, where, they say, they catch a great many when they have molted their wing feathers.

## 591a. CHEN HYPERBOREUS ALBATUS (Cass.) Ridgw.

LESSER SNOW GOOSE (Kil'ñ o).

All the snow geese taken were of this smaller form. They are not at all common, but are occasionally seen during the spring migrations, that is, from the middle of May to the end of June. They are usually in pairs and small fleeks, and generally come off the land from the south and go out to sea, as if going out to feed.

Once or twice larger flocks came up in the morning and went back again in the afternoon, and occasionally stragglers were found alighting round the pools on the tundra. None of them bred in the neighborhood of the station.

### 593a. ANSER ALBIPRONS GAMBELI (Hartl.) Coues.

AMERICAN WHITE-FRONTED GOOSE (Nú'a' lúa' rua).

This was our most abundant goose. They are fairly plenty during the spring migrations and a few breed. Like the swans they are said to be extremely abundant "south," near Meade River, where many eggs are secured and many geese taken while molting and unable to fly.

They arrive about the middle to the end of May (May 16, 1882, and May 25, 1883), and for a couple of weeks are generally to be found in small parties along the lagoons and the small pools which rave opened along the crown of the beach. We could be sure to find a few geese every day in a small marshy lagoon above the station, which we got into the habit of calling the "goose pond" from this fact.

As the snow cleared off—early in June—they scattered in pairs over the tundra, occasionally feeding together in small parties of half a dozen or so.

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The eggs are always laid in the black, muddy tundra, often on top of a slight knoli. The nest is lined with tundra moss and down. The number of eggs in a brood appears subject to considerable variation, as we found sets of four, six, and seven, all well advanced in incubation. The last laid egg is generally in the middle of the nest, and may be recognized by its white shell unless incubation is far advanced, the other eggs being stained and soiled by the birds coming on and off the nest.

We never saw any young birds, and the adults disappeared early in July. Perhaps they go inland to the rivers to molt their flight-feathers.

In the fall migrations they were exceedingly rare, a flock or two being seen each season in August.

These birds are familiar objects, during the breeding season stalking around the level tundra, where the mirage makes them loom up as big as a man, and their peculiar laughing cry is frequently to be heard.

At this time they are exceedingly shy and difficult of approach, but when they first arrive can easily be called within gunshot by the rudest imitation of their cry.

### 596. BERNICLA NIGRICANS (Lawr.) Cass.

## BLACK BRANT (Nûg'tû'g'nû).

The Black Brant appear at the end of the main spring migrations of the water-fowl, but in no very considerable numbers, following the same track as the eiders.

A few remain to breed and are to be seen flying about the tundra during June. The nest is placed in rather marshy ground and is a simple depression lined with down, with which the eggs are completely covered when the birds leave the nest. The birds sometimes begin to sit on four eggs and sometimes lay as many as six.

After the middle of August they begin to fly across the isthmus at Pergniak, coming west along the shore of Elson Bay, crossing to the ocean and turning southwest along the coast. Whenever during August the wind is favorable for a flight of eiders at Pergniak the brant appear also. They, however, frequently turn before reaching the beach at Pergniak, follow down the line of lagoons and cross to the sea lower down the coast.

The adults return first. No young of the year were taken till the end of August. During the first half of September, a good many flocks cross the land at the inlets as well as at Pergniak, and are to be seen resting and feeding along the lagoons and pond-holes.

At this season they are very shy and hard to approach, and all are gone by the end of September.

## 598. PHILACTE CANAGICA (Sevast.) Bannist.

## EMPEROR GOOSE.

This bird did not occur at Point Barrow, and its name is only inserted here because the expedition received the gift of a skin at Saint Michael's from Lieut. Frederick Schwatka, U. S. A.

## 605. DAFILA ACUTA (Linn.) Bonap.

### · PINTAIL (Îvicâgâ).

The Pintail does not come to the coast in anything but small numbers, and probably none breed in the vicinity of the station.

One or two small flocks were occasionally seen during the spring migrations in 1882, but none in 1883, until the fall.

During the fall migrations, that is through August and early in September, several small parties came down into the little ponds near the village and several were taken. These returning birds were mostly young of the year, and very fat.

The natives say that they are very plenty in summer on the larger rivers running into the Arctic Ocean east of Point Barrow, and are very keen of sight and hearing.

#### 623. HARELDA GLACIALIS (Linn.) Leach.

LONG-TAILED DUCK: OLD SQUAW (A'hadlin, A'dyigia).

This was one of our commonest ducks, though never appearing in great flights like the eiders. They are first seen about the middle or end of May, and remain as long as there is any open water in the fall. The seal hunters in 1882 reported seeing these birds as late as December 9, in open holes in the ice-field.

Though the first ones arrive from the 15th to the 20th of May, they are not plenty till the first week in June, about which time there is a considerable flight, larger flocks passing up to the northeast in the afternoon or evening.

The flight-flocks are never so large as the flocks of eiders, and always go very high, making a great clamor. They are exceedingly noisy all through the spring migrations and the breeding season. The native name "Ahadliñ" is a capital imitation of their ordinary cry.

After this flight they are to be found in tolerable abundance in all the ponds and pools on the tundra which are free from ice. They appear to have paired before their arrival, and only seldom collect in small parties at some favorite feeding ground like the "goose pond."

During the breeding season each pair seems to adopt a pool for its own, and drive out all intruders. At this season they feed almost exclusively on vegetable food, and are fat and in excellent condition for food, with no fishy tlavor.

They breed in considerable numbers all over the tundra, but the nests are scattered and not easy to find. The nest is always lined with down and generally near a pool.

As the open holes begin gradually to form at the outlets of the lagoons, and along the beach, the Old Squaws resort to them in increasing numbers, frequently sitting on the ice. By the first week in July they begin to abandon the tundra and collect in large flocks along the shore.

After the ice has broken up and gone away they are to be looked for especially along the shore, although a small party is generally to be found in each of the large lagoons. Through July and Angust they vary in abundance, some days being very plenty, while for two or three days at a time none at all are to be seen. At this season they fly up and down not far from the shore and light in the sea. Towards the end of August they are apt to form large "beds" near the station, and this habit continues in September whenever there is sufficient open water.

Many come from the east in September and cross the isthmus at Pergniak, and continue on down the coast to the southwest. We noticed them going southwest past Point Franklin, August 31, 1883, in very large flocks.

After October 1 they grow searcer, but some are always to be seen as late as there is any open water.

They begin to lay about the middle of June, and downy young were found July 20.

## 625. POLYSTICTA STELLERI (Pall.) Brandt.

STELLER'S DUCK (Ignikan'kto).

Though not common in the sense that the King-ducks and Pacific Eiders are common, this beautiful little duck is far from a-rare bird during the late spring and summer at Point Barrow and in the vicinity.

The breeding-ground, however, appears to be some distance off. Early in June they are to be found at the "leads" of open water at some distance from the shore, and perhaps the majority of them pass on in this way to their breeding-grounds. From the middle to the end of June they appear on land in small parties scattered over the fundra.

At this time they are in full breeding plumage, and the males are generally in excess in the flocks. They are generally to be found in small "pond-holes," frequently sitting on the bank asleep, and are very tame, easily approached within gunshot, and generally swimming together when alarmed, before taking wing, so that several can be secured at one discharge. I have stopped a whole flock of five with a single shot.

They appear to go off to breed about the end of June, although it is possible that the birds we have on the tundra are non-breeding birds.

Birds, however, that have bred, judging from the looks of the ovaries, begin to come back from the first to the middle of July, appearing especially at Pergniak and flying in small parties up and down the coast. They generally keep to themselves, but are sometimes found associating with small parties of King-ducks.

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When the open water forms along shore, that is, in the latter part of July and early part of August, they are to be found in large flocks along the beach, collecting in "beds" at a safe distance from the shore, feeding on marine invertebrates, especially gephrycan worms. These flocks consist almost exclusively of molting females, whose ovaries show that they have bred. The males appear to undergo a fall change of plumage like the other eiders, gradually putting on the brown dress of the females. We were, however, unable to secure any specimens to illustrate this change.

They disappear from the first to the middle of August, and when gathered in large flocks are exceedingly wild and hard to approach.

Though less abundant in the early part of the season of 1883 than they had been in 1882, they were, on the other hand, much more plenty after the sea opened, and staid considerably later.

## 626. LAMPRONETTA FISCHERI Brandt.

Spectacled Eider (Ka'waso: & Tútúlu: & Yû'kalulu).

This species has not been previously noted north of Bering Straits, but we found it to be a regular though rather rare summer visitor in the vicinity of Point Barrow. They evidently breed not far from the station, as a female was taken June 19, 1883, with an egg in the oviduct just ready for laving.

They arrive towards the end of the great spring migrations of eiders, as has been observed at Saint Michael's, in company with the King-ducks and Pacific Eiders, and are occasionally to be seen in pairs and small parties on the tundra, especially on the wetter portions back of the beach lagoons.

They were not observed either season in the fall migrations. The young, about three-fourths grown, were taken August 24, 1883, and had the eye-patches even then distinctly indicated.

The male in the breeding season has the green feathers of the back of the head developed into a decided nuchal crest, which I do not find mentioned in any of the published descriptions of the species.

I found the iris of the female white, and not hazel or blue as has been stated by other observers. This character is possibly variable.

### 628. SOMATERIA V-NIGRA Gray.

PACIFIC EIDER ( & Amaw'lin; & Teu galù'ktun).

This species appears to be decidedly less plenty than the succeeding, although it is often difficult to distinguish them, as during the great migrations they frequently associate in large mixed flocks, so that one shot may bring down birds of both species.

They arrive later than the King Eiders, not appearing before the middle of May, after which time they are to be taken in every flight, gradually increasing in numbers. Towards the end of the migrations there are occasional days when the flocks seem to be made up almost exclusively of this species. A few small parties are also to be seen loitering around the lagoons, and open pools in the shore ice towards the end of June.

During the migrations, they are exceedingly fat and excellent eating. In the autumn they associate with the King Eiders, following the same course at Elson Bay, and frequently sitting in good-sized parties close to the shore.

Towards the end of the fall migr. tions, the change to the fall plumage in the males is pretty well marked. This change of plumage has been noted in this species by Mr. Dall, but beyond has short note, I can find no reference to the change in any history of the species. Unfortunately, no specimens were secured to illustrate this.

This species does not breed anywhere near the station. The natives say they all go a long distance to the eastward, and there breed in large numbers. As well as we could make out, one extensive breeding-ground is on some sand island, rather more than half-way between Point Barrow and the mouth of the Colville River.

By a curious misnomer, these ducks are known to the whalemen as "canvas-backs"!

## 629. SOMATERIA SPECTABILIS (Linn.) Boie.

King Eider ( & Ki'nalin; 9 Annabia).

This is by all means the most abundant bird at Point Barrow. Thousands hardly describes the multitudes which passed up during the great migrations, within sight of the station, and yet equally great numbers passed up along the "lead" of open water several miles off shore.

They appear in the spring before there is any open water except the shifting "leads" at a distance from the shore, and travel steadily and swiftly past Cape Smythe to the northeast, following the coast. Some flocks cross to the eastward below Point Barrow, but the majority follow the barrier of grounded ice past the point. It is probable, however, that they turn to the east after passing Point Barrow, because all the returning flocks in the autumn come from the east, hugging the shore of the mainland.

The first ducks in the spring of 1882 were seen on April 27, a comparatively warm day, with a light southerly wind blowing. They were flying parallel to the coast over the barrier of grounded ice. The natives said they were all "kingaling" "nosy birds" or males (referring to the protuberance at the base of the bill), and the first flocks of the migration appear to be composed exclusively of males.

During the first half of May, 1882, several males came from the south off the land, and gained the ice in a very exhausted condition, frequently so utterly worn out that the natives caught them and killed them with sticks. They were all found to be very much emaciated, and their stomachs were empty of food.

The season was later in 1883, and no ducks were seen till May 5. There were six great flights in 1882, the first on May 12 and the last on June 11, and five in 1883, the first on May 17 and the last on June 4. As a rule, these flights took place on comparatively warm days, with light westerly or southwesterly winds. On one day each year, however, there was a large flight with a light breeze from the east. A warm southwest wind is pretty sure to bring a large flight of eiders.

The flight seldom lasts more than two or three hours, beginning about eight or nine in the morning, or between three and four in the afternoon. More rarely a flight begins about ten in the morning and lasts till afternoon.

During the flights, the great flocks in quick succession appear to strike the coast a few miles from the station, probably coming straight across from the Seahorse Islands, and then follow up the belt of level ice parallel to the coast towards Point Barrow, going pretty steadily on their course, but swerving a little and rising rather high when alarmed.

Their order of flight was generally in long diagonal lines, occasionally huddling together so that several could be killed at one discharge. A few flocks in a great flight usually followed up the line — broken ice a mile or two from the shore, and a flock occasionally turned in at the mouth of the lagoon and proceeded up over the land.

On the days between the flights and when the wind was east, a few flocks would struggle up against the wind either going up far off the shore or overland; but most of the birds on "off days" came off the land from the south, and either continued on towards the open water or turned to the northeast along the broken ice. These flocks were never so large as the great flight flocks, and generally flew in more compact order. A few were occasionally seen early in the migrations going back towards the southwest. On many days when there were no ducks in shore they flew abundantly at the "lead" of open water.

The majority of them are paired by the middle of May, and the flocks are made up of pairs flying alternately, ducks and drakes. If a duck is shot down, the drake almost invariably follows her to the ice, apparently supposing that she has alighted.

Early in June straggling pairs and small parties settle about the tundra pools and breed sparingly in the neighborhood of the station. A few nests were found. After the main flight and during the latter part of June a few stragglers and small flocks are to be seen almost daily.

Captain Owen, of the steam whaler North Star, who got up to the station June 25, 1882, reported that the day before there were myriads of eiders of both sexes in the open water off Point Belcher.

By the second week in July, before the ice is gone from the sea or from Elson Bay, the males begin to come back in flocks from the east, and from that time to the middle of September there is a flight of eiders whenever the wind blows from the east. The flocks are all males at first, but mixed flocks gradually appear, and the young of the year were first observed in these flocks on August 30, 1882.

Most of the flight birds make no stay but continue on to the southwest, generally a couple of miles out at sea, though they occasionally stop to rest, especially when there is much drifting ice. Between the regular flights they continue to straggle along, coming off the land, and occasionally siting apparently asleep on the beach. Small flocks and single birds are to be seen till the sea closes, about the end of October, and in 1882 many were seen as late as December 2, when there were many holes of open water.

When the birds are flying at Pergniak, it is quite a lively scene, as there is a large summer camp of Eskimos close to the point where the ducks cross when the conditions are favorable. When the wind is east or northeast, and not blowing too hard, the birds come from the east and strike the land at a point which runs out on the shore of the bay about half a mile from Pergniak, close to where the lagoons begin.

They would be apt to turn and fly down these lagoons were it not for a row of stakes, set up by the natives, running round the semicircle of the bay to the camp. As soon as the flock reaches this critical point, all the natives, and there may be fifty of them on the watch with guns and slings, just at the narrowest part of the beach above the tents, immediately set up a shrill yell. Nine times out of ten the flock will waver, turn, follow round the row of stakes, and naturally whirl out to sea at the first open place, where of course the gunners are stationed. With a strong wind, however, the ducks do not follow the land, but come straight on from the east and cross wherever they happen to strike the beach, so that the shooting cannot be depended on.

The flocks during the fall flight are not so large and do not follow one another in such rapid succession as in the spring, and though they arrive from the east in the same stringing order, they huddle into a compact body as they whirl along the line of stakes and out over the beach.

The natives, although as a rule they are far from good shots, are provided with poor guns, and appear particularly averse to putting in enough powder and shot to kill a strong eider duck, nevertheless succeed in capturing a good many with guns and slings. They reap a plentiful harvest of them in the spring, when they are all at home, and the crews of the whaling umiaks out at the open water spend their leisure time while they are waiting for whales in shooting ducks, which form an important article of food. They of course always boil their ducks, as they do all the rest of their food, and usually skin instead of plucking them. They are very fond of the fat which adheres to the skin, scraping it off with their knives industriously till not a particle remains, licking their knives with great relish. The intestines, boiled by themselves, are also considered a great delicacy.

The males that appear at Pergniak at the beginning of the autumn migrations are at first in full breeding dress, perhaps a little faded, especially about the bill. As the season advances they show more and more extensive patches of brown feathers, until at the end of the migrations they cannot be distinguished from the females except by the white wing and back patches.

I do not find this autumnal change of plumage me..tioned in any published account of the species, and it has been questioned on general principles by experienced ornithologists. I accordingly give a detailed description of three specimens brought home by our party, which illustrates this process very well. They were all taken on July 26, 1883, and exhibit three different stages of the change

1. Museum No. 93,296. Compared with a drake in full breeding dress, all the colors are more dingy. The black of the back has lost its rich velvety gloss, and the remiges and tail-feathers are

H. Ex. 44---16

faded and worn. The cream color of the throat and shoulders is much paler, fading almost to white on the back, and beginning to become mottled with darker patches between the shoulders. The white feathers on the neck are thin and sparse, and drop out very easily, while very young brown feathers are making their appearance among them. The black V on the throat has assumed a "spotty" appearance, caused by the dropping out of some of the black-tipped feathers, so as to expose their white roots. The green feathers of the cheeks are faded, thin, and hairy. The bluegray of the crown and back of the head appears at first sight to be merely faded, but drawing aside the feathers discloses at their roots a crop of brown feathers rather more advanced than those on the neck. All the feathers of the head and neck except the brown ones fall out very easily and appear faded and worn. The bill has grown dark, the protuberance at its base much shrunken, and the epidermis is coming off the frontal processes, patches only remaining.

2. Museum No. 93,297. The head and neck now show about equal proportions of the new brown feathers and the old light-colored ones. The back between the shoulders and the front part of the throat shows a large proportion of new brown feathers (still growing from the capsule, as may be easily seen by pulling out one or two), and many of the white or cream-colored feathers of the throat have been lost. A few new brown feathers have also appeared at the flanks.

3. Museum No. 93,298. The white and light-colored feathers are nearly gone from the head and neck, remaining only in a few patches on the cheeks and forehead, while the brown feathers are fairly well developed, so that the fore part of the throat and back is nearly as in the female. The breast is still cream-colored.

The drakes grow almost entirely dark before the migrations are over, the wing-patches remaining white the longest. The Pacific eider and Steller's duck both undergo a similar change, but we were mable to secure any specimens to illustrate this.

None of the eiders of any species molt their wing-feathers so as to be incapable of flight until after leaving the neighborhood of Point Barrow.

### 657, PAGOPHILA EBURNEA (Phipps) Kaup.

IVORY GULL (Nau'yabwûñ).

The Ivory Gull is at best a rare visitor at Point Barrow. Early in the spring of 1882, Lieutenant Ray reported seeing two in full plumage out at the lead of open water, some six miles from the shore.

No others, however, were seen or reported until late in the fall, when large numbers of Rosy Gulls were flying up the coast and among them a few of this species, of which one was taken.

The bird was not observed in the season of 1883.

## 660. LARUS GLAUCUS Briinn.

GLAUCOUS GULL; BURGOMASTER (Nauya).

Large gulls, mostly in the immature plumage of this species, were plenty round the station from the time we landed up to the middle of October, flying up and down the beach, sitting on the water, or feeding at the edge of the beach. The first two of the large lagoons were always favorite resorts for the gulls at all seasons when they were open, and even after they were partially frozen gulls were to be seen sitting on the ice.

After the middle of October, they became scarcer, sometimes disappearing for days, but a few stragglers remained as long as the sea was open, up to the middle of November. In the autumn of 1882 none were seen after October 18, except one solitary straggler reported November 1.

They arrive in the spring, about the first week in May, and during May and June a few are to be seen nearly every day, though they sometimes disappear altogether for a day or two, and occasionally are rather numerous specially round the lagoons and near Pergniak. They always turn out in full force when there is a flight of eiders, and make themselves troublesome by picking up dead and wounded ducks.

If a duck be shot so that he fall in the water or any not easily accessible place, an hour is generally time enough for him to be reduced to a skeleton by the gulls. They are occasionally to be seen inland, but usually crossing to some particular point, sometimes lighting on the tundra,

None breed anywhere near the station, though they are to be seen every day during the breeding season.

They are rather abundant after the sea opens, and continue so during August and September. The young appear in August. Towards the end of September, when numerous, they have a regular track near the station, flying in over the beach and out over the magnetic observatory.

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The natives say they find them plenty at the rivers inland when they are killing deer in the summer.

They are a favorite bird with the natives, and many are shot in the autumn as they fly up and down the shore. They are also occasionally caught with a baited line in the autumn when there is a light snow on the beach. A little stick of hard-wood, about 4 inches long and sharpened at both ends, has attached to its middle a strong line of deer sinew. The stick is carefully wrapped in blubber or meat and exposed on the beach, while the short line is securely fastened to a stake driven into the sand and carefully concealed in the snow. The gull picks up the tempting morsel and swallows it and of course is caught by the stick, which turns sidewise across his gullet, and his struggles to escape fix it more firmly.

It was at first supposed that *Larus leneopterus* occurred at Point Barrow, and several gulls in the collection were identified as belonging to this species. Mr. Howard Saunders, however, the great English authority on the *Laridw*, while in Washington last summer, carefully examined our series, and is of the opinion that they are all referable to *L. glancus*, with the exception of one small and very brown immature bird, which he was unable to identify.

## 661a. LARUS KUMLIENI Brewster.

LESSER GLAUCOUS-WINGED GULL (Nati-ya).

The above-mentioned dark and small immature bird (Museum No. 93306), which Mr. Saunders was unable to identify, is considered by Mr. Ridgway as probably referable to Brewster's species L. kumlieni,\* which has hitherto been obtained only from the eastern coast of America. It is not at all unlikely that the species should straggle westward along the northern coast of the continent as Pelidna subaranata and Actodromas fuscicollis were found to do.

Small and dark young gulls were observed quite often with the young Burgomasters in the antumn, but the above was the only one obtained in a state fit for preservation.

## 676. RHODOSTETHIA ROSEA (MacGill) Bruch.

Ross's Gull (Kā'āmax'lu).

(Plates I and II.)

Our expedition succeeded in obtaining a large series of this rare and beautiful bird—more, in fact, than there were before in all the museums of the world put together—and a still larger series might have been obtained had the weather and other conditions been favorable.

Unfortunately, we were able to add very little to the biography of the species, as the birds are simply autumn visitors at Point Barrow, making no stry, but passing rapidly to the northeast. This, however, is the only locality where the birds have been observed in abundance even for a short time, all previous records referring to the capture of sporadic individuals.

In 1881, from September 28 to October 22, there were days when they were exceedingly abundant in small flocks—generally moving towards the northeast—either flying over the sea or making short excursions inshore.

Not a single one was seen during the spring migrations or in the summer, but two or three stragglers were noticed early in September—a few out among the loose pack-ice—and on September 21, 1882, they were again abundant, apparently almost all young birds.

<sup>\*</sup> See Bull. Nuttall Ornithological Club, viii, No. 4, pp. 214-219, October, 1883.

They appeared in large, loose flocks, coming in from the sea and from the southwest, all apparently traveling to the northeast. Most of the flocks whirled in at the mouth of our lagoon and circled round the station with a peculiarly graceful, wavering flight, and many were shot close to the house. A cold easterly wind was blowing at the time.

They continued plenty for several days—while the east wind blew—all following the same track, moving up the shore, and making short excursions inland at each of the beach lagoous.

After September 28 they disappeared until October 6, when for several days there was a large flight. On October 9, in particular, there was a continuous stream of them all day long moving up the shore a short distance from the beach and occasionally swinging in over the land. Note there seen to return.

The nature of our duties at the station prevented any investigation as to where they came from or whither they went. They appeared to come in from the sea, to the west or northwest, and

traveled along the coast to the northeast.

They were not observed on Wrangel Island by either the Jeannette, the Corwin, or the Rodgers, and yet the direction from which they come to Point Barrow in the fall points to a breeding-ground somewhere in that part of the world. May it not be that some land yet to be discovered, and north of Wrangel Island, will one day yield a glorious harvest of the eggs of this splendid species?

It is difficult to form any idea of what becomes of the thousands that pass Point Barrow to the northeast in the autumn. It is certain that they do not return along the shore as they went. Nevertheless, at that season of the year they must of necessity soon seek lower latitudes.

Perhaps the most plausible supposition is that soon after leaving Point Barrow, perhaps when they first encounter the main ice-pack, they turn and retrace their steps so far out at sea as to be unnoticed from the land, and pass the winter at the edge of the ice-field, proceeding north to their breeding-ground as the pack travels north in the spring.

Capt. Everett Smith, of the steam whaler Bowhead, who is a trustworthy witness, reports that when he was in the loose ice, 70 miles northwest of Point Hope, on June 10, 1883, he saw large

numbers of these birds.

The greater number of the birds we obtained were immature, and probably the young of the year, though in a stage slightly more advanced than the young bird taken by Mr. Nelson at St. Michael's. The few adults that we captured were in a plumage hitherto undescribed, and one in particular was especially beautiful. The following is a description of this specimen:

Museum No. 93321, Rhodostethia rosea & .—White parts everywhere tinged with rose color, except the tail feathers; rose color somewhat blotchy and approaching salmon color, especially on the crissum. Mantle pearly blue, extending as mottled markings to the back of the head. No traces of the black collar; a few black marks round the eye. Edge of wing from shoulder to wrist bright rose. First four primaries rose-shafted beneath, third the brightest; outer web of first primary black nearly to the tip; fifth to last primary and first secondary, white-tipped; remaining secondaries rose-tipped. A few small obscure black markings on the breast. Feet, "terra-cotta" red, with brown knuckles and webs. Bill, black.

The above description was taken from the freshly-killed bird. The beautiful blush-rose tinge had not, however, faded perceptibly, when the skin was examined a year later. The other adults were in almost the same plumage, but the rose color was much paler and confined to the under parts from the throat to the under tail-coverts. The only adult female secured was the least pink of any of the adults. One specimen, No. 93364, shows a few dark feathers among the upper wing-coverts. Mr. Ridgway makes the rather reasonable suggestion that this is a bird in its second year.

Mr. Howard Saunders, in "Ibis" for 1875, has given an excellent description of the immature plumage from two young birds in the Vienna Museum. As, however, these birds differ in some respects from those we collected, I will venture to give a detailed description of our large series.

Three specimens (Museum Nos. 93328  $\delta$ , 93353  $\delta$ , and 93354  $\delta$ ) present a stage of plumage which is possibly a little younger than the great majority of the birds collected.

The following is a description of this stage:

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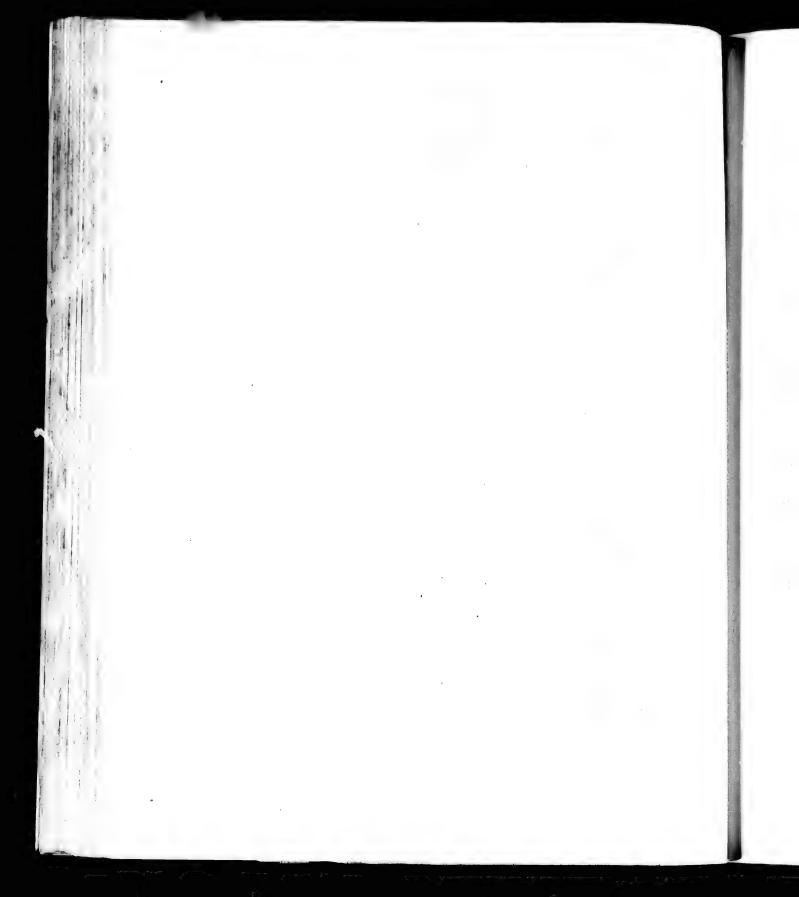
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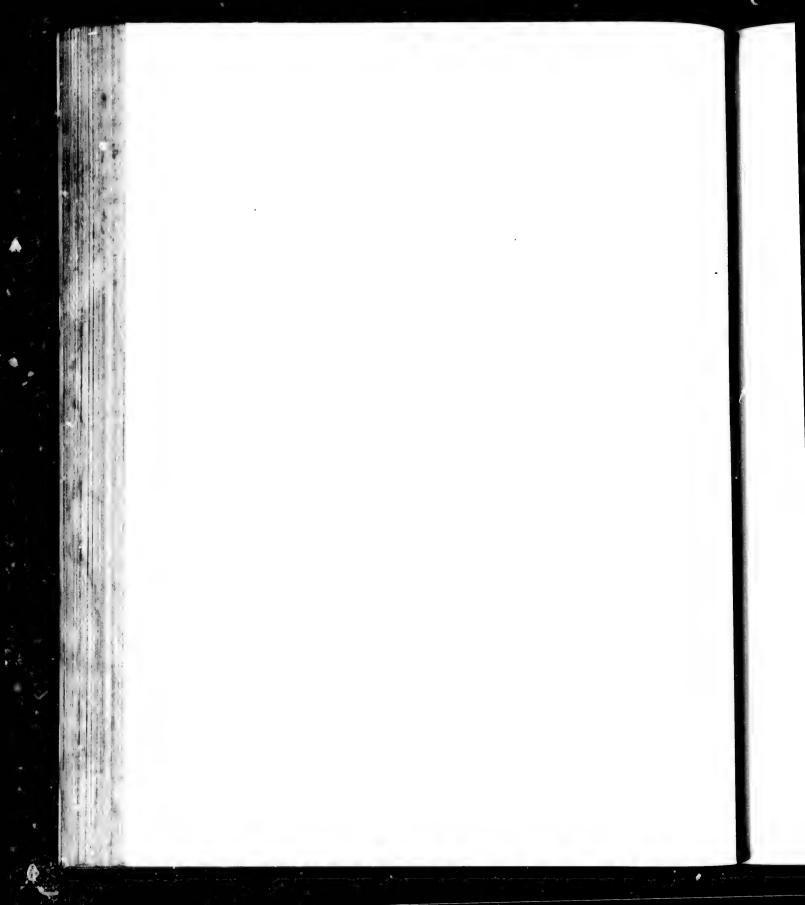
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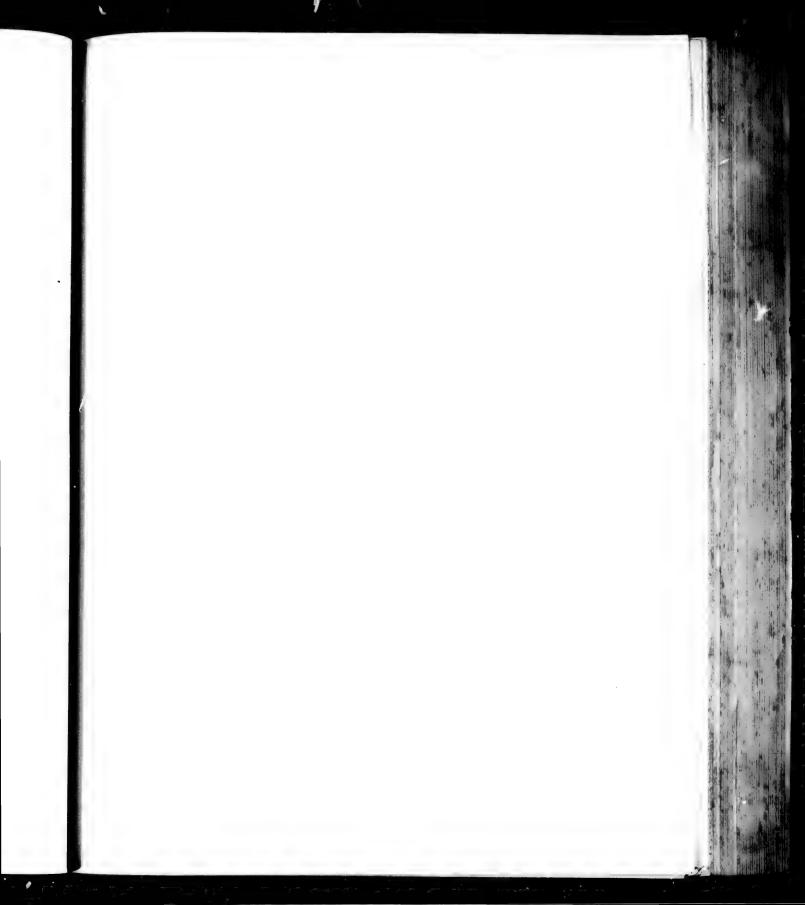
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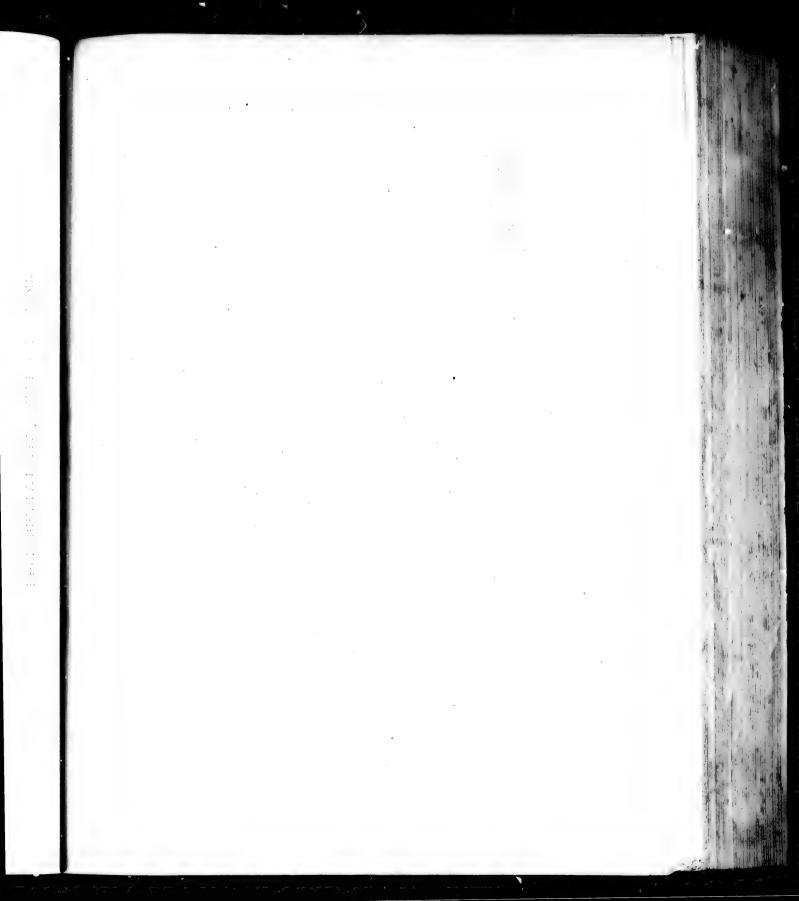












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Below, including lower tail-coverts, white, or slightly tinged with rose-color; mantle pale nearly blue, extending on to the sides of the neck and back of the head, which is faintly mottled with dark markings in one specimen; black and white mottled markings round the eye, extending to the corner of the mouth in one specimen; small black spot on each side of the neck, while in one case the dark collar of the adult is faintly indicated; forehead in every case white; rump more or less mottled with black feathers, occasionally edged with white or pale brown. Upper tail-coverts white, sometimes showing indistinct dark marks towards the tips of the feathers. Tail with a broad black tip about one-fourth of its length. Middle rectrices black-shafted, with this color extending more or less on the webs, continuous with the black of the tip. First, second, third, and fourth primary above, shaft, outer web, and about half of inner web including tip, black, the rest white; one specimen has a large white subapical spot on the fourth primary. Remaining primaries gray at the base, fading into white towards the tip, where there is an oblique black bar across the feather. This bar grows smaller on the successive primaries till the last is wholly white. Secondaries, white. Tertiaries and scapulars dusky black, with white or light-brown edges. Upper wing-coverts, alula, and lower primary coverts black, with white or light brown edges, lower secondary coverts like the mantle. Under surface of the wing nearly uniform, like the mantle.

The majority of those taken were in a very similar plumage, but always without the black shafts to the middle rectrices, though the tail is always black-tipped, and one or two show slight black markings on the upper tail-coverts. In two or three specimens the blue of the mantle extends completely around the neek, and two or three have the dark collar faintly indicated, especially on the back of the neck. Two have a few scattered dark feathers in the blue of the mantle, and two have a few on the sides of the neck where the black spots are invariably present. A few specimens have the upper wing coverts indicating a change to the adult plumage. One has a few "mantle-blue" feathers mixed with the mottled ones, and three or four others have about the upper half of the coverts like the mantle. The white markings on the first four primaries are rather variable. One specimen has a small subapical spot on the outer web of the second, a large one on the third, and about half the outer web of the fourth, white. The fourth primary is frequently in this condition when the others are unspotted, and the spot appears occasionally on the third.

The outer web of the first appears always to be black.

About a third of the birds examined in this stage were more or less tinged with pink, and four-fifths of these were males, so that this may be more or less of a sexual character.

Both the specimens examined by Mr. Saunders lack the black tip to the tail so characteristic to this stage of plumage in the autumn. The date of capture of his specimens is unknown, but it is quite possible that they are the young of the previous year after the spring molt.

## 677. XEMA SABINEI (J. Sabine) Leach.

## Sabine's Gull (Yûkû'drigûgia).

Though by no means uncommon, this bird is somewhat irregular in its occurrence at Point Barrow. In 1881 the young birds of the year, easily recognized by the broad, black band from the shoulder to the tip of the wing, were quite abundant from the time we landed till the end of October.

In 1882, however, none were seen after August 3, and they were scarce during the breeding season. On the other hand, though equally scarce in the breeding season of 1883, they appeared in considerable numbers late in July and during the month of August, and were frequently seen in considerable flocks, young and adults together, about the lagoons, and with the other gulls collected round the whale-ships anchored at the Point.

They evidently breed somewhere in the neighborhood, probably on the sandy islands east of Point Barrow, for one was taken June 28, 1882, with the breast bare of feathers, as if incubating, but the eggs were never found.

They are usually to be seen flying singly up and down the shore with a peculiarly slow, wavering flight, zigzagging to right and left, and occasionally light upon the water close to the beach. Early in the season they are occasionally found flying some distance inland, and lighting among the tundra pools.

The first stragglers appear in the spring, about the first of June. An adult male, in full breeding plumage, taken in June, 1882, had the under parts as rosy as'in the Roseate Tern.

#### 687. STERNA MACRURA Naum.

ARCTIC TERN (Utyutákin).

The Terns appear about the 10th of June, but are never plenty about the station till the month of Angust, when they appear in good-sized flocks, fishing about the lagoons and among the broken ice, especially in the neighborhood of the sandspit at Point Barrow.

During the breeding season we only saw stragglers from the breeding grounds, which are probably the same as those of Sabine's gull, the sandy islands east of Point Barrow. None of our party succeeded in finding the nest, as we were unable to reach these islands, but eggs were brought as by the natives, who said they got them there.

The Terns leave early. None were seen after the end of August.

## 697. STERCORARIUS POMATORHINUS (Temm.) Vieill.

POMARINE JAEGER (T'suñû).

This is perhaps the least common of the three species of Skuas, although a regular summer visitor. They are to be seen flying about the tundra and occasionally lighting during the months of June, July, and August.

None of them breed anywhere near the station. The natives make no distinction between this and the two following species.

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## 693. STERCORARIUS CREPIDATUS (Banks) Vieill.

RICHARDSON'S JAEGER (I'sunu).

This appears to be rather more plentiful than the last species, but is nowhere to be compared in abundance to the following. They are occasionally to be seen during the summer, both before and after the sea opens, flying about with the other Skuas.

None breed anywhere near the station, and from the looks of the sexual organs of some taken early in July, they are late breeders.

## 699. STERCORARIUS PARASITICUS (Linn.) Saunders.

LONG-TAILED JAEGER (I'sunû).

This is by all means the commonest of the Skuas at Point Barrow and is rather abundant, though none breed. They arrive in the spring, about the end of May, and are tolerably plenty from that time till the end of August.

Before the sea opens they are to be found on the tundra, where they have a habit of walking about in small parties, feeding on flies. At such times they are not at all shy, and if one be shot down the others are apt to fly back within gunshot, sometimes coming straight at the shooter.

They are sometimes to be seen traveling about in large, straggling parties, fifty or more together, moving slowly up or down the coast, occasionally alighting and then taking wing again.

The natives say they are "bad" and eat birds' eggs, and they point out the broken egg-shells which are to be found scattered over the tundra as the work of this bird. We never happened to see them eating any eggs, but they certainly act as if they were searching for nests, and they have been seen in suspiciously close proximity to ducks' nests which were found broken up.

Their bad reputation is probably well deserved, as the natives of the Norton Sound region are said to tell the same story.

After the sea opens they are rather less abundant, but are still seen occasionally both on land and at sea.

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### 737. COLYMBUS ADAMSI Gray.

GREAT WHITE-BILLED LOON (Tu'd'liñ).

The Great Loon, which is curiously enough called by the same Eskimo name as the Golden Ployer, is a regular summer visitor and probably breeds, though the eggs were never found.

They were not often noticed in the season of 1882, but were quite abundant in 1883. They are first to be seen about the end of May, or early in June, at the "lead" of open water and flying inland to their breeding grounds. As the sea opens along the shore and open holes are found in the lagoons they are to be looked for in such places, gradually going out to sea as the season advances.

They are generally to be seen alone or in pairs, seldom more than three or four together, and are silent birds compared with *C. torquatus*. I only heard this bird "laugh" once during the whole of my stay. The "laugh" appeared to be harsher than that of *torquatus*.

Fully fledged young were seen August 7, 1883. The breeding-grounds are probably around the swamps and lakes some distance inland.

C. torquatus, although reported by Mr. Nelson from the shores of the Arctie, was not observed at Point Barrow during our stay there.

## 739. COLYMBUS PACIFICUS Lawr.

PACIFIC DIVER (Kà'ksau).

All the black-throated loops we obtained proved upon examination to be this species, so that this is probably the only one that occurs.

The natives make no distinction between this and the next species, and they are both very common birds. Their peculiar harsh cry, "kok, kok, kok," from which they get their name, "Kāksau," is to be heard all summer, and the birds were seen nearly every day, flying backwards and forwards and inland from the sea.

During the breeding season these smaller loons have a habit of getting off alone in some small pond and howling like a fiend for upwards of half an hour at a time. It is a most blood-cardling, weird, and uncanny sort of a scream, and the amount of noise they make is something wonderful. They can be heard for miles.

They arrive early in June, and before the pends are open are generally flying eastward as if they had come up along the open water at sea and were striking across to the mouths of the rivers at the east. As the pends open they make themselves at home there, and evidently breed in abundance, though we were unable to find the nest. One of their breeding grounds was evidently a swampy lagoon some five or six miles inland, but the nests were inaccessible.

After the breeding season they are frequently to be seen in the open pools along the shore, especially when the lagoons have broken out. They are always very wild and difficult to secure. They are plenty through August and the greater part of September along the shore, and occasional stragglers remain round open holes well into October. Some appeared to be feeding young as late as the middle of September, 1882, as they were seen going inland from the sea carrying small fish.

#### 740. COLYMBUS SEPTENTRIONALIS Linn.

RED-THROATED DIVER (Kā'ksau).

This species is quite as common as the foregoing, and appears to have precisely the same habits.

The only identified loons' eggs we obtained were of this species, and were brought in with the parent bird from a stream some miles east of the point. The natives also brought in from time to time both seasons a number of eggs of the Kaksau, and these all appeared to be this species.

## 560. URIA GRYLLE (Linn.) Brünn.

BLACK GUILLEMOT (Sú'kûbirû).

During the season of open water we only saw one or two of these birds, always in full black plumage, and at some distance from the shore. In November and December, however, in fact as long as there are any pools and "leads" of open water, these birds in winter plumage are to be found in considerable numbers, usually in small flocks. They only leave us when the ice becomes solidly packed by the winter gales, and curiously enough are not to be found during the spring migrations. A number were taken in the winter of 1882, and with one exception were all the young of the year.

## 764. LOMVIA ARRA (Pall.) Bp.

THICK-BILLED GUILLEMOT (A'tpa).

This species, the "Crowbill" of the whalemen, reaches Point Barrow only as a rather rare straggler. They were sometimes seen at the lead of open water in the early spring and during the summer at some distance from the shore. One was taken as late as December 9, 1882, out among the broken ice by one of the seal hunters. We found them quite plenty at the Seahorse Islands on our return yoyage, and of course extremely abundant about Cape Lisburne.

# III.-FISHES.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army,

Fishes were scarce in the neighborhood of the station, and the shortness of the open season rendered collecting exceedingly difficult. The marine species were almost all obtained from the natives, who caught them while fishing for food through the ice.

The fresh-water ponds and small streams around Point Barrow are quite barren of fish life, and the fresh-water species in the collection come from the great rivers east of Point Barrow, whence they were brought in frozen in the fall and early spring.

Dr. Tarleton II. Bean has kindly identified the species of the difficult genera Gymnelis, Lycodes, Lingis, and Cottus, and has verified the writer's identification of the other species.

### GASTEROSTEIDÆ.

### 1 GASTEROSTEUS PUNGITIUS L. subsp. BRACHYPODA Bean.

On December 1, 1882, Capt. E. P. Herendeen brought in a number of large burbot (*Lota*) from Meade River and Kuaru, both streams flowing into the Arctic Ocean east of Point Barrow.

On preparing these for the table, one or two were found to have their stomachs literally crammed full of sticklebacks, which or examination proved to belong to this species.

They were most of them fresh enough for preservation.

### GADIDÆ.

## 2. BOREOGADUS SAIDA (Lepech.) Bean,

This species was found to be quite plenty close to the station at most seasons of the year. We first saw them early in October, 1881, when the natives brought down large numbers from Point Barrow, where they had been washed up on the beach.

Usually during the latter part of October and early in November, after the sea has closed, and when tide-cracks form along the shore, the natives generally catch a good many of them at the very edge of the beach in about a foot of water.

They use a short line of whalebone to which is attached a small lure made of blackened ivory, which roughly represents an amphipod crustacean, and is armed with a barbless hook.

After this, no more are caught till after the return of the sun, early in February. The natives say that they go away, and it is quite probable that they leave the shore and go off into deeper water. If there were any fish to be caught, the natives would undoubtedly fish for them during the winter months, as at this season they are frequently hard pressed for food.

Early in February, they become exceedingly abundant in about 15 fathoms of water, wherever there is a level field of the season's ice not over 4 feet in thickness, inclosed between rows of hummocks of broken ice. Such a field as this was formed in the winter of 1882, and remained unchanged from February till about the middle of May, when the ice began to soften and melt on the surface. Large numbers of the natives from the Cape Smythe village, especially women and children, resorted

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to this field nearly every day and caught these fish literally by the bushel. The method of winter fishing is as follows: A hole about 18 inches square is cut through the ice, and through this is let down a long line made of strips of whalebone, and provided with a sinker of lead or copper and two small pear-shaped "jigs" of bright copper or walrus-ivory, armed with four barbless copper hooks. The reel on which the line was wound and which is a stick about 18 inches long serves as a rod, being held in one hand, while a long-handled scoop is held in the other hand and is used to keep the hole clear of ice. The jigs are kept close to the bottom and the line is continually jerked up a short distance and allowed to sink again. The fish are attracted by the bright "jig," and "nosing" round it are caught by the upward jerk. The line is recled up on the two sticks, held one in each hand, so that it never has to be touched with the fingers, and the fish is adroitly jerked off the hook on to the ice.

No such field, or "fishing ground," as we were in the habit of calling it, was formed in 1883, and only comparatively few fish were eaught.

Early in July, when open holes of water form along the shore at the outlets of the lagoons, the fish are again to be found in considerable abundance. The young fry were first noticed about the middle of July, and were quite plenty in the shallow water at the edge of the beach.

Young fish, two to three inches long, were taken at the head of our lagoon, which is brackish, about the first of September, and at about the same time the full-grown fish were plenty along the beach in about 3 fathoms of water, swimming about in large, loose schools.

## 3. TILESIA GRACILIS (Tiles.) Swainson.

We found this species abundant along the shore at St. Michael's, and caught a good many with hook and line.

### 4. LOTA MACULOSA (Le S.) Rich

(Titálě.)

This species was abundant in Meade River and Kuaru. The natives catch many large ones through the ice with hook and line.

They are exceedingly voracious, and Captain Herendeen caught one in his net which had swallowed a white fish already caught in the net and then managed to entangle himself.

The season for catching them is in October and November, and again in February, March, and April. They are generally considered rather a refuse fish, and worthless for food, but we found that they made a very palatable chowder.

### LYCODIDÆ.

### 5. GYMNELIS VIRIDIS (Fabr.) Reinhardt.

A small specimen was found washed up on the beach September 13, 1882. Its colors when fresh were two shades of orange, with the spot at the beginning of the dorsal fin black, edged with white.

## G. LYCODES TURNERII Bean.

(Kúxraunä.)

Two specimens were obtained, having been caught by the natives while "jigging" Polar cod through the ice.

The following color-notes were made while the fish were fresh. Collector's No. (metal tag) 6; Museum No. 33,922 ?: Ground-color a rather light-reddish chocolate, shading into a reddish brown on the belly. Head, underneath, white. Lower edges of pectorals and ventrals, rufous red. Interrupted band from eye to edge of operculum, brownish cream-color edged with chocolate. Crescent-shaped band on top of head, same color. Ten lateral bands of the same color with dark edges, broken on the side of the body and appearing as spots. Indistinct tip to caudal. Creamy spot on pectoral, near root.

Collector's No. 26, Museum No. 33924 8; Large. Marked on the same general pattern as the female, but with only seven lateral bands. All the markings smaller and obscured. General color a brighter red, approaching scarlet.

#### 7. LYCODES COCCINEUS Bean.

(Kůxraună.)

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This species was obtained with the preceding, and one large specimen was washed up on the beach. A small specimen had the following colors when fresh:

Collector's No. 7, Museum No. 33,923 & juv., 11.5 inches long. Paler than *L. turrerii*, with the contrast between the chocolate and cream color more strongly marked. Belly lighter, and the red more of a pale orange. Cheeks brownish orange. The second, fourth, and sixth bands end as roundish spots on the back; the alternate bands are continued down, widen, and nearly meet each other. Broad band on anal extending from origin about one-third the length of the fin.

## LIPARIDIDÆ.

#### 8. LIPARIS GIBBUS Bean.

On March 30, 1883, a small specimen much mutilated washed up in the tide-hole, covered with small amphipods (*Onivimus littoralis*). Radial formula: D. 43; A. 37; C. 12; P. 38. Museum No. 33,949.

### COTTIDÆ.

### 9. COTTUS DECASTRENSIS Knerr.

(Kû'n-ai-ó; kû'l-ai-ó).

These were obtained wherever Boreogadus saida was taken, but always in comparatively small numbers.

### 10. COTTUS QUADRICORNIS Linn.

This species was taken with the preceding, and the young were plenty in our lagoon, close to the outlet, in September, and also in the shoal water of Elson Bay, at Pergniak. Captain Herendeen brought in a small specimen of this species taken in a tributary of Meade River, some 80 or 90 miles from the sea. Its colors when fresh were: Ventrals, lower edge of pectorals, branchiostegal membrane, and edge of mouth, bright vermilion. Back, dark olive, shading through dark slate to white on the belly.

### MICROSTOMIDÆ.

## 11. OSMERUS DENTEX Steindachner

(Ithoánin).

In February, 1883, a Kungmeun Eskimo brought in a large number of these smelts, which he said were caught with hook and line in "The River" ("Ku"), supposed to run into Wainwright's Inlet. The species was well known to the natives at Point Barrow, who said that it occurred nowhere in the immediate neighborhood, and was always taken with hook and line.

### 12. MALLOTUS VILLOSUS (Müller) Cuv.

In 1882, after the sea was fairly opened, that is, about the 20th of July, these fish appeared along the beach in small numbers at first. A few days later they were passing up the shore close to the beach in very large schools, all moving northeast, and occasionally running into the mouths of the lagoons.

By July 25 they had all passed, and one female only was observed in the autumn. She was seined with a number of Polar Cod on September 5 close to the beach. None at all were noticed in the summer of 1883.

## COREGONIDÆ.

#### 13. COREGONUS LAURETTÆ Bean

This species appears to be abundant in the large rivers (Meade River and Kuaru) flowing into the Arctic Ocean east of Point Barrow, as large numbers were brought in frozen by the Eskimo deer-hunters, generally badly mutilated and unfit for preservation.

The rivers are visited in October and early November, and again in February, March, and April, when the fish are caught in gill-nots set under the ice. Many natives also visit the rivers when they are open in summer and find fish plenty, but bring none home. The species also occurs in summer in the shoal-water bays east of Point Barrow, and is taken rather sparingly in gill-nets at Perguiak, Elson Bay, where we also caught a few young ones in our seine. Captain Herendeen visited the rivers in October, 1882, and brought in several specimens of this species in good condition, with other whitefish.

# 14. COREGONUS NELSONI Bean.

We obtained this species of large size from the rivers, where it appears abundant. It was not obtained at Elson Bay.

#### 15. COREGONUS KENICOTTI Milner.

This species appears to be the most abundant at the rivers, and attains a large size. It was not obtained in Elson Bay.

# SALMONIDÆ.

# 16. SALVELINUS MALMA (Walb.) Jordan & Gilbert.

In the autumn of 1882 we obtained from a native a piece of the dried skin of one of these fishes. He said that he took it in the sea, near the mouth of the Colville River, and that they were so plenty that they fed the dogs with them.

Just as we were preparing to abandon the station in August, 1883, the Eskimos brought in a couple of large specimens of this species which had been taken in the gill-nets at Pergniak. They were a very pale, "sea-run" form, with the spots hardly perceptible.

When we were at Unalaska, in September, 1883, Dr. Wilson, of Lieutenant Schwatka's party, and I found this trout plenty in the stream back of the village. They were rather pale and silvery as if in the habit of running to the sea, and took small, dark flies greedily.

They are also plenty and large in the small lakes at Plover Bay, Eastern Siberia.

# 17. ONCHORHYNCHUS ap.

A large salm in was brought down from Pergniak in July, 1882, but was mutilated and was used for food. The season of 1883 was so backward that we were unable to secure any specimens before abandoning the station.

I suspect this to have been O. nerka.

# 18. ONCHORHYNCHUS GORBUSCHA (Walb.) Gill and Jordan.

This species occurs sparingly in the salt water at Pergniak, Elson Bay, where it is taken in the gill-nets, in July and August.

# IV.-INSECTS.

# INTRODUCTORY-BY JOHN MURDOCH.

The shortness of the summer season rendered the collecting of insects difficult and unsatisfactory, and the difficulty was increased by the engrossing nature of the other zoölogical and physical work of the station. The season at which insects could be collected was precisely the time when the collecting of birds and their eggs was at its height, and the time of the party was pretty fully occupied.

Nevertheless, a small collection of insects was made and turned over to Prof. C. V. Riley, Curator of Insects, U. S. National Museum, for study. As will be seen by his report, which follows, insects were obtained belonging to the following orders and species:

# NEUROPTERA.

Leptocerus sp.
Oligoplectrum morosum?

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# COLEOPTERA.

Amara obtusa. Chrysomela montivagans.

# DIPTERA.

Scatophaga sp.
Cordylura sp.
Chironomus spp.
Anthomyia spp.
Ctenophora spp.
Gedemagena to andi.
Urocerus flavicornis,
A Tachinid fly.

#### LEPIDOPTERA.

Laria rossii. An Arctian moth.

# HYMENOPTERA.

Bombus moderatus. Bombus sylvicola.

A species of Podurid and a spider were also turned over to Professor Riley.

The following is Professor Riley's report:

# REPORT UPON A COLLECTION OF INSECTS MADE AT POINT BARROW, ALASKA.

By C. V. RILEY, Curator of Insects, United States National Museum.

No. 1, found swarming around the dead bodies at the Eskimo cemetery, Jane 22, 1882, is a species of Scatophaga and, in all probability, undescribed. It comes nearest to the reddish-haired specimens of *S. stercoraria* Linn., a form common to both Europe and America, but Dr. S. W. Williston, to whom specimens were referred, considers it distinct. The arista is bare, the bristles are fewer, weaker, and shorter, and the cross-veins of the wing are narrowly but strongly clouded. In the twelve specimens examined there is some variation in these respects and in the coloration of the legs. Judging from the known habits of the genus to which the species belongs there can be little question that the larva would be found preying upon dead animal and stercoraceous matter.

No. 2, which is reported rather abundant near the pools all over the tundra, but keeping very quiet except on the occasional calm and warm days, represents three different species of *Chironomus*, most of the specimens too poor to identify. The observations of their habits correspond to the well-known aquatic habits of the genus.

No. 3, taken near the station, June 22, is also a species of *Scatophaga*, showing some points of difference from No. 1, but probably only varietal.

No. 4, found not commonly flying around sunny banks, is one of the Crane-flies (Tipulidae) belonging to the genus *Ctenophora*. There are two species represented by the number, both apparently new. The larvae of these flies dwell in meadows, feeding on the roots of grass.

No. 5, which hatched from a cocoon in the house, is a female, imperfectly developed, of *Laria rossii* Curt., one of the Bombycidæ, common in Europe and North America, and originally described under the genus *Dasychira*. It is a rare species.

No. 8 is an *Anthomyia* that from the soiled material cannot well be identified, but is very near to *A. zew.* Riiey, the habits of which will be found recorded in the first Report on the Insects of Missouri, p. 154.

No. 9, taken June 27, is also a Tachinid identical with No. 6.

No. 10, which was found not uncommon in the dryer and sunny spots in the tundra from May till July, is Amara obtusa Le Conte, family Carab.dw. The species was originally described from Alaska and does not appear to extend further south and east. Among the seven specimens collected, Mr. E. A. Schwarz, to whom I referred them, finds the following variations which are of interest to record though parallel series are known to occur in other arctic Coleoptera. Two specimens have the elytra decidedly more parallel on the sides and consequently the apex more suddenly rounded; the basal punctation of the thorax is well marked in three specimens, while in the remaining four the middle of the base is more or less smooth, the sculpture of the elytral strice is very strong in some and nearly obsolete in other specimens. The color of antennae, elytra, and legs varies from red to piecous.

Under No. 11 there are three different insects: (1) the same Anthomyia included under No. 8; (2) a single specimen of a Neuropterous insect belonging to the Perlid genus *Leptocerus* Leach, very much damaged and unfit for study; (3) a single specimen of another species of crane-fly belonging also to the genus *Ctenophora*, but differing from No. 4, and also, according to Dr. Williston, a new species.

No. 12, taken July 11, 1882, near the house, is *Urocerus flavicornis* Fabr. (family Uroceridæ), a rather small specimen. This is an insect rather widely distributed, and its larva, as is the habit of the genus, doubtless either fed in the stem or trunk of some shrub or tree growing at Point Barrow, or may have issued from timber taken to the Point for building purposes.\*

No. 13, taken along the dryer edge of the tundra, is again an Anthonyid, small, but allied to No. 8, but under the same number there is a single specimen of another Dipteron belonging to the genus Cordylura, and, so far as I have ascertained, undescribed but closely related to C. gilvipes. It belongs to the same family with Scatophaga, and, without doubt, has similar habits. There is also under this number a single, very much damaged, specimen of a Neuropterous insect belonging to the family Phryganidae or caddis-flies. So far as the specimen permits an opinion, it comes near Oligopheetrum morosum McLachlan.

No. 14 contains two different species of Bumble-bees, the one Bombuo moderatus Cresson, the other the common boreal form of B. sylvicola Kirby.

No. 15, found on the shore of the lagoon, is another specimen of the Tipulid genus *Ctenophora* and without much question the female of one of those of No. 4.

No. 16. I find no insect with this number.

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end No. †No. 17. A boreal Arctian (-----); also common to Europe and America.

No. 18, caught near the house, is the well-known gad-fly (*Edemagena tarandi* Linn.) of the reindeer (*Cercus tarandus* var. *arcticus*), which suffer much from the larvæ making their way through the skin:

Of the alcoholic material, No. 649, found in the stomach of a bird (Centrophanes lapponicus), belongs to the genus Chrysomela (family Chrysomelide, or leaf-beetles), and appears to be referable to Ch. montivagans Le Conte. Of this particular group of Chrysomela (Chrysomela sens. str.), characterized by the thickened thoracie margin, only a few species are known to occur in North America, in the majority of which the specific characters are very feebly expressed, the number of species thus becoming more or less opinionative. Whether or not the only specimen from Point Barrow is correctly referred to the above species must be left undecided until more complete material from different localities can be compared. Le Conte described montivagans from the high alpine region of Central Colorado, and the typical specimens are much larger and more brilliantly colored than that from Point Barrow.

Most of the species are quite interesting, as is generally the case with species collected in such regions, where proper notes are made in connection with them. The misfortune is, however, that most of the material is too poor for proper specific identification or description. It is for this reason that I do not care to accompany this report with descriptions of the new species, though I may send in descriptions of some of them before the report is published if I can find time to make the necessary critical comparisons. It is preferable, however, to leave them for the present undescribed until such time as some specialist shall work up the particular families or groups to which they belong. There is little gain to entomology in describing such fragmentary material, and it should not be done except where absolutely required.

<sup>\*</sup>The latter is probably the case, as there are no trees or shrubs large enough to maintain the insect growing at Point Barrow,—J. M.

<sup>+</sup>This insect, though perfect when turned in, was accidentally destroyed in the laboratory at the Agricultural Department .-- J. M.

# V.-MARINE INVERTEBRATES.

(EXCLUSIVE OF MOLLUSKS.)

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

The collections and observations upon which the following report is based were made by the writer and Sergeant Middleton Smith, naturalists and observers, assisted by the other members of the party, especially by Lieut. P. H. Ray, commanding, and Capt. E. P. Herendeen, who took especial care of the dredging and seining operations.

Collecting was attended with considerable difficulty on account of the short season during which the sea was free from ice, but it is believed that the collection gives a fair representation of the marine fauna of the region.

It will be seen to be purely Arctic in character, showing many striking points of resemblance to that of Greenland and the Arctic Ocean of the Old World, and offering but little analogy to the fauna of the North Pacific.

A report on the Medusæ observed by the writer, prepared by Dr. J. W. Fewkes, of Cambridge, has been incorporated with the following, which also includes a description of the few fresh-water invertebrates collected.

The Mollusks have been submitted to Mr. W. H. Dall, of the Smithsonian Institution, who presents a separate report on them.

# NUMBER OF SPECIES COLLECTED OR OBSERVED.

Pycnogonida
Crustacea
Vermes
Echinodermata
Anthozoa
Hydrozoa
Mollusca
Tunicata
Brachiopoda
Polyzoa
Porifera
Total

# CRUSTACEA.

#### DECAPODA.

## BRACHYURA.

#### 1. CHIONOECETES OPILIO (Fabr.) Kr.

Year.	. Name.	Citations.
1780 1788	Cancer phalangium, O. Fabricius Cancer opilio, O. Fabricius	Fauna Grænlandica, p. 234 (sp. 214) (not of J. C. Fabricius, 1775). Det Kongelige Danske Vidensk, Selskabs Skr., nye Samling, iii.
18387	(	p. 181, with plate. Naturhistorisk Tidaskriff, i Rakko, ii, p. 240 (1838); in Gaimard,
18495	Chlonoecetes opilio, Kröyer	Voyages en Scandinavic, en Laponio, au Spitzberg et aux Féroë, Crust. pl. 1.
1856	Peloplastus pallasii, Gerstaecker	Carcinologische Beiträge. Archiv für Naturgeschichte, xxil, p. 105, pl. 1, fig. 1.
1857) 1858)	Chionoccetes behringianus, Stimpson	Proceedings Boston Society of Natural History, vi, p. 84 (1857); Journal Boston Soc. Nat. Hist., vi, p. 448 (8) (1857); Proceedings Academy of Natural Sciences, Philadelphia, 1857, p. 27 (23) (1858) (young).
1867	Chionoecetes opilio, Packard	Memoirs Bost, Soc. Nat. Hist., i, p. 302.
1873	Chionoecetes opilio, Whiteaves	Report on a second deep-sea dredging expedition to the Gulf of St. Lawrence (in 1872), p. 15.
1875	Chionocetes phalangium, Lütken	(Nominal) List of the Crustacea of Greenland, Arctic Manual,
1882 !	Chionocetes opilio, Smith Chionocetes opilio, Stuxberg Chionocetes opilio (/), Elliott Chionocetes opilio, Smith	p. 146. Transactions Connecticut Academy of Arts and Sciences, v. p. 41. Vega-Expeditionens Vetenskapliga Iakttagelser, i, pp. 714, 715. A Monograph of the Scal Islands of Alaska, p. 137. Proceedings U. S. National Museum, vi, p. 224.

Two small males were captured in the rich haul of the dredge, made ten miles west of Point Franklin, in 13½ fathoms of water, August 31, 1883. Nordenskiöld found this species very abundant in Bering Strait and in the Arctic Ocean north of the strait. According to Elliott (loc. cit.) this crab is very abundant on the island of St. Paul, of the Pribyloff group, though not found on St. George, and is of great value as an article of food.

The species is well known from Greenland, where it was originally described, Labrador, and as far south on the American coast as New England (in deep water), from Siberia, the Arctic Ocean, and Bering Strait.

The specimens obtained agree in proportions with Stimpson's *C. behringianus*, from nearly the same locality. This species, however, according to Smith, was based on young specimens of *C. opilio*, such as ours are.

The specific name phalangium, originally applied to this species, was rejected by Otho Fabricius himself, on the ground, as he expressly states, that he found it preoccupied by Cancer phalangium J. C. Fabricius (Stenorhynchus phalangium M. Edw.). Having been able to consult O. Fabricius's original description of Cancer opilio, I find that it was published in 1788, which settles the question of priority over C. opilio J. C. Fabricius (1793), and establishes the specific name opilio for this species.

#### 2. HYAS LATIFRONS Stimpson.

Year.	Name.	Citations.		
1857 Hy 1879 Hy	as latifrons, Stimpson	 Proc. Acad. Nat. Sci., Phila., p. 217. Trans. Conn. Acad. Arts and Sci., v, p. 45.	-	

Three large males were picked up on the beach near the station, one dry, in the spring of 1883, and the other two fresh, August 23, 1882. 'One small male was also dredged in 13½ fathoms, on the rich bottom of small pebbles, sand, and broken shells, ten miles west of Point Franklin, August 31, 1883. This crab was well known to the natives of Point Barrow, who called it by the name "Kinaura."

I have carefully examined Dr. Stimpson's types of *Hyas latifrons* in the National Museum, and compared our specimens with them. I find our specimens indistinguishable from Dr. Stimpson's types, and differing from a typical *Hyas coarctatus* from Greenland only in the shape of the rostrum, which is slightly shorter and less acute.

Smith (loc. cit.) pronounces *H. latifrons* a good species, and I have accordingly followed his authority in recording the species.

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#### ANOMOURA.

# 3. EUPAGURUS TRIGONOCHEIRUS Stimpson.

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Year.	Name.	Citations.	
1858	Eupagurus teigonocheirus, Stimpson	Proc. Acad. Nat. Sci., Phila., 1858, p. 240.	

This species was found washed up on the beach near the station in considerable abundance during the months of July and August, after the sea had opened completely. It was also found in the gullet of *Somateria spectabilis* shot near the station. Comparatively few were dredged off Point Franklin in 13½ fathoms, and a few were also dredged at the head of Norton Sound in 5 fathoms on a pebbly bottom.

Our series of specimens have been carefully compared with identified specimens of *E. pubescens* and *E. Kröyeri* from the eastern coast (its nearest allies). The species is very closely related to *E. Kröyeri*, but shows the following well-marked and constant differences in the form and proportions of the chelipeds: Hand of right cheliped in *Kröyeri* twice as long as broad; in *trigonocheirus*, generally less than twice as long as broad, often much less. Outer or right-hand margin of hand in *Kröyeri* slightly concave; in *trigonocheirus* strongly arched, except in very large specimens, almost exactly as in *E. pubescens*. Hand of left cheliped in *trigonocheirus* nearly the same as in *Kröyeri*, but stouter in proportion, and with the outer surface, between the keel and the margin, more concave than in *Kröyeri*.

Stimpson's types of  $\tilde{E}$ , trigonocheirus appear to have been destroyed in the Chicago fire, and consequently the only means we have left of identifying the species is his Latin description (loc. cit.). Our species differs so much from E,  $Kr\ddot{v}ycri$  that it must be considered at least a well-marked variety.

As, however, it agrees so closely with Stimpson's description quoted above, it seems preferable to regard it as Stimpson's *E. trigonocheirus*, especially as Stimpson described the species *Kröyeri* after he had described *trigonocheirus*.

Stimpson gives as the habitat of this species, "In Oceano Arctico et in freto Beringiano vulgaris; sublittoralis, et ad profund. 10-20 org, inventus."

## 4. EUPAGURUS SPLENDESCENS (Owen).

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Year.	Name.	Citations.	
		and the same of th	
1839	Pagurus salendescens. Owen	Zoölogy of Beechey's Voyage, p. 81, pl. xxv, fig. 1.	

This species is easily recognizable by its long, slender left hand, and the beautiful iridescent colors of the carapace and claws.

One small specimen was dredged in 15 fathoms on a muddy bottom off Point Barrow, August 8, 1883. Two other small ones were obtained off Point Franklin in 13½ fathoms August 31, 1883, and six good-sized individuals, four of them females bearing eggs, were dredged with the other Hermit Crabs at the head of Norton Sound in 5 fathoms, September 12, 1883.

Dr. Leonhard Steineger also obtained this species at the Commander Islands.

# MACROURA.

# 5. CRANGON VULGARIS J. C. Fabricius ex Linné.

	Year.	Namo.	Citations.
100	1852 1857 1863/ 1867\	Crangon vulgaris, Owen Crangon vulgaris, Dana Crangon nigricarda, Silinpson Crangon rulgaris, Packard. Crangon vulgaris, Smith	U. S. Exploring Expedition, Crustacea, p. 536, ii, p. 561.

A single specimen was dredged in 5 fathoms at the head of Norton Sound, September 12, 1883.

# 6. CHERAPHILUS BOREAS (Phipps) Kinahan.

Year.	Name.	Citations.
1774 1780 1806 1824 1835 1839	Cancer boreas, Phipps Cancer homoroides, Fabricius Crangon boreas, Miiller Crangon boreas, Sabine Crangon boreas, Ross Crangon boreas, Noss Crangon boreas, Owen	Voyage towards the North Pole, p. 235. Fauna Greenlandica, sp. 218; Mehr, Islanda Naturhist., n. 245, t. & Zöölogia Darica, fas. 1v, p. 14, pl. 132, fig. 1. Supplement to the Appendix to Parry's Voyage, p. 235. Second Voyage, il. p. 1838. Zöölogy, Becchey's Voyage, p. 87.
18427	Crangen boreas, Kröyer	Nat. Tids., i R., iv, p. 818, pl. iv, f. 1-14.
1840ý 1851 1852	Crangon boreas, Brandt	Sibirischo Reise, Zoölogy, p. 114 (teste Stimpson). In Sutherland's Journal of a Voyage in Baffin's Bay a'di Ba row's Straits, ii; App. p. ech
1855 1860 1864 1874	Crangon boreas, Bell Crangon boreas, Stimpson Cheraphilus boreas, Kinahan Crangon boreas, Buchholz	In Belcher's "Last of the Arctic Voyages," H, p. 402. Proc. Acad. Nat. Sci., Phila., xii, p. 25. Proceedings Royal Irish Acad., viii, p. 68. Zweite Deutsche Northolariahtt, ii, p. 271.
1875	Crangon boreas, Lätken	(Nomined list) Arctic Mannal, p. 146 Annals and Magazine of Natural History, ser. 4, xix, p. 133.
1877	Cheraphilus boreas, Miers	Annals and Magazine of Natural History, xx, p. 60.
1878	Crangon boreas, Heller	Denkschriften der kaiserliche Akadem, der Wissenschafte Wien, xxxv, p. 26.
1879 . 1881 .	Crangon (Cheraphilus) boreas, Miers	Trans. Conn. Acad. Arts and Sci., v, p, 56. Annals and Magazine of Natural History, ser. 5, vii, p. 46.
1882 1883	Cramon boreus, Stuxberg	Vega-Exp. Vetensk, Iakt., i, pp. 695, 713.

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ety. ble geri culOne good-sized specimen was picked up on the beach near the station. The species was dredged in considerable numbers, both large and small, in 13½ fathoms, off Point Franklin, and a few large ones were the only crustacea taken off Port Clarence. It is well known from Arctic and northern seas generally.

#### 7. NECTOCRANGON LAR (Owen) Brandt.

Year.	Name.	Citations.
1851 1860	Crangon lar, Owen Argie lar, Kriyer Vectoeringon lar, Brandt Nectoeringon lar, Stimpson Argie lar, Packard Nectoeringon lar, Whiteaves	Nat. Tids., i R., iv. p. 255, figs. 45-62. Sibirische Reise, Zoöl., 115 (teste Stimpson). Proc. Acad. Nat. Sci., Phila., xii, p. 25. Mem. Bost. Soc. Nat. Hist., i, p. 392.
1879	Argis lar, Lütken	(Nominal list) Arctic Manual, p. 146. Trans. Conn. Acad. Arts and Sci., v, p. 61.
1881	Argis tar, Stuxberg	Voga-Exp. Votensk, Iakt., i, p. 713. Proc. U. S. Nat. Mus., vi, pp. 219, 225.

One single specimen was picked up on the beach near the station. This species has been quoted from Greenland, along the eastern coast of America as far as Cape Sable, Nova Scotia; also, from the Arctic Ocean, as rth of Bering Strait, and in Bering Sea.

# 8. HIPPOLYTE FABRICII Kr.

Year.	Name.	Citations.
1841 1860 1863/ 1867/ 1871 1875 1879/ 1883/	Hippolyte fabricii, Stimpson	Nat. Tids., i R., iii. p. 571; Det Kongelige Danake Videnskabernes Selskabs Afbandlingar, ix, p. 277, tab. I, figs. 12-20. Proc. Acad. Nat. Sci. [Phila. xii, p. 33; Can. Nat. and Geol., viii, p. 121 (24). Mem. Bost. Soc. Nat. Hast., ip. 302. Annals Lye, of Nat Hist. of New York, x, p. 125. (Nomural list) Arvite Manual, p. 147. Trans. Conn. Acad. Arts and Sci., x, p. 63. Bulletin U. S. Nat. Mus., No. 15, p. 139. Proc. U. S. Nat. Mus., Vi, p. 225.

A single individual of this species was dredged among the other *Hippolytes* off Point Franklin, August 31, 1883. It has been found on the Atlantic coast of America from Massachusetts Bay to Greenland, and also in Avatscha Bay, Kamschatka.

#### 9. HIPFOLYTE GAIMARDII M. Edw.

Year.	Name.	Citations.
1837 1841 1942 1842 1853 1863 1863 1867 1871 1877 1879 1882 1883	Hippolyte gaimardi, Milne Edwards Hippolyte gaimardi, et yibba, Krüyer Hippolyte gaimardi, Krüyer Hippolyte yibba, Krüyer Hippolyte yibba, Krüyer Hippolyte yibba, Krüyer Hippolyte gaimardi, Bell Hippolyte gaimardi, Gues Hippolyte gaimardi, Gues Hippolyte gaimardi, Gues Hippolyte gaimardi, Fackard Hippolyte gaimardi, Fackard Hippolyte gaimardi, Hakken Hippolyte gaimardi, Micra Hippolyte gaimardi, Micra Hippolyte gaimardi, Stuxhery	Histoire Naturelle des Crustacées, ii. p. 378. Nat. Tids., I.R., iii. p. 572. Kong. Dan. Vidensk. Schek. Arhand., ix. p. 282, pl. l. figs. 21–29. Op. cit., p. 288, pl. l. fig. 30; pl. ii. firs. 31–37. British Stalkeyed Crustacen, p. 294. In Belcher'n "Last of the Arctic Voyages," ii. p. 402, pl. 34, fig. 1 Proc. Acad. Nat Scl., Phila., xii, p. 32. Oliversigt Vetenskaps-Akademiens Förbandlingar, xx, p. 168. Canad. Nat. and Geeb., viii. p. 424. Annals Lyc. Nat. Hist. of New York, x, p. 126. (Nomian Hist. Arctic Manual, p. 147. Annals and Magazine of Natural History, ser. 4, xix, p. 134. Trans. Com. Acad. Arts and Sci. v., p. 67, pl. x, figs. 8 and 9. Vega Exp. Vetensk. Inkt., i, pp. 668 et sep. (passim.) Proc. U. S. Nat. Mus., vi, p. 219 and 229.

One specimen was picked up on the beach near the station in the autumn of 1882.

We found this species very plentiful off Point Franklin in 13½ fathoms of water, August 31, 1883. Of ninety-one individuals taken in a single haul of the dredge, one only was a female bearing eggs.

The species is known from Grinnell Land south to Massachusetts, from Spitzbergen, Norway, the southern Baltie, and Scotland; also from Bering Strait and the Arctic Ocean north of the strait.

10. HIPPOLYTE SPINUS White.

Year.	Name.	Citations.
1813? 1814\ 1817 1835 1841\ 1842\ 1842\ 1842 1853 1860 1863 1871	Cancer spinus, Sowerby  Alpheus spinus, Leach	Malacostraca Podolphthalmata Brittannia, pl. 39. App. Ross Voyago, p. 83. f. B. flg. 2. Nat. Tids., i R., iii, p. 673 (1841); Kong. Dan. Vidensk. Selsk. Af- hand., xx, p. 298 (1842). List of Crustacea in the British Museum, p. 76. British Stalkeyed Crustacea, p. 294.
1879 .	Hippolyte spinus, Lütken	(Nominal list) Arctic Manual, p. 147. Traus, Conn. Acad. Arts and Sci., v. p. 68.

Two small specimens which have the spine of the third pleonal segment less strongly developed than it is in the typical specimens of *H. spinus* in the National Museum, were dredged among the other *Hippolytes* off Point Franklin in 13½ fathoms, August 31, 1883.

It is known from the Atlantic coast of North America from Massachusetts to Greenland; from Spitzbergen, Norway, and Scotland, and Stimpson found it in Bering Strait.

11. HIPPOLYTE PHIPPSII Kr.

Year.	. Name.	Citations.
1841	Hippolyte phippsii, Kröyer	Nat. Tids., i R., iii, p. 575 (3).
1841	Hippolyte turgida, Kröyer	Nat Tide i R. iii n 575 (0)
	Hiprolyte turgida, Kröyer	Kong, Dan, Vidensk, Selsk, Afh., ix, p. 308, pl. ii, figs. 57-58, and pl. iii, 59-63.
1842	Hippolyte phippsii, Kröyer	Op. cit., p. 314, pl. iii, figs. 64-68.
1860 -	Hippolyte turgida, Stimpson	Proc. Acad. Nat. Sci. Phila., xii, p. 34.
1863	Hippolyte phippsii, Goes	Öfv. Vetensk, Akad. Förhand., xx, p. 169.
1867	Hippolyte phippsii et turgida, Packard	Mem. Bost. Soc. Nat. Hist., i, p. 301,
1871	Hippolyte vibrane, Stimpson	Ann. Lyc. Nat. Hist. New York, x, p. 125 ( f var.).
1874	Hippolyte phippsii, Whiteaves	Recent doep-sea dredging operations in the Gulf of St. Lawrence, from Am. Journ. of Sci. and Arts, vii, March, 1874, p. 5.
1877	Hippolyte phippsii, Miers	Ann, and Mag. Nat. Hist., ser. 4, xx, p. 62 (12).
1879 1	Hippolyte phippsii, Smith	Trans. Conn. Acad. Arts and Sci., v. p. 73.
1883	Hippolyte phippsii, Smith	Proc. U. S. Nat. Mus., vi, pp. 220, 225.

Dredged in considerable numbers off Point Franklin in 13½ fathoms, August 31, 1883. Out of nineteen specimens taken at one haul of the dredge, four were females carrying eggs.

This is a circumpolar species, extending as far south as Massachusetts.

## 12. PANDALUS DAPIFER Murdoch.

(Plate --, fl gs.--.)

1884, Pandalus dapifer, Murdoch. Proc. U. S. Nat. Mus. vii, p. 519.

DESCRIPTION.—Length of carapace (including rostrum) contained about 24 times in total length. Rostral carina beginning about the middle of the carapace, and armed with two or three teeth. Rostrum exceedingly long, nearly 11 times the length of the carapace, slender and tapering. slightly curved up, with 5 to 7 teeth on the upper edge, running only about one third of the length of the rostrum, leaving the rest unarmed to the tip. Lower edge with 4 or 5 teeth, the anterior tooth a short distance from the tip. Eyes large, pyriform, and black. Peduncle of antennule reaches about to middle of antennal scale, and its distal segment is about one-third the length of the preceding. Internal flagellum of antennule slender, reaching nearly to end of rostrum; external about two-thirds as long as internal, much thickened nearly to the tip, where it suddenly becomes slender. Antennal scale a little more than half as long as the rostrum. External maxillipeds long and slender, reaching nearly to the tip of the antennal scale, or about to the middle of the rostrum. First pair of legs very slender, reaching to the tips of the outer maxillipeds. Second (chelate) legs unequal: left very long and slender, reaching to the tip of the rostrum, carpus multiarticulate, with about 25 joints, of which the distal twenty or so are separated by distinct articulations; right leg much shorter, reaching only to the tip of antennal scale, with a carpus of about 7 joints only; distal joint of carpus in each leg equal in length to preceding two, the rest about as long as broad. Right chela a little the larger, both alike otherwise, hardly stouter than the carpus; digits equal, slightly gaping, and a little shorter than the basal portion. Third, fourth, and fifth pairs of legs long and slender, reaching nearly to the tip of the antennal scale. Abdomen rounded above, except the third segment, which is compressed and keeled. This keel is produced into a blunt backward-pointing hook in the male. Sixth segment once and a half as long as the fifth, and equal in length to the telson. Telson rounded at the tip, and armed with three pairs of spines. Dredged in abundance off Point Franklin, in 131 fathoms, August 31, 1883. Museum No., 7881.

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## SCHIZOPODA.

# 13. MYSIS RAYII Murdoch.

(Plate -, figs. -).

1884, Mysis rayii, Murdoch. Proc. U. S. Nat. Mus. vii, p. 519.

This was dredged in rather large numbers, not far from the shore, about half a mile above the station, in about 5 fathoms of water, on a bottom of mud and sand mixed, August 13, 1882. Some of the females were still earrying eggs in the brood-pouches. This species belongs to the same division of the genus as *M. vulgaris*, having the telson entire and the antennal scale fringed on both sides with setce. It may at once be distinguished from *M. vulgaris* by the shape of the rostrum, which is quadrangular, with rounded corners.

Description.—Rather slender, with the cephalothorax a little narrower in front than the rest of the body. Carapace of medium length, exposing only the dorsal portion of the last thoracid segment. Rostrum lamellar, quadrangular, with the antero-lateral angles rounded, about as broad as long, reaching half the length of the coular peduncles. Eyes not large, hemispherical; peduncles clavate, stout. Peduncle of antennule about one-third the length of the carapace, bearing two flagella, about equal to the carapace in length. Antennal scale sharply lanceolate, about as long as the carapace, bearing setse on both edges, and armed at the tip with a sharp spine. Antennal about as long as the body. Legs medium, with tarsi of eight or nine joints. Telson about half the length of the cephalothorax, lanceolate, channeled deeply above for its whole length, with apex truncated, entire, and fringed with short stout setse. Uropods long, with the inner lamina as long as the telson, and the outer more than twice as long.

Transparent, with a few arborescent black pigment spots. Length between 60 and 65mm.

The species is respectfully dedicated to the commanding officer of the expedition, Lieut. P. H. Ray, Eighth Infantry, U. S. A., who was superintending the dredging at the time it was taken. Museum Nos., 7880 and 7892.

# CUMACEA.

#### 14. DIASTYLIS RATHKII var.

Two individuals of a large species of *Diastylis* were obtained, one on the beach near the station and one in the rich haul of the dredge off Point Franklin. Both specimens were more or less battered, but as far as can be made out agree very closely with the published descriptions and National Museum specimens of *D. rathkii*, except in having the dorsal keel smooth anteriorly instead of secretard

I have ventured to record these as possibly a variety of *D. rathkii*, which, as is well known, is circumpolar in its distribution, but dare not hazard any further conclusions on account of insufficiency of material.

# 15. DIASTYLIS sp.

#### 16. DIASTYLIS sp

Two other small species of Diastylis were also obtained by the expedition, one close to the station, in  $2\frac{1}{2}$  fathoms of water, and the other off Point Franklin.

I have been unable to identify them with any of the means within my reach, and am inclined to believe that they are undescribed. In view, however, of the difficulty of the group and the insufficiency of the literature at my command, I have concluded to record them simply as above.

# ISOPODA.

## 17. ARCTURUS HYSTRIX G. O. Sars.

Year.	Name.	Citations.
/		
1876	Arcturus hystrix, G. O. Sars	Archiv for Mathematik og Naturvidenskab, il, p. 359 (250).

Three small individuals were dredged on the rich bottom off Point Franklin, in 13½ fathoms. I am indebted to Mr. Oscar Harger, of New Haven, Conn., for the identification of this species.

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## 18. CHIRIDOTEA ENTOMON (Lin.), Harger.

		4 6 64	
Year.	Name.	Citations.	
1		rated and the second of the se	
1774	Oniscus entomon, PallasOmiscus entomon, Tilesius	Spicilegia Zoölogica, fasc. 9, t. 14, pp. 6 Mém. de l'Acad. do St. Pétersbourg, v.	4-66. 93.
1774	Idothea entomon, Owen	Zoölogy of the Biossom, p. 91.	
1839	Idothea entomon, Stuxberg	Vega-Exped., Vetensk, lakt. i, pp. 695	et seq. (passim), fig. on p.
1882		749.	

Only three specimens were obtained, and these were washed up on the beach. Stuxberg (loc. cit.) gives the distribution as confined to the northern coast of the Old World, from the Varanger Fjord in the west to Bering Strait in the cast, thence extending down into Bering Sea to Kamtschatka and the Sea of Okhotsk; also in the Baltic, the lakes of Sweden and Russia, the Caspian Sea, the Sea of Aral, and Lake Baikal.

There are, however, many specimens in the National Museum (No. 2430) sent by Macfarlane, from the Anderson River region, thus extending the range much farther to the east. It was also collected by Nelson at Saint Michael's, Alaska.

# 19. CHIRIDOTEA SABINEI (Kr.) Harger.

Year.	Name,	Citations.
1821	Idothea entomon, Sabine	Suppl. App. Parry's Voy., p. 227.
1547	Idothea sabinei, Kröver	Naturhistorisk Tidsskrift, ii R., ii, p. 395; Voyage, tab. 27, fig. 1.
1852	? Saduria entomon, Adams	In Sutherland's Journal of a Voyage in Baffin's Bay and Barrow Strait, ii, app., p. cevii.
1855	Idothea entoscop. Bell	Belcher's Last of the Arctic Voyages, p. 408.
1 1875	Idotheo entomon, Liitken	(Nominal list.) Arctic Manual, p. 149.
1878	Idothea sahini, H. Aber	Denkschr, d. K. Akad, d. Wiss , xxxv, p. 22.
1882	Idothea sabini, Stuxberg	Vega-Exp. Vetensk. Iakt., p. 697 of seq. (passim), fig. on p. 716.

This species was rather abundant and of large size on the muddy bottom along the shore in 2½ to 15 fathoms. Only a few females were obtained. It was very often found washed up on the beach during the season of open water, and occurred in especially large numbers after the great gales of October, 1881.

It is circumpolar in its distribution.

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#### 20. SYNIDOTEA BICUSPIDA (Owen) Harger.

Year.	Name.	Citations.
1839 1867 1874 1877 1877 1879 1880 1882 1883	Idother bicuspida, Owon Idother marmorata, Packard Idother marmorata, Whiteaves Idother bicuspida, Streets and Kingsley Idother bicuspida, Streets and Kingsley Idother pidebra, Lockington Symidotea bicuspida, Harger Symidotea bicuspida, Harger Idother bicuspida, Stuxberg Symidotea bicuspida, Stuxberg Symidotea bicuspida, Stuxberg Symidotea bicuspida, Smith.	Zoilogy of the Blossom, p. 92, pl. xxvii, fig. 6. Mem. Boxton Soc. Nat. Hist., i. p. 206, pl. vivi, fig. 6. Further Deep-Sea Dredding in the Gulf of Saint Law rence, p. 15. Proc. Essex Institute, ix, p. 108. Proc. Cal. Acad. Sci., vii, p. 43. Proc. U. S. Nat. Mus., ii, p. 169. Report U. S. Fish Commission for 1878, p. 352. Vega-Exp. Vetensk, lakt., i, pp. 495 et seq. (passim). Proc. U. S. Nat. Mus., vi. p. 231.

This species occurred in very great abundance on the rich bottom 10 miles west of Point Franklin, in 13½ fathoms, and was rather plenty also at the head of Norton Sound, on a pebbly bottom, in about 5 fathoms.

The color when alive is a whitey-brown, clouded with bright crimson, generally forming crimson patches on the terga of the segments and on the edges of the epimera, which sometimes coalesce, forming bars across the head, the middle, and the end of the thorax. The peduncles of the antenna and the middle third of the flagella are bright crimson.

The species was originally described by Owen (loc. cit.) from the "Arctic seas." Packard secured one specimen at Sloop Harbor, Labrador, and it has also been recorded from the Gulf of Saint Lawrence. Two specimens (Lockington's *Idothea pulchra*) were brought by W. J. Fisher from the "west coast of Alaska, north of Bering Strait," and two specimens have been obtained on the Grand Bank of Newfoundland. The Swedish expeditions obtained this species at various points along the northern coast of Siberia from Nova Zembla nearly to Bering Strait.

# Амрнірода.

## 21. HYPERIA MEDUSARUM (Müll.) Bœck.

Year.	Name.	Citations,
1776	Cancer medusarum, O. F. Müller	Zeillogiae Danicæ Prodromus, No. 2355, p. 198,
	Gammarus medusarum, J. C. Fabricius	Reise nach Norwegen, p. 326.
1815	Cancer (Gammarus) galba, Montague	Linnaran Transactions, xi, p. 4, pl. 2, fig. 2.
	Hielta orbignii, Strauss	Mém. du Muséum, t. xviii, pl. 4.
1830	Hyperia latreillii, M. Edwards	Annales des Sciences Naturelles, xx, p. 388, pl. xl, figs. 1-7.
1838	Hoperia oblivia, Kröve	Grönlands Amphip. D. Vidensk, Selak, Afhandl., vil, p. 298, pl. iv.
		fig. 19 (2).
1838	Lestrigonius exulans, Kröver	Op. cit., p. 296, pl. iv, fig. 13.
186.1	Lestrigonius Kinahani, Spence Bate	Catalogue of Amphipodous Crustacea in the British Museum, p.
		289, pl. xlviii, tig. 1.
1865	Hyperia exultus Goës	Crustacea amphipoda Maris Spetsbergiam alluentis, &c., Oefv. at
	7. 7	K. Vetensk-Akad. Förhandl., xvii, p. 534.
1875	Hyperia medusarum, Lätken	(Nominal list.) Arcti: Manual, p. 158.
1883	Huperia medusarum, Smith	

Several were found under the disk of large medusa (Chrysaora) in the summer of 1883. It has been recorded from Greenland, Spitzbergen, Norway, and Great Britain.

# 22. THEMISTO LIBELLULA (Mandt) Goës.

Year.	Name.	Citations.
1822	Gammarus libellula, Mandt	Observationes in historia naturale in itinero grænlandico factæ, Diss., p. 32.
1835 1838	Themisto gaudichaudii	Appendix to Ross' Veyage, p. lxxxvi. Grigh, Amphip, D. Vid. Selsk, Afbandl., vii, p. 291, pl. 4, fig. 16.
1898	Themisto crassicornis, Ktöyer	Op. cit., p. 295, pl. iv, fig. 17. Proc. Phila. Acad. of Nat. Sci., p. 130.
1865 1870	Themisto libellula, Goös	Oefv. af K. Vetensk-Akad. Föthandl., xxii, p. 533, pl. 44, fig. 33. Crinstacea Amphipoda borealla et arctica, p. 8; Skand. og Arkt. Amphip., p. 88, pl. l. fig. 5.
1874 1875	Themisto libellula, Buchholz	Ampuip, p. co. ji. i. iig. 3. 2te Deutsche Nordpolarf., ii, p. 385, pl. 13, fig. 1. (Nominal list.) Arctic Manual, p. 158.
1877	Themisto libellula, Miers	Ann. and Mag. Nat. Hist., ser. 4, xix, p. 138. Denkschr. d. K. Akad. d. Wiss., xxxv, p. 29.
1881	Themisto libellula, Miers	Ann. and Mag. Nat. Hist., ser. 8, vii, p. 51.

A single individual was picked up on the beach near the station September 12, 1883.

The species has been found in Greenland, Spitzbergen, Finmark, Kennedy Harbor (Arctic America), and north of Nova Zembla during the voyage of the Tegethoff.

# 23. EURYTENES GRYLLUS (Mandt) Goës.

Year.	Name.	Citations.
	1	
1832	Gammarus grillus, Mandt	Observ., &c., p. 34.
1848	Lysianassa magellanica, H. Milne-Ed- wards,	Ann. des Sci. Nat. Ser. 3, ix, p. 398.
1862	Lysianassa magellanica, Sp. Bate	
1865	Eurytenes magellanieus, Lillieborg	Acta Upsal., ser. 3, p. 11, pis. 1-3, figs. 1-22.
1865		Oefv. af K. VetenskAkad. Förhandt., xxii, p. 517, pl. 36, fig. 1.
1870	Eurytenes gryllus, Beeck	Crust. Amphip., p. 25; Skand. og Arkt. Amphip., p. 144.
1875	Lysunassa gryllus, Lütken	(Nominal list.) Arctic Manual, p. 151.

This species occurred washed up on the beach near the station in considerable numbers in the early part of September, 1882.

Two were dredged just outside the grounden ice in 15 fathoms, August 8, 1883. A few large specimens were also obtained off Point Franklin in 13½ fathoms.

It has been observed in Greenland, Spitzbergen, and Finmark.

# 24. ONISIMUS LITORALIS (Kr.) Bosck.

Year.		Name.	Citations.
1845 1846	Anonyz literalis, Anonyz literalis,	Kröyer	Nat. Tids., 2 R., i, p. 621. Nat. Tids., 2 R., ii, p. 36; Voyage, pl. 13, fig. 1.
1859 ( 1860 (			K. Svensk. Vetensk. Akad. Handl., new series, iti, p. 46.
1862 1865 1870	Lusianassa litora	Sp. Bate	Oefy, af K. Vetensk, Akad, Förhandl., xxii, p. 521.
	Anonyx littoralis.	Buchholz	2te Deutsche Nordpolarf., ii, p. 302. (Nominal list.) Arctic Manual, p. 152.
1878 1881 1882	Onisimus litorali Onesimus litorali	s, Hellers, Miers	Denkschr, d. K. Akad, d. Wiss., xxxv, p. 31, pl. ii, figs. 9-16. Ann. and Mag, Nat. Hist., ser. 5, vii, p. 51. Vega-Exp. Vetensk, lakt., p. 711.

This was always rather abundant in the shoal water along the beach. The specimens preserved in the collection floated up in the tide hole with a small dead fish on which they were feeding, March 30, 1883.

This species has been recorded from Greenland, Spitzbergen, Finmark, and the neighborhood of Franz Josef Land. "Rather plenty on the surface of the sea at the edge of the ice, as well as between the pack-ice" (Heller, loc. cit. tr.). The Vega Expedition obtained it on the northeast coast of Siberia, in longitude 177° 28′ E.

#### 25. STEGOCEPHALUS AMPULLA (Phipps) Goës.

(Nev auct, = 8. inflatus Kr.)

Year.	Name.	Citations.
1774 1840 1805 1870 1877 1882	Megacephalus ampulla, thies	Histoire Naturelle des Crustacéos, III, p. 22. Oefv. af K. Vetenak. Akad. Förhandt, xxii, p. 521, pl. xxxviii, fig. 9. (Part.) Forhandt, Videnak. Selsk., p. 123. (Crust. Amplup.) Ann. and Mar. Nat. Hist., ser. 4, x/x, p. 134.

In the synonymy above given I have only quoted such descriptions as can be undoubtedly referred to this species by good figures or otherwise, as two species have been confused under this name. Phipps first obtained it in the neighborhood of Spitzbergen and gave an excellent figure and description.

This form does not appear to have been observed again till the Rev. E. A. Eaton brought it from Spitzbergen, in the summer of 1873, except by Goës, who collected both species at Spitzbergen, but considered the difference as perhaps sexual.

In 1842 and 1844 Kröyer (Nat. Tids., 1 R., iv, p. 156, and 2 R., i, p. 522, pl. 7, fig. 3) established the genus Stegocephalus for an amphipod brought from Greenland, which he called S. inflatus. Most subsequent writers have considered this a synonym of Cancer ampulla Phipps, and Bell (in Belcher's "Last of the Arctic Voyages," ii, p. 406), under the name of S. ampulla, gives an excellent figure of S. inflatus, criticising Phipps's really very accurate figure as a bad one.

Miers (loc. cit.), having obtained the two species from Mr. Eaton, was the first to recognize the difference and to point out the fact that Kröyer's species was distinct from the one described by Phipps. Stegoccphalus ampulla was obtained at many places on the Arctic shore of Siberia by the Vega Expedition, and Stuxberg, overlooking Miers's paper, considered it a new species which he proposed to call S. kessleri though he gave no description but only an excellent figure.

It is quite unlikely that the difference is a sexual one, as suggested by Goës (loc. cit.), because Phipps figures both male and female of *S. ampulla*, and there are besides well marked differences in color between the two species. Moreover, *S. ampulla* has never been obtained in Greenland, or on the eastern coast of North America, where *S. inflatus* is of comparatively frequent occurrence.

## 26. EUSIRUS CUSPIDATUS Kr.

Year.	Name.	Citations.
1859 ( Eustrus c 1865   Eustrus c 1870   Eustrus c 1875   Eustrus c 1877   Eustrus c 1877   Eustrus c	uspidatus, Brazelius uspidatus, Goės uspidatus, Ewek uspidatus, Bwhhoiz uspidatus, Latken uspidatus, Miers	Nat. Tids. ii B., i, p. 501, pl. 7, fig. 1; Voyage, &c., pl. 19, fig. 2   K. Svensk, Vetensk, Akad, Handlingar, New Series, iii, p. 63

A single specimen was picked up on the beach near the station, September 12, 1882. It has been observed in Greenland, Spitzbergen, Finmark, and Franz Josef Land.

## 27. RHACHOTROPIS ACULEATA (Lepech.) Smith.

Year.	Name.	Citations.
1778 1824 1835 1846 1852 1865 1870 1874 1875 1877 1878 1878 1878 1881	Oniscus aculcatus, Lepechin Tolitrus Edicardaii, Sabine. Amphiloc Edicardaii, Gwen. Amphiloc Edicardaii, Kröyer Amphiloc Edwardaii, Adams Amphilocotus Edwardaii, Adams Amphilocotus Edwardaii, Sp. Bato.	Acta Petropolitana, 1778, f., p. 247, pl. 8, 6g, 1.  Suppl. App. Parry's Voy., p. 233, pl. 2, figs. 1-4.  App. Ross Voyage, ii. p. xc.  Nat. Tida, ii R., ii. p. 78; Voy. pl. 10, fig. 1.  In Sutherland's "Journal of a Voyage, a.c.," ii, app. p. cevi.  Cat. Amph. Crust., p. 131, pl. xxviii, fig. 5.  Cefv. af K. Vetensk, Akad. Forbandl. xxii, p. 526.  Crust. Ampl., p. 78.  2te Deutsche Nordpolarf, ii. p. 316, pl. iv.  (Nominal list.) Aretic Mannal, p. 154.  Ann. and Mag. Nat. Hist. ser. 4, xix. p. 137.  Deuksche, d. K. Akad. d. Wiss. xxxv. p. 32.  Ann. and Mag. Nat. Hist., ser. 5, vii, p. 49.  Vega-Exp. Vetensk, lakk, pp. 704, Tig. 779.

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s pre-

rhood ell as theast Two individuals were dredged off Point Franklin in 134 fathoms.

The species has been recorded from Labrador, Greenland, the Parry Archipelago, Spitzbergen, Franz Josef Land, and the Kara Sea.

## 28 ACANTHOSTEPHEIA MALMGRENI (Goës) Borck.

		·
'Your.	Natio .	Citations
1893	Amphithea Ass mulasgreas, time	Octy, at K. Vetenak. Alcad. Forhandl , xxll, p. 529, pl. xxxix, fig. 17
1874	Acar those pheia malmaren. White aver .	"On Recent Deép-Sea Dredging Operations in the Gulf of St. Lawrence," p. 1, from Am. Joseph of Sci. and Arts, vii
1878 1883	Acus thest phear malagreni, Heller Leur thest phear authoricai, Sursburg	Denkschr, d. K. Akad, d. Wiss, yxxy, p. 32. Vega-Exp. Vetensk, Jakt., pp. 698 et seq. (passim). Fig. on p.

Four or five specimens were dredged on the muddy bottom close to the station in about  $2\frac{1}{2}$ 

The species has been found in Spitzbergen, north of Nova Zembla, towards Franz Josef Land, and at several localities during the voyage of the Vega.

Stuxberg (loc, cit.) gives the range of this species as confined to the Old World from Franz Josef Land, Nova Zembla, and Spitzbergen, along the Siberian coast east to Bering Strait. White axes records it from the Gulf of Saint Lawrence.

# 29. PARAMPHITHOE PANOPLA (Kr.) Bruz.

Year.	Name.	Citations.
1838	Amphithoc panopla, Kröyer	Voyage, pl. il, fig. 2.
1853	Amphithonotus cataphractus, Stimpson	Matine Invertebrata of Grand Manan, p. 52.
1859	Paramphithoe pampla, Bruzelius	Skand, Amphip., VetenskAkad. Handl., n. s. iii, p. 69
1402 .	Pleustes tuberculatus, Sp. Bato	Cat. Amph. Crint., p. 62, pl. iv, fig. 8
1862	Pleustes panoplus Sp. Bate	Cat. Ample Crust., p. 63, pl. iv, fig. 9.
1865	Paramphithoe panople, tiois	Ocfv. af K. Vetensk. Akad. Förhandl., xxii, p. 521
1867	Amphithonotus cata) bractus, Packard	Mem. Boston Soc. Nat. Hist., I, p. 298.
1897	Paramphithoc panopla, Packard	Op. cit., p. 297.
1870	Paramphithoc panopla, Back	Ciust, Amph., p. 96,
1874	Pleusten panoplus, Buchholz	2to Deutsche Nordpolarf., ii, p. 334, pl. vi.
1875	Paramphithoe panopla, Lütken	(Nominal list.) Aretic Manual, p. 153.
1842	Pleestes panoplus, Stuxberg	Vega-Exp. Vetensk, Iakt., f, p. 704, 779.
1882	Pleaster agrandus Smith	Proc. U. S. Nat. Mass., vi. na 200 028

A few were dredged off Point Franklin in 132 fathoms on the rich bottom.

The species has been obtained in Greenland, Labrador, Grand Manan, Spitzbergen, and the Kara Sea.

# 30. ACANTHOZONE POLYACANTHA Murdoch. (Plate I. fig. 4.)

Vear. Name. Citations.

1884 Acanthozone polyacantho, Murdoch . . . . . Proc. U. S. Nat. Mus., vii, p. 520.

Description.—Head rounded, with a very short, sharp rostram and a small lateral spine at the base of the lower antennae. Eyes round and prominent. Posterior edge of first five segments of pereion raised into a rounded ridge, developing into a median tooth on the fifth segment. Anterior edge of first segment also raised into a similar ridge, curving forward over the head. Last two segments of pereion and first four of pleon armed on the posterior edge with a large broad median tooth pointing backwards, largest on the third segment of the pleon, and very small, almost obsolete on the fourth. The last two segments of the pereion and the first two of the pleon also carry a small accessory tooth midway between the median tooth and the epimeral suture. The epimeral suture bears a deep lateral keel which becomes a sharp, posterior, backward-pointing tooth on the last two segments of the pereion and the first four of the pleon. The infero-posterior

angle of the epimeron bears a spine (there are two on the second segment of the pleon). Upper antenne about two-thirds the length of the lower. Gnathopods slender, subchelate. Telson rather long, entire.

A few specimens were dredged off Point Franklin, in 13½ fathoms, August 31, 1883, Museum No. 7898.

## 31. ATYLUB SWAMMERDAMII (M. Edw.: Sp. Bate.

1		regimen referr +	
1	fear.	Name	Utations
		Amphithos Swammerdamii, Milne Ed-	
		Desamine Gordoniana, Spince Bate	Oefv. of K. Vetenok. Akad. Forhandl. p.s. Ann. and Mag. Nat. Host., p. 142
	1×59	Paramphithos compressa, Bruzellus	K. Vetensk, Akad. Handl. p. 7 Förhandl, ved de Skand, Naturf., 8de Møde, p. 659.
	1863	Dexamine Loughrini, Sp. Bate	Cat. Amph. Crust., p. 130, pl. xxiv, it is
	1862	Atylus Swammerdamii, Sp. Bate	Op. ett., p. 142.
	1870 !	Atylus Swammerdamil, Boock	Crust Amplin, p. 111.

The species of Atylus dredged in 13½ fathoms off Point Franklin, where it was decidedly plenty, appears undistinguishable from A. Swammerdamii, although this species has hitherto been recorded only from the western coast of Norway and from the coast of England.

## 32. GAMMARUS LOCUSTA Lin. J. C. Fabr.

	and W Young	
Lest.	Name.	Citations.
		A 100
1767	Cancer locusta, Linne	Systema Naturie, ed. 12ma, p. 1055.
1767	Cancer puler, Linné	Ibidem.
1774	Cancer pulex, Phipps	Voyage, &c. App., p. 193
1775	Gammarus locusta, J. C. Fabricius	Systema entomologia
1720	Oniscus puler, O. Fabricina	Faun, Greenb., p. 254, sp. 231.
15.20	Gammarus arcticus, Scoresby	"An Account of the Arctic Regions," i. p. 541, ii, pl. 16, fig. 14.
1621	Gammarus borews, Sabine	Suppl. App. Parry a Voy., p. cexxix
1838	Gammarun locusta, Kröver	D. Vidensk, Selsk, Afhandl., vd. p. 27.
1883	Gammarus locusta, Rathke	Beiträge zur Fauna Norwegens, Nov. Act. Nat. Cur., xx. p. 67.
1851	Gammarus sitchensis, Brandt	Sibirische Reise, ii. pt. i. p. 133.
1851	Gammarus mutatus, Lillichorg	K. VetenskAkad. Handl., p. 4).
1553	tianimarus pulce, Stimpson	Mar. Inv. Grand Manan, p. 57
1555	Gammarus horeus, Bell	Belcher's "Last of the Aictic Voyages," ii, p. 405
1859	Gammarus locusta, Bruselins	K. Vetensk, Akad. Handl, p. 52
1862 :	Gammarus locusta, Sp. Bate	Cat. Amph. Crust., p. 206.
1865	tiammarus locusta tiacs	Octv. at K. Vetensk. Akad. Förhandl., xxii, p. 531.
1870	Gammarus locusta, Bæck	Crust, Amphip., p. 124.
	Gammarus locusta, Buchholz	2re Deutsche Nordpolarti, ii. p. 343.
	Gammarus locasta, Lütken	(Nominal list.) Arctic Manual, p. 156.
	Gammarus locusta, Miers	Ann. and Mag. Nat. Hist., ser. 4, xix, p. 138.
	Gammares localit, Heller	Denleschrad, K. Abad, d. Wasse, xxxv., p. 35.
	tiammarus locasta. Miers	Ann. and Mag. Nat. Hist. ser. 5, vii, p. 51
	Gammarus locusta, Stuxberg	Vega-Exp. Vetensk, lakt., pp. 711, 712, 715.
1883	tiammarus locusta, Smith	Proc. U. S. Nat. Mus. vi. pp. 222, 229

Considerable numbers of this species were dragged up in the seaweed by a seine in the shoal water along shore at Pergniak, Elson Bay, along with *Gammaracanthus loricatus*. A few were also dredged just above the station in about 3 fathoms, on a bottom of mud and sand mixed.

The species is recorded from Arctic seas generally, as well as from the temperate regions of the northern hemisphere.

# 33. MELITA FORMOSA Murdoch.

(Plate II, figs. 1, 1b.)

	FR FRE A			
Year.	Name.	1	Citations.	
1884 Melita formosa,	Murdoch	, Proc. U. S. Nat. Mus., vii.	p. 520.	

This species is very close to M. obtusata, but may be distinguished by the shape of the nail of the second gnathopods.

DESCRIPTION .-- Antennules with the first joint of the peduncle not quite as long as the second.

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e at ents uteast oad

iost ilso The ing ior Two anterior segments of pleon with infero-posterior angle acute; third segment with this angle acute and produced upwards. Second and third segments of pleon armed with a single tooth each on posterior margin, fourth with three, fifth with four teeth, all very small. Hand of first gnathopod oval and fringed with long hairs on the posterior margin. Hand of second gnathopod in male broadly oval, and armed on the edge with 3-4 blunt teeth and running out into a broad, blunt tooth; claw large, curved, and acute, shutting on the inside of the palm. Inner ramus of the last pair of saltatory feet ovate. Color purple with a lighter streak down the middle of the dorsal surface.

Picked up on the beach near the station in considerable numbers, late in the summer of 1882. Museum numbers, 7893, 7894, 7895.

# 34. MELITA LEONIS Murdoch.

(Plate II, figs, 2, 2b.)

Year.	Name.	1	Citations.	
		_		
1884   Melita i	leonis. Murdeeh	Proc. l*. S.	Nat. Mus., vii, p. 521.	

This species is closely allied to *M. dentata*, but differs in the dentition of the segments of the pleon, and in the length of the antennules.

DESCRIPTION.—Eyes small, oval, black. Antennules reaching to the first segment of the pleon, with the first joint of the peduncle a little shorter than the second. Third segment of the pleon with the infero-posterior angle acute and produced upwards. First and second segments of the pleon with one large median tooth on the posterior edge and eight fine denticulations, the latter larger on the second segment; third with nine teeth, of which the median one is the largest fourth with five; fifth with six, lacking the median tooth; sixth with two small, blunt teeth. Hand of first gnathopod with infero-posterior angle of third joint not produced into a tooth; hand elongate-oval, edge rot toothed. Color purple, with two lighter streaks along the dorsal surface.

I have named this species from the schooner Lee of San Francisco, from which vessel the specimens were obtained, by dredging in about five fathoms of water at the head of Norton Sound, September 12, 1883.

Museum numbers, 7893, 7897.

#### 35. G. "TMARACANTHUS LORICATUS (Sab.) Sp. Bate.

1		
Year.	Name.	Citatio 8.
1-24	Gan. marus loricatus, Sabine	Suppl. App. Parry's Voy., p. 22, pl. 1, fig. 7.
18.5 (	Gara a tras loricatus, Owen	App. Ross' Vov., ii, p. xxxix.
138 (	tien varys loricatus, Kröyev	Vidensk, Selsk, Skr., vii, p. 250, pl. 1, fig. 4.
8.39 ' (	Germanus Privatus, Redyer	Nat. Tids., i R., ii, p. 258.
18 15 6	Grammas lore atus "all	Belcher's "Last of the Arctic Voy.," p. 405.
1801 (	tianamarus lorances a ven	Oefv. af k. VetenskAkad. Förhandt, p. 287.
1862 6	Gammar, Panthus Urb. 198, Sp. Bate	Cat. Crust. Amph., p. 202, pl. xxxvi, fig. 2.
1865 (	Ganemar stricetas, G. et	Octy, af k. Vetensk. Akad. Förhandl., xxii, p. 531.
1870 6	Generaliste thus the first Brook	Crust, Amph., p. 135.
1875 6	Gala narawayth ex lo worlds, Latteen	Arctic Manual, p. 157 (nominal list).
		Vega-Exp. Vetensk, Iakt., i, pp. 700 et seq. (passim).

A few were taken at Pergolak (in Elson Bay) among seaweed dragged up by the seine, August 11, 1853, and some were also picked up on the beach late in the summer of 1882.

It has been observed at Prince Regent's Inlet, Arctic America, abundant (Sir J. C. Ross) in the "Arctic Scas" (Sir Edward Parry and Sir Edward Belcher) and Greenland (Kröyer, quoted by Spence Bate). Beeck (loc. cit.) gives as its habitat "Grænlandia, Spitsbergia, in lacubus Finlandia, et Svecia et Norvegia."

The Vega expedition obtained it at various points along the Arctic coast of Siberia from Nova Zembla nearly to Bering Strait.

# 36. DULICHIA ARCTICA Murdoch.

(Plate II, fig. 3.)

Year.	Name.	Citations.	
1881	Dutichia aretica, Murdoch	Proc. U.S. Nat. Mus., vii, p. 521.	

DESCRIPTION.—Head slightly produced, forming an obtuse angle. First epimeron produced into a sharp spine projecting forward, the rest unarmed. Body smooth. Basa of second gnathopods dilated and armed with two teeth; hand large, subtriangular, and armed on the edge with two long, stout teeth. Last three pairs of perciopods not specially long; third joint as long as the fourth and fifth together. Second pair of saltatory feet with outer ramus nearly twice as long as the peduncle; inner a little longer. Eyes small, round, and black. Color grayish.

Dredged in rather small numbers off the station in 5 fathoms on a muddy bottom, Museum numbers, 7899, 7900.

# PHYLLOPODA.

# 37. LEPIDURUS GLACIALIS (Kr.) Baird.

Year.	Name.	Citations.
1852	Lepidurus glacialis, Baird	Nat. Tids., if R., II, p. 431; Voy., pl. 40, fig. 1. Monograph of the family Apodidae. Proc. Zoo. Soc. Lond., pl. xx, p. 6; Annulosa, pl. xxii, fig. 2.
1878	Lepidurus glacialis, Packard	Phyllopods of N. America. Report of U. S. Geological and Geo- graphical Survey of the Territories, pt. i, p. 316.

This species has been kindly identified by Dr. A. S. Packard, jr., of Brown University, who examined our specimens and compared them with a specimen from Greenland.

It was abundant on the pools on the tundra, where it lurked in the mud and alga, but appeared slightly capricious in its distribution, as it was not found in every pool. They lived until the pools froze up in the autumn.

They were especially abundant in the pool near the station from which we obtained our drinking water. In 1882 they were observed for the first time on July 8, but the next year they were ten days later in appearing, and seemed scarce and sluggish.

The species has been obtained in Greenland and also near Cape Krusenstern, Alaska.

# 38. BRANCHINECTA PALUDOSA (Müll.) Verrill

Year.	Name.	Citations.
1780 1788 1851 1852 1857 1860 1860 1869 1869 1878	Cancer stagnalis, O. Fabricus Branchipus paludosus, Muller Branchipus paludosus, Muller Branchipus mideralungianus, Fischer Branchipus (O. Barti Branchipus (O. Barti Branchipus paludosus, Beinhardt Branchipus paludosus, Packard Branchipus (Branchinecta) artica, Verrill, Branchipus (Branchinecta) urgenlandica Branchimeta artica, Verrill, Branchinecta grenlandica, Verrill Branchinecta paludosa, Packard	Fanna Graenl, J. 247, 8p. 224. Zoologia Druica, il., p. 10, pl. 48 figs 1–8. Sibirische Riess, il., p. 15, pl. 58. Proc. Zool. Sic. Lond., xx, p. 29. Bidrag file of Boskrivelse af Groenland. Mem. Rost. Soc. Nat. Hist., i, p. 295. Amer. Jour. of Sci. and Arts, ser. ii, xlviii p. 253. Ibid. Proc. Amer. Ass. Adv. Sci., xviii, p. 244. Op. cit., p. 245. Pixlopods of N. A. Report U S. Geological and Geographical Survey of the Territories, pt. l. p. 336, pl. ix, figs. 1–6, pl. x. figs.

This species was very abundant in the fresh-water pools all ever the tundra, first appearing about the middle of June in the small pools made by the melting snow along the edge of the tundra at the crown of the beach.

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It has been found in Greenland and Labrador and at Cape Krusenstern, Alaska. (See Baird, loc. cit.)

Dr. Packard has kindly examined these specimens, and says that they do not differ from those brought by Dr. Bessels from Polaris Bay.

#### 39. POLYARTEMIA HAZENI Murdoch.

(Plate 11, figs. 1 16.)

Year.	Name.		Citations.	
1884	Polyartemia hazeni, Murdoch	Proc. U. S. N.	at. Mus., vii, p. 522.	

Specimens of a species of Phyllopod, found in abundance near the station, were examined by Dr. Packard, who declared that they belonged to the genus *Polyartemia*, but were different from the single species (*P. forcipata*) of this genus, described by Fischer in Middendorff's Sibirische Reise, ii, pt. i, p. 454, pl. vii, figs. 24–28 (1851).

I therefore decided to describe this as a new species under the name of *Polyartemi hazeni*, after General W. B. Hazen, Chief Signal Officer, U. S. A., to whom the species is respectfully dedicated.

Description,—Body long (twice the length of the abdomen) and stout. Legs generally seventeen pairs, males usually with one pair more than the females. Head in the male prolonged anteriorly into a short, thin, lamellar process. Male "claspers" large, stout, broad, and palmate, strongly incurved. From the middle of the lower edge projects a large curved process armed on the tip and inner surface with numerous fine teeth. The extremity of the "clasper" is bifurcated into two short, blunt branches, also armed on the inner side with fine teeth. Feet short and broad-Cau lal appendages small and slender, a little longer than the last abdominal segment. Ovisae voluminous, nearly as long as the abdomen; end rounded, with a short, tooth-like process on each side. Color, when living, a pale, iridescent green.

Museum numbers, 7929, 7930, 7931.

The species was first observed July 13, 1882, in large numbers, copulating, in the pools on the black fundra.

It is not so widely distributed as Branchinecta paludosa, which occurs in the same pools. It swims very swiftly and is very hard to eatch.

# CIRRIPEDIA.

# 40. BALANUS sp.

Small barnacles were quite plenty on gastropod shells near the Pation, and a single large one which I cannot identify was dredged off Point Franklin. (This is probably B. norcetus).

# Rигосернала.

# 41. PELTOGASTER PAGURI Rathke.

Year.	Name.	Citations.
1841	Pellogaster pagari, II. Rathke	Reisebemerkozgen, Neueste Schriften der Naturforschenden Gesellschaft in Danzig, ii. p. 105, pl. v., fig. 12
1843 1859	Peltogaster pagari, H. Rathke	Nov. Act. Acad. Cass. Leon. Car. Nat. Cur., v.x., p. 245, pl. vii, fig. 47. Les genres Liriope et 150 (gaster, H. Rathke). (Extrait des Nov.
1875	Pettomster pagari, Packard. Pettogaster pagari, Laitken Pettogaster pagari, Smith	A et Reg. Soc. Sci. Upsaar, ser. 3, ii), p. 25, figs. 1, 2, 30-35. Mem Bost. Soc. Nat. Hist. 4, p. 295. Vecto Murral, p. 163 (month.). (84) Proc. U. S. Nat. Mus., vi. 222.

Three specimens of this parasite were found on Eupagurus trigonocheirus picked up on the beach near the station. It appears to be quite rare.

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The species has been obtained in Norway and Sweden, Greenland, Labrador, and Maine, on species of Eupagurus allied to the E. trigonocheirus.

#### CLADOCERA.

#### 42. DAPHNIA SD.

A species of Daphuia, or some closely allied genus, was very abundant in all the fresh-water pools on the tundra.

# Pycnogonida.

#### NYMPHONIDÆ.

# 1. NYMPHON LONGITARSE Kr.

Year.	Nume.	Citations.	
1875   A 1877   A 1878   A	ymphon longitarse, Lütken	Nat. Tids., ii R., i, p. 112, V y., &c., pl. 36, figs. 2a-b. Arctic Manual, p. 184 meannal list). Archiv for Mathematik oz Naturvidenskah, ii, pt. iii, p. 366. Trans. Com. Acad. Arts and Sci., v. p. 19, pl. vii, figs. 2a-b. Report U. S. Commissioner Fish and Fisherles, pt. y. p. 489.	A. STATE OF THE PARTY OF THE PA

Three specimens were dredged on the muddy bottom close to the station in 5 fathoms, August 14, 1882.

It has been recorded from Greenland, Norway, and the eastern coast of America as far south as George's Bank.

# 2. NYMPHON GROSSIPES (Lin.) J. C. Fabr.

Year.	Name,		Citations.		
1762 Pha	langium marinum (1), Ström.	Söndmör,	p. 208. •		
1767 P/ a	langium grossipes (!), Linne .	Syst. Nat.	ed. xii, p. 1027.		
1784 Pyci	io jonum grossipes. O. Fabricio	18 Faun, Gre	nl., p. 229.		
1794 Ngu	phon grossipes, J. C. Fabricius	Syst. Ent.	iv. p. 217.		
1824   Nyn	phon grossipes (!) Sabine	Suppl. Ap	p. Capt. Larry's Voy., p. 225.		
1838 . Nyn	iphon grossipes, Kröver	Grönl. An	ifin., p. 92 (teste Kröver).		
1844 Nun	ephon grossipes, Kröyer	Nat. Tids.	, ii B., i. p. 108.		4
1844 Nun	iphon mixtum, Krovei	Nat. Tids.	. ii R., i. p. 110 . Vov., pl. 35, 6	cs. 2a-f.	1
1844 Nyn	iphon brevitarse. Kiöver	Nat. Titls.	ii R., i. p. 115; Voy., pl. 36, ii	ун. 4n-f.	1
1846 · Nun	inhan arassipes, Kröver	Oken's Is	Jahrg. 1846, pt. vi. p. 442 - V	ov. ul. 36 flers	la_h.
1853 . Ami	phon grossipes, Stimpson	Mar. Inv.	Gr. nd Manan p. 38.	og of Par Do, sign	
1857 Nun	ophon brevitarse. Reinbardt	Nat. Bidra	og til en Beskr, af Grönland.	n. 38	
1867 Nun	phon gressipes, Packard	Mem. Bos	I. Soc. Nat. Hist., I. p. 295.	1	
1874 Nun	phon grossipes et mixtum. Bu	chholz. 2te Deuts	the Nordpolart, ii on 396 395		
1874 Nun	phon grossipes, Verrill	Am. Jour.	Sci., vii. p. 502.		'
1875 Nun	phon grossipes, mixtum, et bre	eitaene Aictic M:	nual un 162 163 (numinal lis	to.	
Li	itken.			***	
	phon mixtum, G. O. Sars	Archiv fo	r Mathem on Naturally and	ii 1, 266	
1878 Nun	iphon grossipes, Wilson	Trans. Co.	on Acad v n 20 of vii fi	13.0	
1880 Nun	phon grossipes Wilson	Ren U S	Commissionar Fish and Eiche	tion for 1979 .	4 10 4 101
11/1/1/1	duran are soften at that the every	Mep. C. 19.	commissional trial little trialle	1108 100 1010, [	16. V.O. pt. 9091

We found this species rather plenty but small off Point Franklin in 13½ fathoms. A few good-sized ones, among them one egg-bearing female, were also dredged in about 5 fathoms on a peably bottom near the head of Norton Sound.

It has been recorded from Greenland, Norway, and the eastern coast of North America as far south as George's Bank.

# VERMES.

# Силторода.

# POLYNOIDÆ.

# 1. POLYNOE SCABRA (Fabr.) Sav.

Year.	Name.	Citations.
1		
1780 1820 1843	Aphrodita scabra, Fabricius Polynoc scabra, Savigny Lepidonote scabra, Octsted	Fauna Greenlandica, p. 311. Systeme des Annelides, p. 26. Grönlands Annulata Dorsibranchiata, p. 12, figs. 2, 7, 10, 12, 13, 17, 18.
1860 1865 1875 1879 1883	Palinne nodosa, Sars Ernoe Oerstedii et nodosa, Malingren. Eunoa Oerstedii et nodosa, Liitken Polynoe scabra, Theel Polynoe scabra, Wirén	Forh, i Vldenskalbs/Sebk, i Christiania, p. 58. Nordiska Hafes Annihater, p. 61, p. ivij, figs. 3 and 4. (Nominal list.) Arctic Manual, p. 168. K. Nvensk, Vetensk, Jakud, Hambl., vol. xvi, No. 3, p. 7. Vega-Exp. Vetensk, Takt., ij. p. 337, pl. 28, figs. 1 and 2; pi. 29, fig. 1.

Three specimens of this species were dredged off Point Franklin, in 13½ fathoms, August 31, 1883, The species has been recorded from Spitzbergen, Finland, Iceland, Greenland, and from the North American coast as far south as Grand Manan. The Vega Expedition obtained it at various points on the northeast coast of Siberia from the mouth of the Taimyr River to Bering Sea.

#### 2. POLYNOE ISLANDICA Hansen.

Martin Control		enament of the second		11.00
Year.	Name.	Citations.		-
			-	١
1889 7	olunos islandica Hanson	Den Norske Nordhavs Expedition, vii, Zoölogi, At	melida n. 24.	
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Two specimens were dredged with the other *Polynocs* off Point Franklin, in 13½ fathoms, August 31, 1883.

This species has been united with *P. scebra* by Wirén (loc. cit.); but the specimens we obtained agreed so closely with Hansen's description, and differed so much from our specimens of *scabra*, that I have concluded it best to record it as a distinct species.

It was originally described by Hansen from specimens taken in the North Atlantic.

# 3. POLYNOE SARSI (Kinberg) Théel.

Year.	Name.	Citations.
1867 1871 1872 1875 1878 1879	5 Antinoe sarsi, Malmgren 7 Antinoe sarsi, Malmgren 1 Antinoe sarsi, Enlers 2 Antinoe sarsi, Sars 5 Antinoe sarsi, Catken 8 Antinoe sarsi, Marenzeller	Nordisk, Hafs-Ann. p. 75, pl. ix, fig. 0. Annalata Pelvyheta, p. 33. Sitzungsberichte Phys. Med. Soc. Erlangon, iii, p. 77-79. Nyt Magazin f. Naturvidensk., xix, p. 202. (Nominal list.) Arctic Mannal, p. 186. Denkschr, d. K. Akad, d. Wissen, xxxv, p. 395. K. Syensk. Vetensk. Akad, Handl., xvi, No. 3, p. 16, pl. ; fig. 8.

Four small specimens of this species were obtained August 9, 1883, on one of the sandy patches near the station, in about 3 fathoms of water.

It has been recorded from the sea near England, the Baltic, Norway, Greenland, the Gulf of Saint Lawrence, and New England. The Swedish Expedition obtained it at various points along the northern coast of Siberia from the Kara Sea to the Vega's winter quarters.

# 4. MELÆNIS LOVÉNI Malmgr.

Year.	Name,	Citations.
1867 Melarn	is loréni, Malmgren	Nordiska Hafs-Annulater, p. 78, pl. x, fig. 10. Annulata Polyeberta, p. 14, Vega-Exp. Vetensk. Takt., ii, p. 391, pl. 28, fig. 4; pl. 20, fig. 3.

A single specimen was dredged just outside the grounded ice, about 4 miles above the station, in about 15 fathoms of water. The bottom was an exceedingly tenacious and fetid black mud.

The species has been recorded from Spitzbergen and the neighborhood of Nova Zembla, and as far east as Bering Strait.

#### 5. MELÆNIS LOVÉNI, var. GIGANTEA (Malm.) Wirén.

-	The second secon			
Year.	Name.		Citations.	
		A 1 1 1		
1883	Melwnis lovėni, var. gigantea, Wirén	Vega-Exp. Vetensk,	<b>Iakt.</b> , il, p. 391, pl. 28, fig. 3	pl. 29, fig. 4.

This variety of the preceding species, which was described by Wirén from two specimens obtained by the Vega Expedition near Bering Strait, was found in considerable numbers on the beach near the station.

#### NEPHTHYIDÆ.

# 6. NEPHTHYS CCCA (Fabr.) Oerst.

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Year.	Name.	Citations.
1780	Nereis caca O. Fabricius	Faun. Grænl., p. 304.
1789	Nephthys ciliata, Müller	Zool, Dan., iii, p. 14, nl. ixxxix, figs. 1-4.
1843	Veuhthus coca. Oersted	Grönl, Ann. Dorsib., p. 193, figs. 73, 74, 77-86.
1843		Op, cit., p. 195, figs. 75, 76.
1865	Nevhthus longisetosa, ciliata et caca, Malm.	Nord. Hafs-Ann., p. 104, pl. xif, figs, 17 and 18.
	gren.	
1868	Nerhthus caca, cirrosa et ciliata, Ehlers	Die Borstenwürmer, i, p. 588, pl. xxiii, figs. 10-34, 6, 36, 37, 38.
1875	Nephthyseeca, ciliata et longosetosa, Lütken	(Nominal list.) Arctic Manual, p. 169.
1877	Nephthus corea. McIntosh	Trans, Linneau Soc. London, series 2, i. p. 561.
1878	Venhthus tongosetosa, v. Marenzeller	Denkschr, d. K. Akad, d. Wiss., xxxv, p. 395.
1870	Nephthus cover et ciliata. Théel	K. Svensk, Vetensk, Akad, Handl., xvi, No. 3, p. 24.
1883	Nephthys coca, Wiren	Vega-Exp. Vetensk. Iakt., ii, p. 392, pl. 30, figs. 1-3; pl. 31, figs. 1-

Two good-sized specimens and four smaller ones of the *ciliata* type and two medium individuals of the *longisetosa* type were dredged near the station, in about 3 fathoms, on the muddy bottom.

One smaller specimen of the *longisetosa* type was also obtained near the head of Norton Sound, in 5 fathoms, on a pebbly bottom.

It has been recorded from Labrador, Greenland, Norway, Spitzbergen, Nova Zembla (and northward toward Franz Josef Land, where it was obtained by the Austrian Expedition), and the Arctic coast of Siberia as far round as Saint Lawrence Bay. It also occurs on the British coast.

#### PHYLLODOCEIDÆ.

# 7. ETEONE ap.

A single specimen of a species of *Eteone*, in such bad condition as to render the specific determination impossible, was obtained near the station in 2½ fathoms.

## 8. PHYLLODOCE GROENLANDICA Oersted.

Year.	Name.	Citations.
1867	Phyllodoce grenlandica, Malmgren	Ann. Polych., p. 21, pl. ii, fig. 9.
1875	Phyllodoce grenlandica, Malmgren	(Nominal list.) Arctic Manual, p. 169.
1877	Phyllodoce grenlandica, Littken	Trans. Liun. Soc. London, ser. 2, i, p. 502.
1878	Phyllodoce grenlandica, McIntosh	Denksehr, d. K. Akad, d. Wiss., xxxv, p. 395
1882	Phyllodoce grenlandica, v. Marenzeller	Den Norsk, Nordhafa Esp., p. 31, pl. iii, figs. 21-23.

A bait set at the bottom of the tide-hole, in about 3 fathoms of water, on May 26, 1883, brought up a large number of these worms. They varied a good deal in color when alive, some being red-H. Ex. 44—20

dish and some dark green. They were also dredged on the muddy bottom near the station August 9, 1883, in about 3 fathoms.

It is quite possible that *P. arctica*, described by Hansen (loc. cit.), from the neighborhood of Spitzbergen, is only a variety of this species, as the distinction is based on the number of papilla on the evaginated proboscis, which appears to be subject to great variation.

Among our specimens the same animal has been found to have twelve papillae (characteristic of granlandica) in one row, and fifteen (characteristic of granlandica) in another.

The species has been recorded from New England, Labrador, Greenland, Norway, Spitzbergen, between Nova Zembla and Franz Josef Land, and the Kara Sea.

## 9. PHYLLODOCE sp.

A single specimen of a species of *Phyllodoce*, evidently not *P. granlandica*, but too much mutilated for specific determination, was dredged near the station in about 3 fathoms.

# HESIONID.E.

#### 10. CASTALIA MULTIPAPILLATA Théel.

Year.	Name.	Citations.
1879	Castalia padtiparillata. Therl	K. Svenska Vetensk, Akad, Handl., xvi, No. 3, p. 38, pl. iii, fig. 38.

A few very small specimens of this species were caught in the towing net set under the sea-ice about the end of March, 1883.

Théel described the species from specimens obtained at Nova Zembla.

## SYLLIDÆ.

# 11. AUTOLYTUS sp.

We obtained males and egg-bearing females of a small species of *Autolytus*, which cannot be more accurately identified, swimming free under the ice about the end of March and the first of **A**pril, 1883. The "stem-form" was not obtained.

#### · ARICHD.E.

# 12. ? ARICIA ARCTICA Hansen.

Marine Comment		
Year.	Name.	Citations
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A fragment of a worm of this family, lacking both head and anal end, was obtained off the station, in about 3 fathoms, August 7, 1883. The body segments agree very well in the shape of the feet, gills, &c., with Hansen's figures, but as we were unable to obtain the characteristic hooked ventral seta of the anterior region of the body, the species cannot be positively identified.

It was originally described from near the island of Jan Mayen.

# OPHELIID.E.

#### 13. TRAVISIA FORBESI Johnst.

1840   Travisis fort st. Johnston   Ann. Naf. Hist., iy. p. 573, pl. xi, figs. 11-18, 1844   Ophicia commoditato tested   Gibbl. Ann. Dusth., p. 83, pl. viji, figs. 103, 112, 114, 119, 126, 1865   Travisia probest, Johnston   Cat. Birt Mas, p. 220, pl. xi, figs. 17-18.	Year.	Name.	Citations.	
Staff   Tearsian Inches: Malingren   Ann. Polych., p. 75.     1874   Fearsian Inches: Mobiline   220 Deutsche Kordpolarf., p. 225.     1875   Tearsian Inches: Lutken   (Nominal list ) Arctic Manual, p. 172.     1879   Tearsian Inches: Theel   Kongl. Svenisk Vetensk. Akad Handl., xvi, p. 49.     1883   Fearsian Inches: Witch   Vega-Exp. Vetensk Lutk., p. 406.	1843 1865 1867 1874 1875 1879	Ophicia communitata Octsted Travisa radosi, Johnston. Travisa radosi, Malinguen Fransie radosi, Malinguen Travisie radosi, Mobius. Travisie forbesi, Lutken. Travisia forbesi, Tubed	<ul> <li>Grönd, Ann. Dorsik, p. 53, pl. viff, figs. 103, 112, 114, 119, 120</li> <li>Cat. Brit. Mus. p. 220, pl. viv. figs. 11-18</li> <li>Ann. Polych, p. 75.</li> <li>Cate Deutsche Nortpolarf, p. 225.</li> <li>(Nominal list) Arctic Manual, p. 172.</li> <li>(Nominal list) Arctic Manual, p. 172.</li> <li>(Nominal list) Arctic Manual, p. 174.</li> </ul>	

 $\Lambda$  single specimen of this species was obtained close to the station in about 3 fathoms on a muddy bottom.

It has been observed in Greenland, Iceland, Scotland, Western Scandinavia, Spitzbergen, Nova Zembla, and near the winter quarters of the Vega.

#### TELETHUSEÆ.

#### 14. ARENICOLA GLACIALIS Murdoch.

Year.	Name.	Citations.	1
1884	Arraicula alacialis, Murdoch	Proc. U. S. Nat. Mus., vii, p. 522.	

This species is closely allied to *Arenicola marina*, but has only 6 setigerous segments anterior to the gills, and 11 gill-bearing segments instead of 7 and 13, as in *A. marina*. These numbers are constant in the five specimens obtained.

The 6 abranchiate segments are each composed of 5 distinct annulations, and each bear a pair of simple tubercular feet. The dorsal setæ are all of one kind, about 18 in number; slender and slightly serrulate, the longest longer than the foot. The ventral setæ are 35 to 40 in number, and form a single row on each side of the ventral surface of the ring. They are short, slender, and simple, and barely project above the surface of the skin.

The branchiate segments are each composed of 6 annulations. Each branchia consists of one cluster of about 15 simple cirri annulated in contraction. The branchia increase in size from the first to the ninth pair: the tenth and eleventh pairs are slightly smaller. The feet are small and tubercular; the dorsal seta, 7, similar to those of the abranchiate segments, but only about two-thirds of their length. The ventral setae are the same as in the abranchiate segments.

The caudal portion is about one-third of the length of the animal, without tubercles or other appendages.

Color, in alcohol, blackish gray, lighter on the ventral surface.

Five specimens were picked up on the beach, after a fresh westerly wind, September 12 and 13, 1882.

A couple of mutilated specimens were also obtained from the gullet of an eider-duck which had been diving on one of the sandy patches in about 3 fathoms just above the station.

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# CHLORÆMIDÆ.

#### 15. BRADA GRANULATA Malm.

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Year.	Name.	Citations.	a de la companya de l
	•		
1867	Brada granulata, Malmgren	Ann. Polych., p. 85, pl. xii, fig. 7.	
1875	Brada granulata, Lütken	(Nominal list.) Arctic Manual, p. 172.	
1883	Bradu oranulata, Wiren	Vega-Exp. Vetensk, Iakt., ii, p. 408.	

This species was dredged in considerable numbers near the station, in about 3 fathoms, in August, 1883.

It has been recorded from Greenland, Spitzbergen, and the northern coast of Siberia near the month of the Taimyr River (Vega Expedition).

# MALDANIDÆ.

16.

A long Maldanid worm, of a bright orange scarlet color when living, was dredged on one of the patches of mud and sand close to the station, in about  $2\frac{1}{2}$  or 3 fathoms of water, August 7, 1883. The only specimen preserved is a fragment of the body without either head or tail, and cannot be identified.

## AMPHICTENIDÆ:

## 17. PECTINARIA Sp.

A good many empty tubes of a species of *Pectinaria* were dredged on the muddy bottom just outside the grounded ice, in about 15 fathoms, and near the station on the sandy patches in about 3 fathoms. No living specimens were taken.

This is perhaps P. granulata, as this species was obtained by the Vega Expedition as far east as Saint Lawrence Bay.

# GEPHYREA.

# ECHIURIDÆ.

# 18. ECHIURUS VULGARIS (Savigny) Forbes.

	- Control of the Cont	* A * * * *	
Year.	Name.	C	itations.
-			
	Thalassema vulgare, Savigny. / Echiurus sitchemsis, Brandt Echiurus vulgaris, Forbes. Echiurus pallasii, Diesing. Echiurus pallasii, Quatrefages	History of British Star-fishes Revision der Rhyngodeen, Si xxxvil, p. 775.	tzungs-berichte d. K. Akad. d. Wiss.

The specimens of *Echiurus* brought home by the expedition cannot be distinguished from the description of *E. pallasii* (= *E. rulgaris*) given by Quatrefages (loc. cit.).

This species has heretofore been recorded from Great Britain and France. Brandt's description of E. sitchensis (loc. cit.) is not sufficiently detailed to enable me to tell whether it is the same species or not.

This worm was quite abundant on the beach, near the station, after the great gales of September and October, 1881, and two specimens were dredged on the muddy bottom, in about 3 fathoms of water, August 9, 1883.

#### SIPUNCULIDÆ.

#### 19. PHASCOLOSOMA sp.

A good many specimens of a species of *Phascolosoma* were dredged near the station in about 3 fathoms of water. They are so badly contracted in alcohol as to entirely disguise the specific characters. I was able to determine by dissection that they belong probably to the genus *Phascolosoma*, but could make out nothing further.

# NEMATODA.

# CILETOGNATHA.

#### 20. SAGITTA Sp.

A species of Sagitta occurred very rarely in the neighborhood of the station. One or two specimens were caught in the towing-net set under the sea-ice March 1, 1883. A few were also observed after the sea opened in August, 1883.

# ECHINODERMATA.

# HOLOTHURIOIDEA.

# 1. PENTACTA FRONDOSA Jæg.

-		
Year.	Name.	Citations.
1861 1871	Cacumaria frondosa, O. Fabricius Cucumaria frondosa, Lütken Cucumaria frondosa, M. Sars Cucumaria frondosa, Lütken Cacumaria frondosa, Lütken	Videnskabelige Meddelelser fra den Naturhlat, Foren, i Kjöben, p. 2. Ovensigt af Norges Echinoderner, p. 100. Vidensk, Meddel, 23, p. 306.

One small *Pentacta* was dredged in the rich haul off Point Franklin, August 31, 1883, and, as well as can be made out in its present condition, it belongs to this species.

The species has been recorded from Massachusetts Bay to Labrador and Greenland, from Spitzbergen, and on the European coast as far south as Denmark and Green Britain.

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#### 2. LOPHOTHURIA FABRICII (D. & K.) Verrill.

Year.	Name.	Citations.
1851 1857 1857 1857 1875 1878	Holothuri; squamata, O. Fabricius. Ascidia squamata, Pullas. (*Curieria sitchemisi, Brandt Curieria sitchemisi, Brandt Curieria sitchemisi, Stimpson Paolus fabricii, Lütken Paolus fabricii, Lütken Paolus fatricii, Manenzeller Paolus fatricii, Sunkerg	Fann, Greenland., 348. Nova Acta Petropolitana, ii, p. 244, tab, vii, figs. 34-37. Prodromus descriptionis monalium ab H. Mertensio observatorum. Recueil des actes de la scance publique de l'académie impériale des seiences de 84. Pétersbourg, p. 247. Sibirische Reise, ii, p. 450. Crustacea and Echinodermata of the Pacilic Coast of North America, from Jour, of Bost, Soc. of Nat. Hist., vi. p. 85. Vidensik, Meddel, p. 13. (Nominal list.) Arctic Manual, p. 184. Denkschr, d. K. Akad, d. Wissenchaffen, xxxv, pp. 559, 388. Vega-Expeditionens Vetenskapliga Inktragelaer, i. p. 715.

Dredged in great abundance off Point Franklin in 13½ fathoms, and also dragged up on codlines in about 18 or 20 fathoms off the mouth of Plover Bay, Eastern Siberia.

This species has been recorded from Greenland, south to Massachusetts Bay, from Bering Sea (St. Paul's Island, Brandt teste Lütken), Sitka (Brandt), and the Arctic Ocean north of Bering Strait (Stuxberg).

#### 3. MYRIOTROCHUS RINKII Steenst.

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Year.	No de.	Citations.
1851 1852	Myriotroc'. as rinkii, Sternstrup	Vidensk, Meddel., p. 55. pl. iii. figs. 7-10. Appendix to Sutherland's "Journal of a Voyage to Baffin's Bay
1857 1867	Myriotrochus vinkii, Lütken	and Barrow Strait," ii, p. cexi. Vidensk, Meddel, p. 22. Memoirs Boat Seciel, Nat. Hist. 1, p. 269.
1871 1874	Myriotrochus rinkii, Laitken Myriotrochus rinkii, Möbius	Vidensk, Meddel., 23, p. 306, 2te Deutsche Nordpolarfahrt, ii, p. 258.
1875 1878	Myriotrochus rinkii, Lütken	Oefversigt af Kongl. Vetenskaps-Akademiens Forhandlingar, 35,
1882 1882	Myriotrochus rinkii, Stuxberg	p. 28. Vega-Exp. Vetonsk, Iakt., i, pp. 695, et seq. Den Norske Nordhavs-Expedition, vi, Zuölogi, p. 28. pl. v. figs. 1-4.

This species was dredged in abundance off the station, on the muddy bottom, interspersed with patches of mud and sand mixed, in  $2\frac{1}{2}$  to 15 fathoms.

It has heretofore been reported from Greenland (Steenstrup, Lütken), Labrador (Packard), and Nova Zembla (Stuxberg). [? Wellington Channel (Sutherland).]

Lütken considers the *Chirodota brevis* of Huxley to be this species, but Danielssen and Koren consider that as Huxley in his description says pothing of the calcareous wheels being pedanculated it must be considered as a distinct species (= Oligotrochus vitreus M. Sars), for which they propose the name Myriotrochus brevis.

# 4. ? TROCHOSTOMA BOREALE (M. Sars) Dan. and Ko.

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	Year.	Name.	Citations.
	1861	Molpadia borcalis, M. Sara Molpadia borcalis, M. Surs Trockostoma (Molpadia) borcale, Daniels- sen and Koren.	Forhandl, I Vidensk, Selsk, i Christiania, p. 173. Oversigt af Norges Echinodermer, p. 116, pls. 12, 13. Den Norsko Nordhavs-Expedition, vi. Zeölogi, p. 64, pl. x. figs. 7-11.

A single specimen was picked up on the beach near the station, in July, 1882. The perforated calcareous plates appear to have the perforations smaller in proportion than those figured by Sars and Danielssen and Koren, but in the absence of more specimens, and especially of identified material for comparison, I cannot venture to pronounce it different.

The species has been recorded from the Norwegian coast and the North Atlantic, Molpadia violacea, which occurs in large numbers off Kerguelen Island, is considered by Dantelssen and Koren (op. cit., p. 65) to be identical with this species.

# ECHINOIDEA.

#### 5. STRONGYLOCENTROTUS DRÖBACHIENSIS (Miill.) A. AR

Year.	Name.	Citations	
1780	Echinus savatilis, O. Fabricius	Fauna Grandandica, No. 208	1
1834	Echinus chlorocentrotus, Brandt	Prodramus descriptionis S.c. p. 261	
1851	Februar chlorocentrotus, Brandt	Sibreische Reise, H. n. 11	
185.2	Pelinga neglectus, Forbes	In Sutherland's "Journal of a Voyage, & c.," ii, App., p. cexiv.	
1857	Fehinus drebachiensis, Littlen	Vidensk, Meddel., p. 24.	
1861	Pelians drehachiensis, M. Sars		
1571	Toronacust's drobachiensis, Littken		
1874	Lehinus dribachiensis, Mobius		
1875	Tore pneusten dröbachi aris, Lutken	(Nominal list.) Arctic Manual, p. 184.	
Lafa		Denksehr, d. K. Akad, der Wissen, xxxv. pp. 359, 385,	
	, eller,		
1578		Ocfy, af K. Vetensk, Akad, Förhandl., 35, p. 29	
1882	Echiana drobachienaia, Stuxberg	Vega Exp. Vetensk, lakt., f, pp. 705, 706, 708	

A few dry tests were picked up on the beach near the station, during the summer of 1882. The living animals were dredged in very great abundance off Point Franklin in 13½ fathoms, and were also quite abundant off Port Clarence, in 7½ fathoms, on a pebbly bottom. A few were also taken in about 5 fathoms, on a similar bottom, at the head of Norton Sound.

This species is abundant all round the northern parts of both hemispheres.

## Asterioidea.

#### 6. ASTERIAS ACERVATA Stimpson.

Year	Name.	Citations.	
1862	Asterias avervata, Stimpson	Proceed, Boston Society of Natural History, viii, p. 271.	

Rather small specimens of this species, 3 or 4 inches in diameter, were washed up on the beach in considerable numbers after the great gale of October 4, 1881, but none were afterwards found in any of our dredging near the station. One large individual, however, was dredged at the head of Norton Sound, in 54 fathoms, on a pebbly bottom.

This species was described by Stimpson from specimens brought by the North Pacific Exploring Expedition from Bering Strait and the Arctic Ocean north of the Strait. My specimens have been compared with one of Stimpson's own identification in the National Museum.

# 7. ASTERIAS VIOLACEA O. F. Müller.

		· · · · · · · · · · · · · · · · · · ·	 
Year.	Name.	Citations.	,
			1.1
1841	Asterias violacea, O. F. Mütler Uraster violacea, Forbes Asteracanthion violaceus, Mutler and Tro-	British Startishes, p. 91.	į

Numbers of a large purple Asterias were dredged in about 5–fathoms, on a pebbly bottom, at the head of Norton Sound.

I refer it with extreme doubt to this species as I have been unable to see any identified specimens of *violacea* or *rubens* and the literature at my command is exceedingly unsatisfactory.

The species will probably turn out to be undescribed, but I do not feel sufficiently familiar with the group to venture on a description. It is undoubtedly closely allied to the common European forms *rubens* and *riolacea*, if, indeed, the latter be a distinct species.

## 8. ASTERIAS sp.

A few specimens of a small Asterias with five arms were dredged in about 7 fathoms, on a pebbly bottom, off Port Clarence. They undoubtedly belong to the genus Asterias, but the species is not determinable with any means at my command.

## 9. LEPTASTERIAS ARCTICA (Stimpson).

On Point Franklin, in 13½ fathoms, we dredged large numbers of a small starfish which cannot be distinguished from a dried specimen in the National Museum, brought from Bering Strait by the North Pacific Exploring Expedition and labeled in Dr. Stimpson's handwriting Asterias arctica yar. a. I have been unable to find a published description of this species.

The size and position of the papulæ on the back and sides of the arms show that it belongs to Verrill's genus Leptasterias.

The following is a description of the species: Rays five, rounded above, clongated, tapering regularly to the tips. Radia as 1:3.5. Disk small, its radius about equal to width of ray at base. Interambulaeral spines round and slender with rounded tips, usually two to each plate. No small spines between these and the ventral spines. Ventral spines form a double row of alternating spines, of which the upper are the smaller and the lower are larger and stouter than the interambulaerals. Lateral spines rather slender, forming a single row. No well-marked dorsal row, though the spines in the middle of the arm are rather the larger. The dorsal spines are short and stout, with rounded, almost capitate, tips. The spines of the disk are rather smaller than those of the arms and are arranged irregularly. The major pedicellariae could not be well made out, but appeared to be lanceolate and not numerous. The minor pedicellariae form close wreaths around the spines.

Diameter of the largest specimen about 75mm.

## 10. CRIBRELLA SANGUINOLENTA (Mill.) Ltk

Year.	Name.	Citations.
	Asterias sanguinotenta, O. F. Müller	
1780	Asterias spongiosa, O. Fabricius	Fauna Gra-nlandica, 363.
1851	Echinaster Eschrichtii, Brandt	Stbirische Reise, ii, p. 32.
1857	Cribrella sanguinolenta, Lütken	Vidensk, Meddel., p. 31.
1861	Echinaster ganguinolenta, M. Sars	Oversigt at Norges Echinodermer, p. 81.
1871	Cribella sanquinolenta, Liitken	Vidensk, Meddef., 23, p. 307.
	Cribella sanguinolenta, Liitken	
		Oefv. of K. Vetensk. Akad. Förhandl., 35, p. 32.
1889	Echinastee ganquinolentus, Stuxberg	Vega Exp. Vetenak, Inkt., i. pp. 707, 708, 713,

One large specimen and a number of very small ones were dredged off Point Franklin, but none were obtained elsewhere.

The species has been recorded from the eastern coast of North America, from Nantucket Shoals to Labrador and Greenland, and southward on the European coast to Norway and Great Britain, also from Nova Zembla, Spitzbergen, the Arctic Ocean north of Bering Strait, and the Sea of Ochotsk (Brandt teste Lütken, op. cit., p. 62).

# 11. CROSSASTER PAPPOSUS (Phipps: Miill, and Tr.

Year.	Name.	Citations.
1780   Asterias   1824   Asterias   1844   Asterias   1840   Crossash   1842   Solaster   1857   Solaster   1871   Solaster   1871   Solaster   1875   Sol	pappower, Stuxberg	Fauna Grænlandiea, p. 369.  Supplementary Appendit to Capt. Parry's Voyage, p. cexxil.  Prodr. Descrip, p. 271.  Prodr. Descrip, p. 271.  Prodr. Descrip, p. 271.  System der Asteriden, p. 26.  In Sutherland's "Journal of a Voyage, &c.," ii, App., p. cexiv.  Vidensk, Meddel, p. 40.  Oversigt af Norgea Echinodermer, p. 76.

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A good many were found washed up on the beach after the great gales in the autumn of 1881, and a few were afterwards picked up during the season of open water of 1882. Three small specimens were dredged in 13½ fathoms off Point Franklin.

The species has been recorded from the eastern coast of North America (Massachusetts Bay to Greenland), Iceland and the Faroes, Scandinavia to the English Channel, Nova Zembla, Spitzbergen (Phipps and Lütken), and Bering Strait (Brandt).

12. SOLASTER ENDECA (Lin.: Forbes.

Year	Name.	Catualous.	
1800 (1853 1857 (1861	Asteriar ender t. Liuné Act vines a diese was decemendiata, Brandt. Solsties ender f. Forbes. Solsties ender t. Stimpson. Solsties ender t. Stimpson. Solsties ender M. Stars Solsties ender M. Stars Solsties ender M. Stars Solsties ender M. Stars	Profromus Descr., &c., p. 271.  Memoirs Wernerlan Society, viii p. 121.  Marine Invertebrata of Grand Manan. p. 14.  Vidensk, Meddel, p. 35.  Oversigt af Norges Echinoderner, p. 75.	

A few were washed up on the beach, after the gales in the autumn of 1881. No more were seen till the rich haul off Point Franklin, August 31, 1883, when three good-sized specimens were taken

The species has been recorded from Greenland south to the Gulf of Maine, and from Iceland, the Färöes, Finland, Norway, and on the British coast to the south of Ireland; also from Sitka (S. endeca var. decemradiata Brandt).

# OPHIUROIDEA.

#### 13. OPHIOGLYPHA SARSII (Lütk.) Lyman.

-			1
Year.	Nation	Citations.	,
1854 1857 1858 1861 1865 1866	Ophica (carrol et e. cir. ), Lathen Ophica sursel, Lättlen Ophica sursel, Lättlen Ophica sursel, M. Surs. Ophica (carrol), M. Surs. Ophica (carrol), Linnuman	Valensk Meddel, p. 161. Vidensk Meddel, p. 19. Additamenta ad Historiam Ophiuridarana, p. 42. Oversigt af Norgee Kebinodermer, p. 23. Hinst, Cat. Mus. Comp. Zoff., fp. 44, figs. 2 and 3. Ophiuridden vivertin hucusque cognita. Octy. af K. Vetensk Akad. Förbandl. xxxi8, p. 367.	1
1871 1875 1878 1878 1882	Ophioglypha sarsii, Lütken Ophioglypha sarsii, Lütken Ophioglypha sarsii, v. Marenzeller Ophioglypha sarsi, Stuyberg Ophioglypha sarsi, Stuyberg	Vidensk, Meddela, syanapi 507	į

A large and dark-colored form of this species was found very abundant off Point Franklin in 133 fathoms.

The species has been recorded from New England, Gulf of St. Lawrence, Labrador, Greenland, England, Norway, Spitzbergen, Nova Zembla (and between Nova Zembla and Franz Josef Land during the drift of the Tegethoff), and as far east as longitude 65° 20′ east (Kara Sea), also from the sea of Ochotsk (teste Ljungman).

## 14. OPHIOGLYPHA ROBUSTA (Ayres) Lyman.

Year, No. 10. Cutations.	
Charles.	
Prac. Bost, Suc. Nat. Hist., iv. p. 134   Prac. Bost, Suc. Nat. Hist., iv. p. 134   Prac. Ophicae extended	THE COMMENTS OF THE PERSON OF

This species was dredged in very great abundance off Point Franklin in 134 fathoms. Some individuals have the papillae of the arm-comb obsolete.

The species has been recorded from New England, the Gulf of St. Lawrence, Labrador, Wellington Channel, Greenland, the Faroes, the Shetland Islands, England, Denmark, Norway, Spitzbergen, Nova Zembla (and to the northward during the drift of the Tegethoff), and the Kara Sea as far east as longitude 65° 20' east.

#### 15. OPHIOGLYPHA NODOSA (Ltk.) Lyman.

Year.	Name.	Citations.
1858 1865 1866 1871 1875 1878	Ophioglypha nodosa, Lätken	Vidensk, Meddel., p. 51. Addit at Hist. Onla, p. 48. Hinst. Cat. Mus. Comp. Zoid., l. p. 49 Oriy, af K. Vetensk, Akad. For handl., xxxill, p. 308. Vidensk, Meddel., xxil, p. 307. (Nominal hat) Arctic Manual, p. 185. Oriy, af K. Vetenske, Akad. For hundl., xxxv, p. 34.

One good-sized specimen was obtained on the muddy bottom just outside the grounded ice in 15 fathoms, August 8, 1883, and one or two small ones near the station in 24-3 fathoms. Twenty-five small specimens were obtained in the rich haul off Point Franklin August 31, 1883.

The color of this species when alive is a bright crimson above and white underneath.

It has been recorded from Newfoundland, Greenland, and Spitzbergen, and the Swedish expeditions obtained it at various points along the northern coast of Siberia from Nova Zembla to the Vega's winter quarters.

#### 16. OPHIOPHOLIS ACULEATA (Retz.) Gray.

Year.	Name.	Citations.
1780 1840 1842 1848 1851 1857 1858 1861 1871 1875 1878	Ophiopholis sodopendrica, Littken Ophiopholis aculcuta, Littken Ophiopholis aculcuta, Littken Ophiopholis aculcuta, M. Sars Ophiopholis aculcuta, Littken	Asterius Genera, p. 246. Wiegman's Archiv, Jahrg. c., i. p. 328. 8) stem der Asterichen, p. 96. Radiated Animals of the British Museum, p. 25. Vidensk Meddel., p. 103. Vidensk Meddel., p. 103. Additt ad Hist. Oph., p. 1, p. 60, pl. li, figs. 15, 10. Oversigt af Norgos Echlinodermer, p. 14. Oversigt af Norgos Echlinodermer, p. 14. Oversigt af Norgos Echlinodermer, p. 14. (Nominal Pal Arctic Manual, p. 185. Vidensk Meddel, xxili, p. 307. (Nominal Pal Arctic Manual, p. 185. Denkselv, d. K. Akad, d. Wisse, xxxv, pp. 359, 385. Oety, af K. Vetensk, "Akad, Grithandl., xxxv, p. 36.

We found this species very abundant and of large size off Point Franklin in 13½ fathoms. The specimens brought home are indistinguishable from O. aculeata from the New England coast, except for the fact that the small deciduous spines on the dorsal surface of the disk are a trifle larger and more numerous, and the skin round the mouth and on the under surface of the arms appears a little thicker.

This occurrence indicates a circumpolar distribution for the species. It would have been natural to suppose that the allied Pacific-coast species, O. Kennerlyi Lyman, would be found extending up from the temperate regions into the Arctic Ocean, as O. aculeata does on the Atlantic side.

The occurrence of this Atlantic form in this part of the Arctic Ocean may be compared with the occurrence at Point Barrow of two species of birds (Pelidna subarquata and Actodromas fuscicollis) heretofore supposed to be confined to the eastern coast of the continent.

O. acadeata occurs abundantly on the coast of New England, Newfoundland, the Gulf of St. Lawrence, Labrador, Greenland, Iceland, the Faroes, Norway, the Baltic, the British Islands, Spitzbergen, Nova Zembla (and north towards Franz Josef Land), and the Kara Sea as far east as longitude 65° 35′ east. (Swedish Expeditions.)

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# 17. ASTROPF YTON sp.

While we were fishing for cod in about 18 or 20 fathoms off the East Head of Plover Bay, Eastern Siberia, on the voyage up in 1881, the books brought up several fragments of arms and two small, complete individuals of a species of *Astrophyton* of a bright orange red.

As the alcohol was out of reach in the hold, I endeavored to preserve these specimens dry, but they were unfortunately lost in the confusion of landing and building our house in unfavorable weather.

# ANTHOZOA.

## ALCYONARIA.

#### ALCYONID E.

#### 1. ALCYONIUM RUBIFORME Dana.

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Year.	Name.	Citations.
1855 1846 ( 1863 1865	Alegonium rubiforme, Verrill Peroname rul forme, Verrill	Zoöphytes, U.S. Exploring Pyp dition, p. C25. Mem. Bost. Society Nat. Hist., i. p. 4. Proc. Essey Inst., iv, p. 190.

This species was found washed up on the beach in considerable numbers after gales of wind, while the sea remained open. It was dredged in great abundance on the rich ground west of Point Franklin, in 13½ fathoms. Two small specimens were obtained on a pebbly bottom off Port Clarence, in 7½ fathoms. September 4, 1883, and one large and very pale specimen same from a similar bottom at the head of Norton Sound, in 5 fathoms. We also obtained this species on our fishinglines when catching codifish in about 25 fathoms of water off the entrance to Plover Bay, Siberia, Its color when fresh is a bright strawberry red.

The species has been recorded as occurring in the Arctic Ocean north of Bering Strait, and on the west coast of the strait (North Pacific Exploring Expedition), also Semavin Strait (Brandt). It also occurs on the banks of Newfoundland, where it is known to the American fishermen as "sea strawberries," according to Capt. J. W. Cohins, of the U. S. F sh Commission, and in the Northern seas of Europe.

Aleyonium sp., mentioned in the Vega-Expeditionens Vetenskapliga lakttagelser, i, as occurring in the Siberian Arctic Ocean, probably refers to this species.

## ACTINARIA.

# ACTINIDÆ.

## 2. URTICINA CRASSICORNIS Ehr.

W	37	AND ADDRESS OF THE PARTY OF THE
Year.	Name.	Citations,
1780 1806 1931 1847 1853 1864 1869 1869 1869	Actinia Lawrenti, Brandt Rholactinia Davisia, Agassic, Acti la obtrimeda and carneola, Stimpson Rholactinia Dorisia, Verrill Urticina crassicernia, Verrill Urticina crassicernia, Verrill Actinia (Urticina) crassicernis, Lutken.	Rauna Greenlandica, [55].  Zord Danies, v. p. 24 (pd. 5).  Cordlen des Rothen Meeres, 4  Prodromas Descr. Anim., &c., p. 13  Op. cd., p. 15.  Op. cd., p. 15.  Cometes tendus, xxxv, p. 677.  Invert Grand Manan, p. 7  Meta, Bod. Soc., Nat. Hist., p. 18, pl. 5.  Synopsis of the Polypyand Cords of the North Pacific E cpl. Exp., Part. i. v., p. 26 (from Proc. Essee Thes., v.)  Notes on Radiata, from Trans. Conn. Acad. Arts and Sci., i. p. 469  (teprint 184)-70.

The large sea anemones brought home by the expedition belong, in all probability, to this species, as well as can be made out from alcoholic specimens. The color, when living, varied from bright orange-red to crimson, frequently in splashy stripes on a paler ground.

Large numbers were washed ashore during the great gale<sup>c</sup> in the autumn of 1881, and they were occasionally picked up on the beach during the season of open water of 1882. They appeared to be rather plenty on what was called the "fishing-ground," a place about two miles from the shore, where the natives were catching polar cod through the ice in 10 to 15 fathoms of water. A few large ones were dredged off Point Franklin, in 134 fathoms.

This species is circumpolar in its distribution, and is recorded from Greenland, Norway, Iceland, England, the east coast of North America as far south as Cape Cod, Bering Strait, Sitka, Puget Sound, and the Arctic Ocean between Nova Zembla and Franz Josef Land.

# Subfamily PHELLINÆ.

## 3. ? PHELLIA ARCTICA Verrill.

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Ye	r. Name.	Citations.	
- 1			
18	Phollin arctica Vorrill	Proc Force Inct. vol. v. n. 220	i
18	Production Victoria	Proc. Essex Inst., vol. v, p. 328. Notes on Radata, p. 490 (from Trans. Conn. Acad. Arts and Scl., i), (reprint 1869–70).	
18	Rectif directed, Verrin	i], (reprint 1869-70).	

Several specimens of a rather small polyp, with a rough thickened epidermis and covered with grains of sand, were dredged off the station, in from 2½ to 5 fathoms, especially on the patches of mad and sand mixed.

All the specimens have the disk and tentacles retracted, and are much shrunk in the alcohol, so that identification is practically impossible.

They are very likely to belong to this species, which was described by Verrill from a single specimen brought home by the North Pacific Exploring Expedition from the Arctic Ocean north of Bering Strait, in 30 fathoms of water.

A species of *Pheilia*, which is probably the same as this, was obtained by the Austro-Hungarian Expedition, in 1873, during their drift between Nova Zembla and Franz Josef Land.

A third species of Actinoid polyp also occurred on the beach in large numbers among the large sea apemones. Specimens were obtained, but were spoiled in the attempt at preservation. In contraction, it appears to be devoid of a sucking disk at the base, and takes a spherical form. The color is white and translucent like pure parafine, and the radiating septa are visible through the walls, giving it the appearance of a large gooseberry.

# HYDROZOA.

My drawings of Medvsw observed near Point Barrow, with the notes I made concerning them have been referred to Mr. J. W. Fewkes, of the Museum of Comparative Zoology, Cambridge, Mass., who has kindly examined them, and presents the following report:

LIST OF THE MEDUSÆ FROM NEAR POINT BARROW, ARCTIC OCEAN.

By J. Walter Fewkes, Ph. D.

## CTENOPHORA.

Beroë roscola (sp. Ag.). Mertensia orum Mörch. Pleurobrachia rhododactyla Ag.

# DISCOPHORA.

Aurelia labiata? Cham, et Eyren. Cyanca Postelsii? Br. Chrysaora melanaster Br. Large Discophore, "rich blue violet" in color.

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### TRACHYMEDUSA.

Ægina citrea Esch. Aglantha Camtschatwa Haeck. (sp. A. Ag.).

# HYDROIDA (GONOPHORES).

Gemmaria?

Melicertum sp. ?

Sarsia vosaria Haeck.

Staurophora Mertensii? Br.

Medusa vesembling Turris.

## Chrysaora melanaster BEANDI

Umbrella flat, disk-shaped; radius, a little more than height; diameter, 1 foot. Aboral surface marked with 16 radial stripes of brownish color; 32 marginal lobes, each rounded and destitute of marginal teeth. Sense lappets slightly broader than the tentacular. Oral arms 4 in number; length, 3%; stout at common origin, tapering to pointed extremity, and abundantly fringed with folds on inner margin. Sense bodies, 8. Tentacles, 24; length, 3%. There are 3 tentacles between each pair of sense bodies. Color, bell, mouth-arms, light brown; radial stripes of the umbrella darker; tentacles, dark brown; frills on the oral arms, reddish. Locality, Pomt Barrow. Taken in August, 1883.

From the colored sketches it is not difficult to distinguish this species as *C. melanaster*. Of other species which the drawings resemble might be mentioned the closely-allied *C. helcola* Brandt. They differ from the latter in not having teethed marginal lappets, in the tentacles being shorter (in helcola they are as long as the mouth-arms), and in the colors. The colors agree more closely with those of *C. melanaster* than of helcola. There are, however, several differences. The varieties of color in *C. mediterranea* from different localities have been described by Haeckel, and, considering the great variation which he has shown to exist in the same species, we must not lay any great stress on differences of color as a distinguishing feature of different species of *Chrysaora*.

The species (C. melandster), according to Brandt, is never "less than a foot in diameter" (meaning, of course, the adult). Mr. Murdoch's drawings, therefore, represent small, perhaps young, specimens. The sixteen accessory, small, marginal lappets, which in older forms differentiate themselves from the sixteen ocular lappets, are not represented in the drawings. We may account for their absence from the youth of the specimens drawn.

#### Water attend Dame

Since the original description of this species by Eschscholtz in 1829 it has never been reobserved. The locality from which the specimen which he described was taken is 34° N. lat., 201° W. long., North Pacific.

Eschscholtz described two species of £gina, A. rosca and A. citrea. The £gina collected by M1. Murdoch resembles more closely the descriptions of the latter.

Alexander Agassiz, in "North American Acalepha," described from Nahant, Mass., a new genus of hydroid jelly-fishes, which he called Campanella (sp. pachyderma); this genus is referred by Haeckel to Ægina, under the name of A. pachyderma. The anatomy of Campanella is very different from that of Ægina, and unless, with Haeckel, we regard these differences, following Alexander Agassiz's descriptions, as "Beobachtungs fehlern," we can hardly look upon the two as belonging to the same genus. If Campanella is generically different from Ægina, it is necessary to substitute the name Æginaria Haeckel for it, since, as Haeckel has well observed, Campanella was applied in 1820 to an Infusorian. A new description is necessary before we can certainly know that Æginaria is generically different from Ægina.

Of other species of \*Egina, A. rhodina Haeck, and A. Canariensis Haeck, were found in the Canaries, and A. Eschscholtsii Haeck, in the Azores. The six known species, according to Haeckel, "gehören sämmtlich der wärmeren Zone der nördlichen Erdhälfte." Mr. Murdoch's observation of A. citrea in the Arctic Ocean shows, however, that the genus has a wider distribution as far as

temperature is concerned. Considering, as Haeckel does, that "Campanella" is a species of Egina, his remarks on its limitations in distribution do not hold, for the distribution as known when "Das System der Medusen" was written. The only locality where "Campanella" has been taken is Nahant, Mass., which certainly is washed by cold waters and belongs to the colder zone. It is a significant fact that "Campanella" has never been taken in the bays south of Cape Cod, where the water is much warmer. The meduse of Massachusetts Bay are those characteristic of colder waters, while those of Narragansett Bay, which is south of Cape Cod, belong to the warmer zone of the North Atlantic. "Campanella" is found in the colder waters, and systematic fishing for a number of years in the latter locality has never brought it to light.

Locality.-Cape Smythe, Alaska.

Aglantha camtschatica HAECK.

The figures add a little to our knowledge of this species. Alexander Agassiz, in his description (North American Acalephae) of the same from Galiano Island, Galf of Georgia, says there are from 40 to 48 tentacles. Mr. Murdoch's notes record "96 tentacles." The "three-lobed manubrium," mentioned in the same notes, must have been observed in an abnormal specimen (normally there are never less than four lobes).

TIME OF YEAR WHEN JELLY-FISHES MENTIONED IN THE LIST ABOVE WERE TAKEN.

B. roseola, March 7, July 18.

M. ovum, August 2.

P. rhododactyla, July 18 (in all stages of growth).

A. labiata, August and September.

C. Postelsii, August to September 15, January 7, February 6.

Ch. melanaster, August 11 to October 13.

A. citrea, February 27 to May 31.

Ag. Camtschatica, July 18.

Gemmaria, August 2.

Melicertum, May 24.

S. rosaria, March 9, April 26,

St. Mertensii, August and September.

Turris like Medusa, March 13.

# HYDROZOA.

# HYDROIDA (Trophosomes).

The Hydroid Medusae observed by the expedition have been described above by Mr. Fewkes. The following species of Hydroids are represented in the collection by their trophosomes.

## 1. SERTULARIA VARIABILIS S. F. Clark.

-			
Year.	Name.	Citations.	
1876	Sertularia variabilis, S. F. Clark	Scientific Results of the Exploration of	Alaska, i, p. 17, pl. viii,
1		tigs, 40-48, pl. ix. tige, 49, 50.	
			I

One large cluster and some fragments were diedged on a pebbly bottom in 5 fathoms near the head of Norton Sound.

Clark has described the species from various points on the coast of Alaska, both from among the Aleutian Islands and from Bering Sea.

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#### 2. SERTULARELLA TRICUSPIDATA Hincks.

Year.	Name.	Citations.
1874	Sertularella tricuspidata, Hincks Sertularella tricuspidata, Kirchenpauer Sertularella tricuspidata, Lütken Sertularella tricuspidata, S. F. Clark	(Nominal list) Arctic Manual, p. 190.

This was dredged in very great abundance off Point Franklin, in 134 fathoms.

It has been recorded from the Aleutian Islands and the Shumagins, and also from Greenland,

#### 3. THUIARIA CYLINDRICA S. F. Clark.

Year.	Name.	Citations.	
1876	Thuiaria cylindrica, S. F. Clark	Scient. Ros. of Expl. of Alaska, i, p. 22, pl. x, fig. 57.	1

Several specimens of a *Thuiaria* were dredged off Point Franklin in 13½ fathoms, which I refer with some doubt to this species.

It differs from Clark's types in the National Museum in having the longitudinal rows of hydrothecae less obvious, and the apertures of the hydrothecae directed alternately in opposite directions.

This species was originally described from the eastern shores of Bering Sea.

# 4. TUBULARIA sp.

A good-sized species of *Tubularia*, closely resembling *T. indivisa*, but apparently having more numerous oral tentacles, and of a bright crimson color, both stem and head, was quite abundant on the patches of mud and sand mixed, close to the station, in 24 to 3 fathoms of water.

# TUNICATA.

#### Ascidiacea.

#### ASCIDIA: SIMPLICES.

# 1. ? BOLTENIA sp.

Several large *Boltenias*, in form closely resembling the ordinary *B. bolteni* of the Atlancic coast, were found washed up on the beach October 13, 1881, after a heavy westerly gale. They were a brilliant red in color.

The same (?) species was also dragged up by the cod-lines in about 18 or 20 fathoms of water off the mouth of Plover Bay, Eastern Siberia.

#### 2. º MCLGULA sp.

A small round Ascidian, always covered with sand, and probably a species of Molgula, was dredged in considerable numbers on the patches of mud and sand mixed, in about 2½ fathoms, close to the station.

## 3. HALOCYNTHIA PYRIFORMIS (Rathke) Verr.

Year.	Name.	Citations.
1780 1788 1842 1871	Ascedia pyriformis, Möder	Faun, Greenl., 322 (teste Lütken).  Nova Acta Petropolitana, ii, p. 246, pl. vii, fig. 38.  Nat. Tids., i R., iv, p. 95.  American Journal of Conchology, vii, nt. 2, p. 157.

A single rather small specimen of this species was picked up on the beach near the station. Mr. Dall found it of large size and brilliant coloring at Plover Bay, Eastern Siberia, and at Petropaulovsk, Kamtschatka.

It is recorded on the eastern coast of North America from Massachusetts Bay to Greenland, and also from Norway.

Pallas (loc. cit.) records it from the Kurile Islands, but the specimens of *Lophothuria fabricii*, in association with which this species was brought to him, are believed to have come from St. Paul's Island. Bering Sea.

#### THALIACEA.

#### 4. ? SALPA HERCULEA Dall.

Year.	Name.		Citations.	
[ 1871   Salpa he	reulea. Dall	American Journ	al of Conchology, vii, pt. 2, p. 158.	

As we approached the Aleutian Islands in August, 1881, we observed many enormous solitary Salpw, 4 or 5 inches in length.

Judging by their size and the red color of the viscera, they probably belong to the species provisionally described by Mr. Dall as above.

# LARVACEA.

#### 5. APPENDICULARIA sp.

From August 8 to 15, 1883, the water swarmed with myriads of a large Appendicularia floating backwards and forwards with the tide. The animals were extricating themselves from their "houses" and swimming free. The discarded "houses" continued to drift about for days, and were washed up on the beach in windrows.

# POLYZOA.

The study of the Polyzoa brought home by the expedition has been attended with great difficulty on account of the absence of identified material in the National Museum for comparison.

i have been able to make out three species, which were preserved in alcohol. They are as follows:

## CHILOSTOMATA.

#### 1. GEMELLARIA LORICATA (Lin.) Busk

Year.	Name.	Citations.
1758 1867 1875 1878 1878	Gemellaria loricata, Litken	Octv. af K. Vetensk-Akad. Förhandl., xxiv, p. 286, pl. xvii, fig. 54.

One large cluster was found washed up on the beach near the station.

It has been recorded from the Baltic, Norway, Spitzbergea, Greenland, England, the Gulf of Saint Lawrence, New England, Nova Zembla, and northwards towards Franz Josef Land during the drift of the Tegethoff.

## 2. FLUSTRA PAPYREA (Pall.) Smitt.

Year.	Name.	Citations.
1867 1875	Flostra pappiracco Lutken	Octv. af K. Vetensk-Akad. Förhandl., vxiv, p. 359, pl. xx, flgs. 9-11.

This species occurred in very great abundance off Point Franklin, in 132 fathoms,

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tion. etroIt has been found on the eastern coast of North America north of Cape Cod, in Greenland, the Mediterranean (*teste* Smitt), and the Atlantic from the British islands to Spitzbergen and Nova Zembla.

#### 3. LEIESCHARA SUBGRACILIS (D'Orb.) Smitt.

Yea	. Name.	Citations,		
! 178 1 186	Muriozogu suberacile, Packard	Can. Natur. & Geol., viii, p. 411, pl. ii, fig. 5.		
186	Myriozona subgracile, Littken	Octv. af K. Vetensk Akad. Förhandl., xxiv. Bihang, p. 18. (Nominal list). Ateric Manual, p. 140. Denkschr. d. K. Akad. d. Wiss., xxxv. p. 289.	İ	
187 187 188	Leieschara subgracilis, Smitt	Octy, of K. Vetensk, Akad, Förhandl, xxxy, No. 3, p. 20, Vega-Exp. Vetensk, lakt., i, pp. 697-706 (passim).	1	

This was very abundant off Point Franklin. It has been previously obtained in Labrador, (Packard), Greenland (Fabricius and Lütken), Spitzbergen, and Nova Zembla (Swedish expeditions), and north of Nova Zembla towards Franz Josef Land (Austro-Hungarian Expedition).

Membranipora sp. and Discopera? sp. were found incrusting the dead gastropod shells that washed up on the beach.

At least two other other species of Polyzoa, which at present cannot be determined, were dredged off Point Franklin.

## PORIFERA.

At least three large species of sponges, one (probably) keratose and two (or three !) silicious were dredged off Point Franklin.

They were all obtained in considerable abundance, and are in a good state of preservation, but are quite indeterminable with the resources at my command. They will have to be reserved for future special study.

SUMMARY OF CRUSTACEA AND PYCNOGONIDA.

Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.	Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.
Chimnes et.s optio Hyas latifons Eopagurus trigonocheitus Eopagurus trigonocheitus Eopagurus trigonocheitus Eopagurus trigonocheitus Eopagurus splendesens Cheraphilus noreas Nectoerangon lar Crangon vulgaris Hippolyte fabricii Hippolyte gaimardii Hippolyte spinus Chimadylis spinus Areturus hyatis Chiridotea entomon Chiridotea satonei Synidotea bi uspida Hyperia mediasarum Themisto libellula Eurytenes gydlus			4	0 0	Rhachotropes aculeria Rhachotropes aculeria Acanthotelpheli matingreni Paramphithoe pariopla Acanthotelpheli matingreni Paramphithoe pariopla Acanthozone polyacantha Atylus swammerdamii Gammarus locu ta Melita formosa Melita lounis Gammarus locu ta Melita formosa Melita lounis Gammarus locu ta Dulichia atretea Lepidurus glacinis Branchinerta paludosa Polyartemia hizeni Balanus 'potr atus Polyartemia hizeni	4 4 4 4 4	4		The second secon
Onisimus litoralis. Stegocephalus ampulla Eusirus cuspidatus		•			Total, Crustacea, 44	20	21	1 0	6

NOTE.—The locality (Point Barrow) includes the beach and sea near the station, Elson Bay, and the fresh-water ponds of the tundra.

Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.	Species,	Point Barrow.	Point Franklin.	Port Clarence.	Norten Sound.
Polymos scabra Polymos islandica Polymos islandica Polymos sarai, Melaenis loveni Phyllodoce granlandica Phyllodoce granlandica Castatia multipapiliata Autolytus sp	**	4 4		Tonocon and a supplementary of the	! Arleia arclica. Cravisia forbea Arenicola glacialis. Brada grauninta Maldanie sup. Echiusis viguris Phaseolooma sp.  "gitta sp.  Total, 20	18	2	()	1

#### SUMMARY OF ECHINODERMS

Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.	Plover Bay, Si-	Species.	Point Barrow.	Point Franklin	Port Clarence.	Norton Sound.	Plover Bay, Si- beria.
Pertacta frondosa Lophothuria fabricii Myriotrochus rinkii / Trochostoma boreale Strong/locentotus diöl casis. Asterius acervata / Asterius violucea Asterius acervata Leptasterius arctica	bachi	*		* * *		Cribrella sanguinolenta Crossaste papposis Solaster endeca Solaster endeca Ophiologlypha rodosa Ophiologlypha nodosa Ophiologlypha nodosa Ophiopholis aculeata Astrophyton sp	:	*	2	3	21

<sup>&</sup>lt;sup>1</sup> Dragged up on cod-lines.

#### SUMMARY OF ANTHOZOA.

Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.	Plaver Bay, Si-	Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound. Plover Bay Si.	
Aleyonium tubiforms Urtheina crassicornis Phellia sp	*	*	1 .	1 7	ı	f	. 4	1 2	1	1 1	-

<sup>\*</sup>Dragged up on cod-lines.

## SUMMARY OF HYDROZOA.

Species.	Point Barrow.	Point Franklin.	Port Clarence.	Norton Sound.	Species.	Point Barrow.	Point Franklin.	Port Clarence.	1 1 ,	Norton Sound.
Beroë roseola Mettensia ovum Pleurobrachia rhododactyla Autelia lubiata / Cyanca postelsii / Chrysaora melamaster Ægina citra Aglantha camtschatica Gewmaria / sp. Tubularia sp.	* * * * * * * * *	4		*	Melicertum / sp. Sarsia rosaria Stanuophora mertensii / Turris / sp. Sertularia variabilis Sertularia variabilis Sertularia turia / sp. Thuiaria cylindrica  Total, 17	14	 3	- 0		28

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SUMMARY OF THAICATES

Species.	Point Earrow.		Point Frankus.	Port Clarence.	The state of the s	Norton Sound.	 Plover May, Si- beria	-	North Pacific.2		Specius.	Point Barrow.		Point Franklin.	 Port Clarence.		Norton Sound.	Piover Bay, Si- beria.	North Pacific.2	
Boltenia sp / Molgula sp		,					*	1		,	? Salpa hercufea	*	1			1				٠.
Halocynthia pyritormis Chelysonia macleaya- num			*		ı					í	Total, 6	4	:	1	9		0	1	1	

1 Dragged up by cod-lines. 2 Gulf of Alaska

#### SUMMARY OF POLYZOA



3 Dragged up on coddings

in the foregoing report I have endeavored to make the synonymy of the species as complete as possible for references to works on arctic and boreal zoology, and have generally confined myself to such references.

The following list does not undertake to be a complete bibliography of the subject, but contains the most important works, chiefly on arctic or boreal zoology, which I have been able to examine myself. They are arranged charpologically.

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- Benn, T. H.: Fishes.
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- Dall, W. H.: Mollasks.
- Insects:

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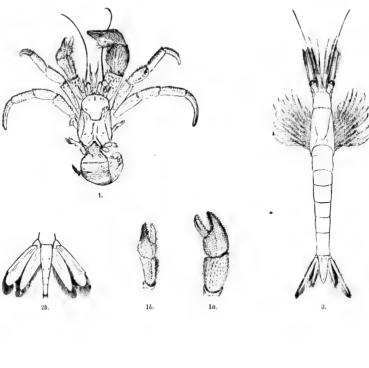
## MARINE INVERTEBRATES.

## PLATE I.

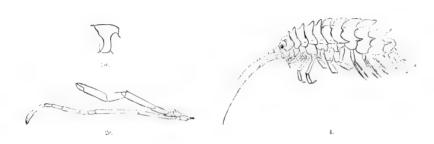
## CRUSTACEA.

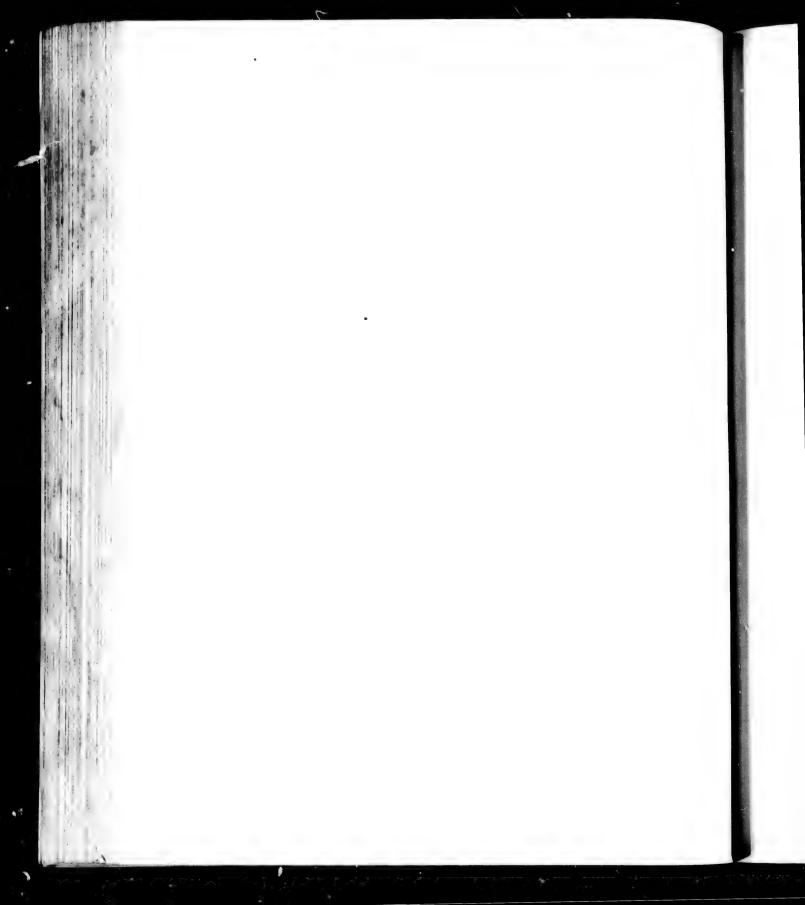
- 1. Eupagurus trigonocheirus Stimpson. 1.
  1a. Same. Right hand. †.
  1b. Same. Left hand. †.
  2. Pandalus dapifer, n. s. 2. †.
  2a. Same. Third pleonal segment of \$\delta\$. †.
  2b. Same. Telson and uropods. †.
  2c. Same. First and second thoracic legs. †.
- 3. Mysis rayii, n. s. ‡.
  4. Acanthozone polyacantha, n. s. ‡.

(Drawn from nature by J. Henry Blake.)











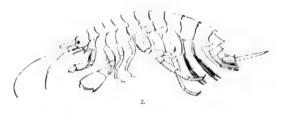
## PLATE II.

crustacea

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(Drawn non-nature by J. Henry Blake,)







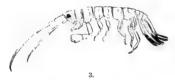
















## VI.-REPORT ON THE MOLLUSKS.

By W. H. DALL.

Opportunities for collecting mollusks are not very good at this northernmost point of the United States. The shores are covered with snow during a large part of the year, and the waters with ice. The latter is frequently grounded and driven upon the beach or over the shoal water adjacent to the beach, so that mollusks must find it a rather disagreeable station to inh, bit, provided they can secure themselves against freezing or crushing. There are no fresh-year stells, though it is probable that a few species occur at a not very great distance inland. The shape is composed of sand and gravel, which is constantly undergoing minor changes. There are few reaweeds, and the phytophagous littoral mollusks, so abundant at most stations more to vorably situated, are altogether absent. There are some places along this stretch of coast where arong currents meet and ice seldom grounds; where eddies permit the deposition of a moderate amount of mud and occasional small seawceds manage to exist, anchored on little pebbles or ridic 2 on the backs of crabs. In such places mollusks abound, individuals, if not species, being numchast. One such locality is well known as a good dredging ground, namely the vicinity of the Seahorse Islands or Cape Franklin, from a couple of hauls near which the best part of the present collection was obtained. A few additions were made to the list in Norton Sound, Unalashka Harbor, &c., but the opportunities for dredging or surface-collecting were not abundant. Considering the disadvantageous circumstances, the naturalists of the party must be commended for their energy and success.

#### SPECIES COLLECTED.

### CEPHALOPODA.

Octopus grænlandicus (Dew.) Mörch.

A fine specimen on the beach near the station. This has been examined by Professor Verrill, who agrees with the writer as to its distinctness from the *O. punctatus* Gabb, so common further south. Museum number, 40953.

#### PTEROPODA.

Limacina Pacifica Dall.

On the surface of the water off the station in July, 1882. Collectors' number, 650; museum number, 40954. This pretty species, which is very much larger than the Atlantic form, was originally described from the North Pacific.

#### GASTROPODA.

## PULMONATA.

Cochlicopa lubrica Müller.

Cionella subcylindrica Lehnert, Science Record, vol. ii, No. 8, p. 172, Boston, June 16, 1881.

Two specimens in moss from the tundra near Uglaämi.

Zonites (Conulus) Stearnsii Bland.

Hyalina arctica Lehnert, J. c., p. 172.

Ten or twelve specimens from the tundra moss. This has been erroneously referred to the genus or section *Microphysa*.

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177

Zor ves. Hvalina radiatula Alder.

Hyalion pethacida Lehnert, L. C.

Three or four specimens with the preceding.

The above were obtained from moss used in packing and rejected as rubbish, which was examined by the Rev. E. Lehnett, of Washington, who published in Science Record an interesting list of plants obtained from it, together with a spider, a minute beetle, and the above-mentioned shells By the kindness of Mr. Lehnert they have been carefully compared with authoritative specimens, and he joins in the identification above made.

Bela (exarata Woller).

This specimen is too dead and worn to be determined with certainty. It was obtained by dredging 10 miles west from Point Frauklin August 31, 1883, in 131 fathoms. Museum number, 10955.

Bela - scalaris Meilet . .

This specimen was in much the same state as the preceding. It was dredged in Norton Sound in 5 fathous mad. Museum number, 40956,

Belt simplex Vidos donn

Legal at A. Adames

Research Verkruser

One dead but perfect specimen from 5 fathoms mud and sand at Cape Smythe. This species has been confounded with B, larginata Dall, which is about one-eighth as large when adult, and altegether different in color and form. B. larigata has hitherto only been found in Norton Sound, where it is abundant. B. simplex has not yet been found in Norton Sound, but has a wide distribution in the boreal and Arctic region, reaching as far south as Chirikoff Island in the North Pacific, It has been obtained on the northern shores of Norway, and is not rare in Bering Sea. The present specimen is uni-colored, but it is usually prettily contrasted with white on the spire and plum-color anteriorly. Museum number, 10957,

Bela tenuilirata Pa-

Bela var, tenado ata, Dall, Am, Jonen, Conch., vii, p. 98, November, 1871 B. simplex, G. O. Sars, Moll. Reg. Arct. Nov., t. 17, f. 4, 1878, not of Middendorff.

This species, distinguished from the preceding by its spiral striae and thinner shell, was originally described from a young specimen obtained in Norton Sound. Since then the writer has obtained it of much larger size from the Arctic, reaching nearly an inch in length. It was collected by Murdoch on the beach near the station, and also at Cape Smythe in 5 fathoms. Museum number, 40958,

Bela harpa De

[17] J. J. Dall, Proc. U. S. Nat. Mus. 1884, p. 523.

Shell fusiform, moderately thin, six-whorled; whorls rounded, suture distinct; sculpture consisting of (on the last whorl) 23 stout, uniform, slightly flexuous, rounded ribs, extending from the suture to the canal, with slightly narrower interspaces; lines of increase distinct, sometimes threadlike: these are crossed by numerous close-set spiral threads separated by narrower grooves, both faint near the suture: threads growing gradually stronger, regularly wider, and coarser toward the canal, near which they are stronger than the obsolete ends of the transverse ribs; anal fasciole indisfinet, aperture narrow, clongated, with an acute posterior angle: outer lip thin, columella simple, canal rather wide; color of shell whitish, with a reddish tinge anteriorly, especially on the last whorl; interior of aperture reddish, of the canal pure white. Longitude of shell 17, of last whorl 12,5, of aperture, 10; latitude of shell 8, of aperture 3,5mm. First found by the writer at Nunivak Island in 1874. One specimen, diedged by the Point Barrow Expedition in 13½ fathoms, 10 miles west of Point Franklin, Arctic Ocean, Museum number, 10959,

This species has been compared with the Belas in the chief museum and private collections of Northern Europe, and seems amply distinct from any of the species contained in them.

Bela murdochiana Dall.

Rela murdochiana Dall, I. c., p., 524, plate 2, fig. 8.



Shell whitish, stout, short, with rather coarse sculpture and very short spire; whorls about five, last much the largest; inflated, suture deep, almost channeled; sculpture of numerous (on the last whorl about two to the millimeter) narrow, backwardly convex, flexuous riblets, with about equal interspaces, strongest near the suture, not crossing the fasciole, and obsolete near the periphery; lines of growth distinct, crossed by numerous (about six to the millimeter) rather coarse threads, of which each alternate one tends to be smaller, separated by narrow grooves, and about uniformly distributed over the

surface, with a tendency to a faint carina in front of the fasciole; fasciole indistinct, outer lip sharp, columella simple, white; aperture pinkish, canal short, wide; nuclear whorls eroded in the specimens; operculum light born color, rather broad and short; soft parts pink. Longitude of shell 11.5, of last whore 10; maximum latitude of shell 8.5 mm. Museum number, 40060.

Specimens from Cape Smythe in 2 to 5 fathoms mud and sand, with young B. tenuilirata, from which they differ in lighter color of shell, coarser sculpture, and stouter proportions. The operculum of B. tenuilirata is almost black, narrow, and claw-shaped. It is dedicated to Mr. Murdoch, naturalist of the Point Barrow party.

Admete Middendorffiana Dall.

Admete vividula Midd, Mal. Ross., ii, pl. ix, figs. 13-14, 1-49; not of Tabricius.

This form is perfectly distinct from A. riridula, and may prove to be a Cancellaria. It is one of the characteristic forms of the Pacific Arctic, and ranges north from Nunivak Island. The present specimen was obtained in Norton Sound in 5 fathoms mad. Museum number, 40961.

Buccinum tenue Gray.

Beach near the station; also at the dredging spot 10 miles west of Point Franklin in 13½ fathoms. Museum number, 40962.

The specimens from the last station included some in which the characteristic broken ribbing was only represented by a few puckerings near the suture, the remainder of the shell being inflated and smooth, except for the fine spiral striation. At first sight these were very puzzling, and might readily have been taken as new without careful study.

Buccinum Baeri Middendorff,

One specimen from 10 miles off Point Franklin in  $13\frac{1}{2}$  fathoms, dead, and inhabited by a Pagarus. This is a very constant form, but probably only an extreme form of B. cyencum. Museum number, 40963.

Buccinum ciliatum l'abricius.

One dead and two living specimens from 10 miles west from Point Franklin in 13½ fathoms. Museum number, 40964. This is always a very recognizable species, but rare in individuals. It extends in Bering Sea, south to Nunivak Island.

Buccinum glaciale Linné. Plate -, figs. 7-5.

Beach near station; also with Pagari in various dredgings. Museum number, 40965. Common to the whole of the Arctic basin north of St. Laurence Island, as well as on the Atlantic side. Further south it assumes other forms, some of which, without the connecting links, appear very distinct, and have been described as species by Mörch and others. The strictly Arctic varieties are B. carinatum Phipps, and a form which in its coarser features so closely simulates B, angulosum var. angulosum Gray that it has been taken for it, and the consolidation with B, glaciale of B, angulosum suggested in consequence. The fine sculpture in perfect specimens will always serve to distinguish them. Normal specimens would never be confounded with each other.

Buccinum angulosum Gray. Plate --, figs. 1-4.

- A. Var. angulosum Gray, Beechey's Voyage. Zoöl., p. 127, t. 36, f, 6, 1828.
- B. Var. normalis Dall.
- C. Var. subcostata Dall.

The normal form was obtained by the expedition on the beaches near the station and at Capo Smythe: thence to 5 fathoms. Museum numbers, 40966-7. The writer has also obtained it at

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numerous points in this part of the Arctic basin. The angulated form is less common, and every grade exists between them. The fine sculpture, and especially the sharp transverse striae, always distinguish it from other species, especially the angulated varieties of glaciale.

Buccinum plectrum Stimpson. Plate III, figs. 9, 10.

Beaches near the station. Museum number, 40968. The variety collected by the expedition is a rather dwarfed form, with intensified sculpture. The metropolis of the species is further south, and I have seen fine specimens from the Shumagins. This is an excellent species and easily distinguished when in good order. It has been mistaken for a variety of *B. undatum*, which is not found in any shape on the Pacific side. A few fraudulent specimens were sent out as from this region by a recently deceased conchologist, but they bore all the marks of having come from London dealers. It is possible that the whalers, who carry and mix shells from all parts of the world, may have been the unintentional means of having distributed a few specimens with erroneous locality labels.

Buccinum polare Gray. Plate III, figs. 5, 6.

Beaches near station; also dredged in 13½ fathoms off Point Franklin. Museum numbers, 40969-70.

This species, which is also well characterized, varies from inflated, large, with fine, sharp carine to small, elongated, with obsolete carine, and is sometimes rather puzzling; but a good series makes the relations clear. It is frequently of a bright, clear orange color, and is generally quite thin. I have seen two specimens of a singularly thick and short variety percrassum from the Arctic north of Bering Strait. It must be exceedingly rare; the upper whorls are smaller, less inflated and less turreted than in the normal form. The operculum is also proportionally larger and more oval. It may prove distinct from polare.

Chrysodomus Kroyeri Möller.

C. Kroyeri, var. Rayana Dall, 1, c., p. 525.

One small one in the state called *cretaceum* by Reeve, at Cape Smythe, on the beach; a very large living specimen of the normal form, in 5 fathoms, from the same locality, some with few ribs from 2½ fathoms at the same place. Museum numbers, 40971–2. This shell, when fresh and perfect, is of a plun color or dull purple, with fine, spiral striæ, recalling *B. tenue*, and strong transverse ribs. When dead and weathered, it turns nearly white—this is Reeve's form; an extraordinary variety *Rayana* has no ribs but is perfectly smooth, except for the fine sculpture which enables its true relations to be determined. This last, named in honor of Lieut. P. H. Ray, United States Army, who commanded the Point Barrow expedition, would be taken as distinct at first sight. The specimens were all rather young, which made their recognition still more difficult. It was also dredged at Cape Smythe.

Chrysodomus liratus Martyn.

C. tornatus Gould.

One specimen from the beach near the station. Museum number, 40973. The metropolis of this species is much further south.

Chrysodomus fornicatus (Gmel.) Gray.

Rare on the beach near the station; abundant near the Mackenzie River mouth, and at Numivak Island, with innumerable varieties. Museum number, 40974.

Chrysodomus spitzbergensis Reeve.

C. terebralis Gould.

One young living specimen, Norton Sound, in 5 fathoms. Museum number, 40975.

Chrysodomus martensi Krause.

One specimen on beach near station. Museum number, 40976. This species was obtained by the writer in Bering Strait in 1880, in 30 fathoms; subsequently by Dr. A. Krause in the same region, in whose report it is about to be described.

Heliotropis harpa (Mörch) Dall.

Finus deforme Midd. Mal. Ross, ii, p. 140, 1840, not of Reeve.

One young, living specimen in 13½ fathoms, 10 miles west of Point Franklin. Museum number 40977. This species is distinguished from F. deforme by its coarser spiral strice and brighter colors. It extends south to the Aleutians, where it reaches a very large size. The undefined name Pyrulofusus was applied to the Atlantic species by Mörch.

Strombella Beringii (Midd.) Dall.

Tritonium Bertugli Midd, Mal. Ross, ii, p. 147, pl. 3, figs. 5-6, 1849.

A dead specimen on the beach near the station. Museum number, 40978.

The genus Strombella Gray is slightly anterior to Volutopsis of Mörch, and has the advantage of a diagnosis. The Strombella of Schleuter, which has been unnecessarily assumed to exclude Gray's name, has no standing whatever, being a mere word in a catalogue without diagnosis or identified type or description of any kind.

This species has fewer transverse ribs than Chrysodomus Kennicottii Dall, with which it has been confounded, and wants the fine characteristic sculpture of the latter. From the following species it differs in its light color; rude, short spire, absence of carine, more rapidly increasing whorls, rounded concavities between more numerous (ibs., and few coarse spine or threads.)

Strombella malleata Dall.

Strombella malleata Dall, 1, c., p. 525,

One specimen from the beach near the station. Museum number, 40979. The writer has collected this species at Icy Cape, Cape Lisburne, Point Lay, Kotzebne Sound, Point Spencer, at Port Clarence, and other localities within the Arctic basin.

It is long and slender, the young shell forming several whorls in an almost cylindrical coil before they begin to enlarge; the adult may reach six inches in length. The surface is covered with tine spiral strice and a thin brown epidermis. It differs from the preceding in its dark purple color, its few (generally five) transverse ribs, between which the space is nearly flat rather than concave, and a sharp carina on the anterior periphery of the last whorl on which the suture is laid. The nucleus is large and blunt, the canal short, the form of the mouth variable in different stages and specimens; the outer lip thin, the aperture dark purple within the last whorl, less than half the length of the shell in nearly all cases. It is usually rude and more or less worn, even when living; the cylindrical tip is usually broken off, but the polygonal section of the whorl is very characteristic.

Trophon clathratus I.,

A dead specimen at Cape Smythe, and another, rather stouter, at 10 miles west from Point Franklin, in 13 $\frac{1}{2}$  fathoms, mud and sand. Museum number, 40980. This species is very variable in relative proportions and closeness of varices.

Turritella (Tachyrhynchus) polaris Beck.

T. crosa Conthony.

One specimen, ten miles west of Point Franklin, in 133 fathoms mud. Museum number, 40981.

Trichotropis borealis Broderip & Sowerle

One specimen in 5 fathoms; Norton Sound; dead. Museum number, 40982.

Trichotropis (Iphinoë) arctica (Midd.) Dall.

Cancellaria arctica Midd. Mal. Ross, ii, p. 112, pl. ix, figs. 41, 12, 15, 4849.

Beach near station, also Norton Sound, in 5 fathoms. Museum number, 40933. It was originally brought by Wossnessenski from Bering Strait.

Crepidula grandis Middendorff.

One young specimen from 13½ fathoms, 10 miles west from Point Franklin. Museum number, 40984.

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al hy same Natica clausa Broderio & Sowerby.

Common on the beach near the station; also at Cape Smythe, 2½ to 5 fathoms; also off Point Franklin in 13½ fathoms. Museum numbers, 40985-6. The specimens have the fine brown color which seems characteristic of those from more northern stations; a few show the white basal area characteristic of X, russa, but do not otherwise approach that species; all are of moderate size and rather thin.

The identification of Gmelin's affinis with this species does not seem sufficiently certain to render its adoption in place of clausa desirable.

Lunatia pallida Broderip & Sowerby,

Abundant in the same localities as the preceding. Museum numbers, 40987-8.

Lunatia Bulbus flavus Gould.

Natica flava Gould, Sill, Journ., xxxviii, p. 196, Rep. Inv. Mass., p. 239, tig. 162, 1842.

A few fine dark brown specimens from the beach near the station. Museum number, 40989. This clegant species is quite distinct from the Natica (Bulbus) Smithii of the north of Europe.

Lunatia Mamma nana Möller.

One specimen from Norton Sound in 5 fathoms. Museum number, 40990.

Amauropsis purpurea Dall.

A. helicides Middendorff, not Johnstone.

With N. clausa, but less common. Museum number, 40991.

Velutina coriacea (Fall, ) Middendorfi.

One specimen on beach near the station. Museum number, 40992.

Scala groenlandica Chemnitz.

One specimen with the preceding. Museum number, 10993.

Margarita striata Brod, & Sow.

One or two specimens from the beach near the station. Museum number, 40994.

Margarita vorticifera Dall.

One specimen with the preceding. Museum number, 40995.

This is much further north than the species was previously known to range.

Margarita obscura Cogthony.

Several specimens from 5 fathoms mud in Norton Sound. Museum number, 40996,

Patella Helcioniscus exarata Reeve.

A single specimen of this well-known Hawaiian species was collected dead on the brach. If was andoubtedly thrown overboard with ballast from some whaler which had refitted at Honolulu, and is interesting as showing an accident of distribution, like Mr. Lord's living Orthalicus undatus from Vancouver Island. Museum number, 10997.

Amicula vestita (Sby.) Dab.

- Chitan Functsonii Conthoux,

Abundant 10 miles west of Point Franklin in 133 fathons. Museum number, 1099s.

Cylichna alba Promin.

A few specimens from 5 fathours mud and sand off Cape Smythe. Museum number, 40999, Cylichna prepinqua M. Sars.

Rether abundant in 2½ to 5 fathous off Cape Smythe. Museum numbers, 41000-41001.

? Dendronotus Dalli Bergh

One specimen of a species of *Dendronotus* was taken in the act of spawning, off Cape Smythe, in 5 fathous, August 14. As the above species is the only one described from north of Bering Strait it is probable that it should be so identified. Museum number, 41002,

Acolidia papillosa (Linné) Bergh.

With the last, and also crawling on the stones, at low-water near the station. Museum number, 41003,

Note.—This completes the list of gastropods, but it may be mentioned that a specimen of *Pricae oregonense* Redf. was brought by the expedition from Unalashka, but, belonging to a different fauna, it has not been formally included in the list.

#### ACEPHALA.

Mya truncata Linné.

Living on the beach near the station of Uglaami. Museum number, 41004.

Macoma sabulosa Spengler.

Beach near the station and at Cape Smythe in 23 to 5 fathoms. Museum number, 41005,

Liocyma fluctuosa (Gld.) Dall.

Cape Smythe,  $2\frac{1}{2}$  to 5 fathoms; also 10 miles west of Point F wiklin, in  $13\frac{1}{2}$  fathoms mud and sand. Museum number, 41006.

Cardium (Serripes) grænlandicum Chemnitz.

Living near low-water mark to  $2\frac{1}{2}$  fathoms at the station; also Norton Sound at 5 fathoms, and at Cane Smythe in  $2\frac{1}{2}$  to 5 fathoms. Collector's numbers, 195 and 1761. Museum numbers, 41007-8.

Cardinm islandicum timelin.

Norton Sound, in 5 fathoms mud. Museum number, 41009.

Cryptodon sericatus Carpenter.

At Cape Smythe in 5 fathoms; also off Point Franklin in 13½ fathoms, mud and sand. Museum number, 41010.

Astarte (Rictocyma) Esquimalti (Baird) Dall.

Crassatella Esquimalti Baird. Rictocyma mirabilis Dall (young).

Two specimens, 10 miles off Point Franklin, in 13½ fathoms. Museum number, 41011.

Astarte fabula Reeve

Norton Sound in 5 fathoms. Museum number, 41012.

Veneticardia borealis Conrad.

One specimen of the variety V. novangliw Morse was found on the beach near the station. Museum number, 41013,

Yoldia limatula Say.

One specimen from 15 fathoms, mud, off Point Barrow. Museum number, 41014.

Yoldia myalis Conthony.

Off Cape Smythe in 23 to 5 fathoms. Museum number, 41015,

Yoldia lanceolata Sowerby

With the last. Museum number, 41015a.

Pecten islandicus Omelen.

Living, off Point Franklin in 13½ fathoms; dead, on the beach near the station. The color of these northern specimens is apt to be of a peculiarly deep rich tint of red in various shades. The living specimen carried on its upper valve a fine specimen of *Chelysoma macleaganum*, an *Actinia*, numerous Sertularian hydroids, and several species of *Polyzoa*. Museum number, 11016.

#### BRACIHOPODA.

Rhynchonella . Hemithyris) psittacea (Ch.) D'Orbigny.

Attached to dead shells from 132 fathoms off Point Franklin. Museum number, 41017,

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#### SUMMARY.

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Species,	Point Barrow.	-	Point Franklin.	-	Norton Sound.	, Species,	Point Barrow.	Point Franklin.	Norton Sound.
Cochlicopa Intrica			,			Lunatia pallida			( )
Zonites stearnsii				,		Bulbus flavus			
radiatula	۰					Mamma nana			
Octopus groulandicus						Velutina coriaesa			٠,,
Bela 'exarata						Scala groudandies			
simplex						Margarita striata			
tenuilitata					(-)	obsenta			
harpa			+			Amicula vestita Cylichna dba			
Murdochiana Admete middendorfhana						propinga			
; Buccinum tenne						Dendronotus dalli			
var. butt						Acolula papillosa Mya truncata			
glaunie			-	1	4	Macoma sabulosa			
augulosum						Liocyma fluctuosa			
vai normalis						Cardium gronlandicum			
100416			8			Crystodon sericatus			
Chrysoderius kroyeri	~					Astarte esquimatti			
var. rayana	- 4					tabula		( )	
formulatus						Yoldia limatula			
spit bergensis					*	niyalis Lincoolata			
Heliotropis harpa						Pecteu islandicus			
Strombella Beringii						Hemithyris psittacca		74	
mal'esta						Chely soma macleay anom			
Trophon (Lathratus	"		4			Appendicularia sp			
. Trichotropis borealis					+	Total mollipsies, 61	4.4	21	12
Iphinois nictica					4	Total Brachiopods, 1	0 .	1	
Crepidula grandis Natica clausa	- 4		- 10			Total Ascidians 2	ı	İ	

It is apparent from this list\* that four families greatly preponderate, namely the *Pleurotomida*, *Buccinida*, *Naticida*, and *Trochida*, as represented by *Margarita*. While the party doubtless obtained a full representation of species resident at or near the station itself, it should be added that the mollusk fanna of the Arctic basin adjacent is considerably larger than the number of species included in the preceding list. There is practically but one fauna from Nunivak Island nerthward to the Polar region, though there are a number of species which do not occupy the whole area, especially littoral forms.

The writer has been gathering material for twenty years toward a faunal description of this region and hopes before long to be able to prepare it for publication, a task which, from the pressure of other duties, has hitherto been unavoidably deferred.

Towards such a complete description such contributions as this, made by the party under the command of Lieut. P. H. Ray, are particularly valuable, and to Mr. Murdoch and his companions, who went into practical exile for two years for the benefit of science, the sincere recognition and hearty thanks of all naturalists are unquestionably due.

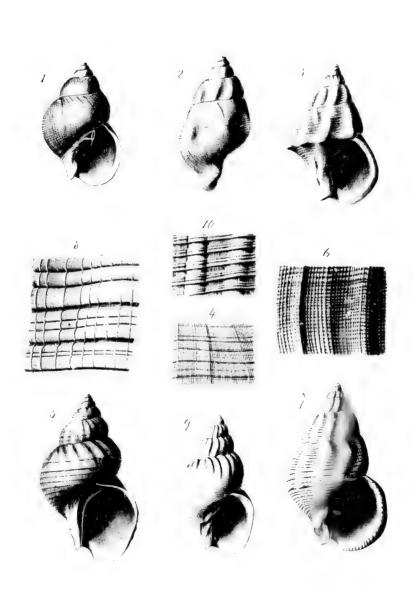
<sup>5</sup> In the list, species obtained at Cape Smythe, Point Barrow, and near the station Uglaami, all within a rhort distance of one another, are included under the heading "Point Barrow,"

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## REPORT ON POINT BARROW MOLLUSCA.

#### EXPLANATION OF PLATE.

- Fig. 1. Buccinum angulosum, Gray, forma normalis.
- Fig. 2. Buccinum angulosum, Gray, forma subcostat .
- Fig. 3. Buccinum angulosum, Gray, forma angulata, typica.
- Fig. 4. Buccinum angulosum, Gray, superficies, × 10 magnif.
- Fig. 5. BUCCINUM POLARE, Gray, forma cormoles.
- Fig. 6. Buccinum polare. Grav. superficies, × 10 magnif.
- Fig. 7. Buccinum Glaciale, Linne, torma normali
- Fig. 8. Buccinum glaciale, Linne, superficies, × 10 magnif.
- Fig. 9. Buccinum plectrum, Stm., forma percrassa, minor,
- Fig. 10. Buccinum plectrum, Sim., superficits, × 10 magnif. Note.—The figures of shells are all natural size.



# VII.—COLLECTING LOCALITIES AND DREDGING STATIONS.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

#### 4. BEACH, CAPE SMYTHE.

This locality comprises the steep pebbly beach and the inlets of the lagoons from about a mile and a half above the station of Ooglaamie to about 3 miles below it.

This stretch of shore was pretty thoroughly patrolled nearly every day during the season of open water. The daily tide is so small that few animals were washed up by its means, and the occasional periods of low water, caused by long-continued off-shore winds, exposed no shore-dwelling animals. The sea was never low enough to uncover the mud flats which are close to the shore. Most of the animals obtained on the beach were washed up whenever there happened to be a strong breeze and heavy sea on-shore.

Soon after we landed in 1881 there occurred several heavy gales from the west and northwest, and, as the ice-pack was a remarkable distance from the land, an exceedingly beavy sea rolled in upon the beach, bringing vast quantities of material. We were unfortunately so busy providing ourselves with shelter against the rapidly approaching winter that we were unable to preserve any specimens, and so favorable an opportunity never recurred.

Most of the material showed signs of having been transported a considerable distance. The lamellibranch shells especially were crushed and ground into small fragments.

The following species were obtained at this locality:

#### CRUSTACEA.

1. Hyas latifrons. 9. Hoperia medusarum. 2. Eupagurus trigonocheirus. 10. Themisto libellula. 3. Cheraphilus boreas. 11. Eurytenes gryllus. 4. Nectoerangen lar. 12. Onisimus littoralis. 5. Hippolyte gaimardii. 13. Eusirus cuspidatus. 6. ? Diastylis rathkii var. 14. Melita formosa, 7. Chiridotea entomon. 15. Gammaracanthus loricatus. 8. Chiridotea sabinci. 16. Peltogaster paguri.

## VERMES.

Melanis lovéni var. gigantea.
 Echiurus vulgaris.
 Arenicola glacialis.

#### ECHNODERMATA.

20. ! Trochostoma boreale. 23. Cro.saster papposus. 21. Strongylocentrotus dröbachiensis. 24. Solaster endecea. 22. Asterias acerrata.

## ANTHOZOA.

25. Alegonium rubiforme. 27. ₹
26. Urticina crassicornis.

#### ACALEPILE.

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29. Aurelia labiata?

30. Cuanca nostelsii?

#### 31. Chrysaora melanaster.

32. Staurophora mertensii.

#### MOLLUSCA.

33. Octobus granlandicus.

34. Limacina pacifica.

35. Bela tenuilirata.

 $36. \ Buccinum\ tenue.$ 

37. Buccinum glaciale.

38. Buccinum angulosum, vav. normalis.

39. Buccinum plectrum.

40. Buccinum polare.

41. Chrysodomus kröyeri.

42. Chrysodomus liratus, 43. Chrysodomus fornicatus.

14. Chrysodomus martensi.

44. Chrysodomus martensi. 45. Strombella berinaii.

46. Strombella malleata.

47. Trophon clathratus.

48. Trichotropis (Inhinoir) aretica.

49. Natica clausa.

50. Lunatia pallida.

51. Lunatia (Bulbus) flavus.

52. Amauropsis purpurea.

53. Velutina caviacea.

51. Scala granlandica.

55. Margarita striata.

56. Margarita vorticifera.

57. Patella (Helcioniscus) evarata.

58. Eolidia papillosa.

59, Mya truncata.

60. Macoma sabulosa,

61. Cardium (Servipes) granlandicum.

62. Venericardia borealis.

63. Pecten islandicus.

#### TUNICATA:

64. Boltenia sp.

65. Halocynthia pyriformis.

#### POLYZOA.

66. Gemellaria loricata.

68. Discopora sp.

67. Membranipora sp.

POPELTIRA.

69. One or two species of sponges, undetermined.

## 2. SHOAL WATER ALONG SHORE, PERGNIAK, ELSON BAY.

The large fish-seine was hauled three times from the shore, in the southwest bend of Elsen Bay, close to the Eskimo summer camp of Pergniak, August 11, 1883. A few small whitefish and sculpins were caught, and the lead-line of the seine brought up a quantity of seaweed containing many amphipods of the following two species:

Gummarus locusta.

Gammaracanthus lorientus.

## 3. OFF CAPE SMYTHE.

Opportunities for dredging near the station were seldom offered on account of ice and bad weather. Most of the work was confined to a small area extending about a mile above and below the station, and from a depth of about 2½ fathoms, close to the shore, to 12 fathoms about a mile from the land. The bottom for the most part was an exceedingly tenacious and fetid black mud containing very little life except Worms and the large Isopods Chiridotea entomon and subinei. Interspersed with this, however, were occasional patches of sand and mud mixed, which contained more life. During the season of open water these patches were generally pretty well indicated by the flocks of ducks swimming over them, attracted by the comparatively rich food.

Dredgings were obtained August 14, 1882, and August 7 and 9, 1883. On August 8, 1883, an opportunity occurred to dredge in 15 fathoms, about three miles above the station and about two miles from shore, just outside the barrier of grounded ice. Two hauls of the dredge were obtained

with great difficulty as the current was too feeble to make our whaleboat drug the dredge. One had was made by making the boat fast to a large cake of floating ice. The bottom was the same black mad and contained animals similar to those obtained at the inshore stations.

The following species were obtained in this locality:

#### PACNOGONIDA.

1. Nymphon longitarse,

## CRUSTACEA.

- 2. Eupagurus splendescens. 3. Mysis rayii.
- 1. Diastylis sp.
- 5. Chiridotea sabinei.

- 6. Eurutenes avultus.
- 7. Acanthostepheia malmareni.
- 8. Gammarus locusta.
- 9. Dulichia arctica.

#### VERMES

- 10. Polynoë sarri.
- 11. Melanis lovéni.
- 12. Nephthys cocca.
- 13. Etcone sp.
- 11. Phyllodoce grantandica.
- 15. Phyllodoce sp.
- 16. Castalia multipapillata (surface).
- 17. Autolytus sp. (surface).

- 18. ! Aricia arctica.
- 19. Travisia forbesi.
- 20. Arenicola glacialis,
- 21. Brada granulata.
- 22. ? Maldane sp.
- 23. Pectinaria sp. (tubes).
- 21. Phascolosoma sp.
- 25. Sagitta sp. (surface)

## ECHINODERMATA.

- 26. Myriotrochus rinkii.
- 27. Ophioglypha nodosa.

#### ANTHOZOA.

- 28. Urticina crassicornis.
- 29. Phellia sp.

## ACALEPHIE SURFACE).

- 30. Beroë roscola.
- 31. Mertensia orum.
- 32. Pleurobrachia rhododactula.
- 33. Aurelia labiata. ?
- 34. Cyanea postelsii. ?
- 35. Chrysaora melanaster.
- 36. Egina citrea.

- 37. Aglantha camtschatica.
- 38. Gemmaria, ?
- 39. Tubularia sp. (dredged).
- 10. Melicertum sp.
- 11. Sarsia rosaria.
- 12. Staurophora mertensii.
- 43. Medusa resembling Turris.

#### MOLLI SCA.

- 11. Bela simplex.
- 15. Bela tenuilirata.
- 46. Bela murdochiana.
- 17. Buccinum glaciale.
- 18. Buccinum angulosum var. normalis.
- 19. Chrysodomus kröyeri.
- 50. Chrysodomus kröyeri var. rayana.
- 51. Nativa clausa.
- 52. Lunatia pallida. 53. Amauropsis purpurea.

- 51. Cylichna alba.
- 55. Cylichna propinqua.
- 56. Dendronotus? Dalli.
- 57. Eolidia papillosa,
- 58. Macoma sabulosa,
- 59. Liocyma fluctuosa,
- Co. Cardium (Serripes granlandicum.
- 61. Cryptodon sericatus.
- 62. Yoldia limatula,
- 63. Voldia myalis.
- 61. Yoldin lancrolate

#### TUNICATA

65. Molgula sp.

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## 1. OFF POINT FRANKLIN.

One haul of the dredge was made August 31, 1883, as the schooner drifted with the current about 10 miles west of Point Franklin, in 13½ fathoms of water.

The bottom consisted of small peobles, sand, and dead shells, and the dredge came up filled with animals of the following species:

#### PYCNOGONIDA.

1	١.	$\mathcal{T}_{i}$	1111	nhon	arossines.

#### CRUSTACEA.

13	Chionacetes opilio.	12.	? Diastylis rathkii var.
3.	Hyas latifrons.	13.	Diastylis sp.
1.	Eupagurus trigonocheirus.	14.	Synidotea biempida.
5.	Eupagurus splendescens.	15.	Arcturus hystrix.
€,	Cheraphilus boreas,	16.	Eurytenes gryllus.
7.	Hippolyte fabricii.	17.	Stegocephalus ampulla.
8.	Hippolyte spinus.	18.	Rhachotropis aculeata.
1	Ili, polyte gaimardii	19.	Paramphithoë panopla.
10,	Hippolyte phippsii.	20,	Acanthozone polyacantha
11.	Pandalus dapifer.	21.	Atylus swammerdamii.

## VERMES.

4)1)	mnoë scal	

## 23. Polynoë islandica.

## ECHINODERMATA.

24. Pentacta frondosa.	30. Solaster endeca.
25. Lophothuria fabricii.	31. Ophioglypha sarsii.
26. Strongylocentrotus dröback	iensis. 32. Ophioglypha robusta.
27. Leptasterias arctica.	33. Ophioglypha nodosa.
28. Cribrella sanguinolenta.	34. Ophiopholis aculeata.
29. Crossaster papposus.	

## ANTHOZOA.

35	Uem	minm	ruhi	forme.

#### 36. Urticina erassicornis.

## ACALEPILE.

37.	Section	larella	triens	nidata

## 38. Thuiaria cylindrica.

#### MOLLUSCA.

35. Bela? evarata.	48. Turritella polaris.
40. Bela harpa.	49. Crepidula grandis.
41. Buccinum tenue.	50. Natica clausa.
42. Buccinum baeri.	51. Lunatia pallida.
43. Buccinum ciliatum.	52. Amauropsis purpured
44. Buccinum glaciale.	53. Amicula restita.
45. Buccinum polare.	54. Cryptodon sericatus.
46. Heliotropis harpa.	55. Astarte esquimalti.
47. Trophon clathratus.	56. Pecten islandicus.

## TUNICATA.

## 57. Chelysoma macleayanum.

## вкастнорова.

## 58. Hemithyrix psittacea.

#### POLYZOA.

59. Leieschara subgracilis.

erent

filled

60. Flustra papyrea.

#### PORIFERA.

Two or three species of sponges, undetermined.

## 5. OFF PORT CLARENCE.

Three hauls of the dredge were made while drifting off the entrance to Port Clarence, September 4, 1883, in a depth of about 71 fathoms. The bottom was pebbly and life scanty. The following species were obtained:

## CRUSTACEA.

1. Cheraphilus borcas.

#### ECHINODERMATA.

2. Strongylocentrotus dröbachiensis.

3. Asterius sp.

#### ANTHOZOA.

4. Aleyonium rubiforme.

## 6. HEAD OF NORTON SOUND.

The dredge was hauled from the vessel near the head of Norton Sound, not far from St. Michael's, September 12, 1883, in about 5 fathoms.

The bottom was pebbly and life rather scanty, comprising the following species:

#### PYCNOGONIDA.

1. Nymphon grossipes.

#### CRUSTACEA.

2. Eupagurus trigonocheirus.

5. Synidotea bicuspida.

3. Eupagurus splendescens.

6. Melita leonis.

4. Crangon vulgaris.

## VERMES.

7. Nephthys eaca.

#### ECHINODERMATA.

8. Strongylocentrotus dröbachiensis.

10. ? Asterias violacea.

9. Asterias acervata.

#### ANTHOZOA.

11. Aleyonium rubiforme.

## ACALEPILÆ.

12. Sertularia variabilis.

## MOLLUSCA.

13. Bela? scalaris.

14. Admete middendorffiana.

19. Mamma nana.

20. Margarita obscura.

15. Buccinum glaciale.

21. Cardium granlandicum.

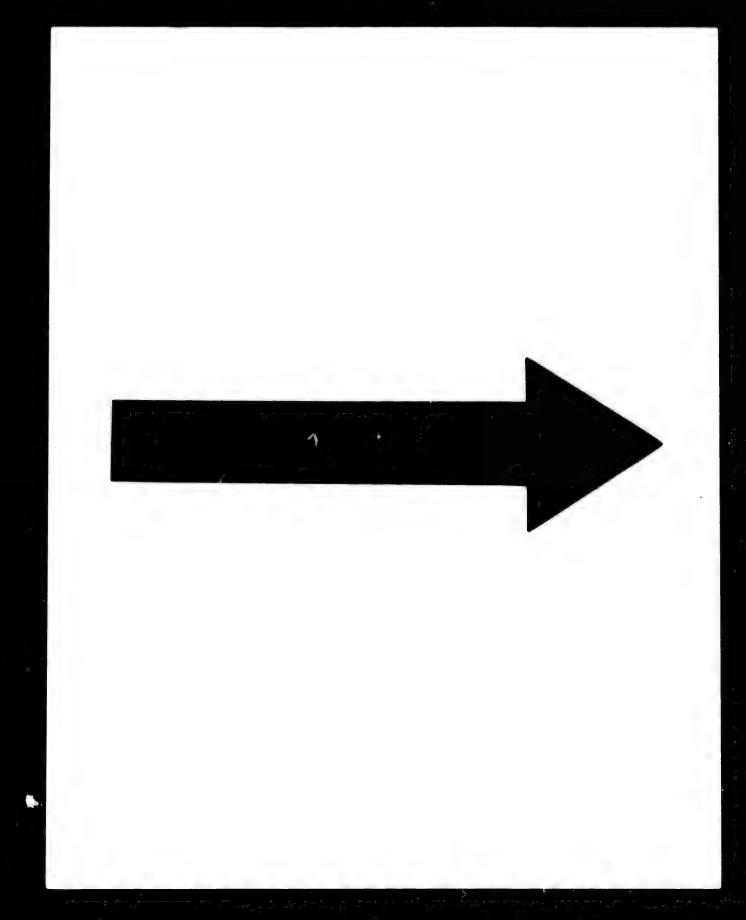
16. Chrysodomus spitzbergensis.

22. Cardium islandicum.

17. Trichotropis borealis.

23. Astarte fabula.

18. Iphinoe arctica.



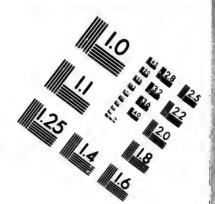
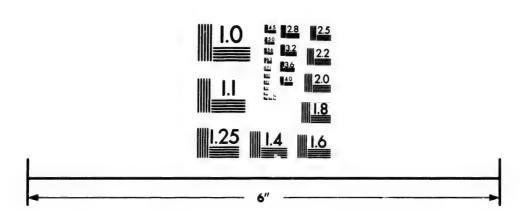
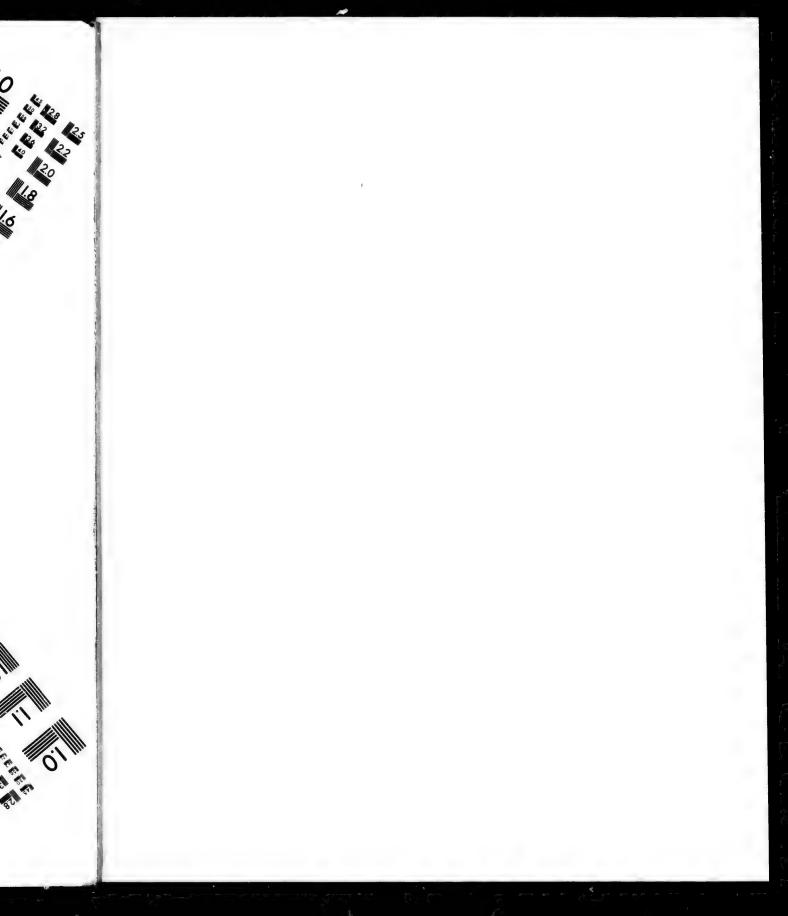


IMAGE EVALUATION TEST TARGET (MT-3)



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It will be seen from the above lists that the region immediately about Point Barrow (Stations 1, 2, and 3) though comparatively poor in individuals, is quite rich in number of species, at least 115 having been collected. Of these the most abundant are Mollusks (41 species exclusive of land shells), Crustacea (22 species, not counting fresh-water forms), and Worms (19 species).

At Point Franklin (Station 4), on the other hand, although fewer species were obtained (62 in all) the number of individuals was simply enormous. The Mollusks were most numerous in species (21 species) but comparatively few in individuals. Crustacca were plentiful, both species and individuals. The Echinoderms were most abundant in individuals, though only 11 species were obtained. Great quantities of the two species of Polyozoa also were collected.

At Stations 5 and 6 animal life was poor both in species and individuals, though 12 species of Mollusks were obtained at Station 6.

## VIII.-PLANTS.

By Prof. Asa Gray, Cambridge, Mass.

This collection probably comprises most of the Phanerogamous plants growing at that Arctic station; some of them not before received by us from that region, rich as our herbarium is in Arctic American plants.

One of these is Ranunculus Pallasii, a most peculiar white-flowered species, which we now for the first time possess in copious specimens. With it comes a very depauperate R. multifidus, R. pygmæus and R. nivalis, and a radicant form of Caltha palustris, with leaves hardly a half inch long at flowering-time.

Paparer nudicante appears to be the most abundant, and perhaps the most showy, plant of that Arctic flora.

Parrya nudicautis is not in the collection, but Miss Heppingstone found it on Cape Lisburne. The other Crucifera are Cochlearia officinalis, or some other of the ill-defined species, Draba alpina, and some related white-flowered species which are not determined for want of fruit.

Stellaria longipes, var. Edwardsii. S. humifusa, and a condensed form of Cerastium alpinum are the only Caryophyllacea, and Astragalus alpinus and A. frigidus are the only Leguminosa.

The Rosacce are Dryas actopetala, var. integrifolia, and Potentilla emarginata Pursh., the latter in numerous and fine specimens. A very dwarf form of this species from Wrangel Island was inadvertently named P. frigida in the list of Muir's collection.

The Naxifrage are N. oppositifolia, N. hirculus, N. flagellaris, N. sileniflora, N. hieracifolia, N. punctata, in a most reduced form, with some stems only a span high, a compact inflorescence, and small leaves which are crenately 7-9-lobed rather than dentate, which is here called var. nana, also S. stellaris, var. convexa, N. rivularis, var. hyperborea, and N. cernua.

Valeriana capitata of Pallas was sparingly collected.

Stations at least of land d (62 in species ad indi-

ecies of

The Composita are only three, Petasites frigida, Senecio frigidus, and Arctie forms of Taraxacum officinale, var. lividum.

The Ericacea are even fewer, being only Vaccinium ritis-ida and Cassiope tetragona.

The remaining Gamopetalw are only Mertensia maritima in a condensed form, Pedicularis Sudetica, and P. Langsdorfli.

The Apetale, Polygonum viviparum, Oxyria digyna, Rumex salicifolius, and the following willows, which have been examined and named by Mr. Bebb. An abstract of his notes upon them is here given:

Salix oralifolia, Trauty., in both sexes, and with well-formed fruit. Clearly an Arctic modification of S. myrtilloides, with subsessile capsules.

Satix glacialis, Anderss., with female flowers, and young foliage, agreeing with the character in the want of a style.

Salix buxifolia, Trev. (S. phlebophylla Anderss.), with nervose lineate leaves and a manifest style. Salix rotundifolia Trauty., which is probably only S. polaris with glabrous capsules.

Salix fulcrata Anderss., in both sexes. Distinguished from 8. chlorophylla mainly by its stipules, which in these specimens answer to Siemann's plant, but not to Andersson's figure.

No petaloideous Monocotyledon was collected except Luzula arenata; of Glumacca, only Exiophorum Chamissonis and an immature Carex, which may be C. rulgaris; and of grasses a fine stock of Phippsia algida, Arctagrostis (Colpodium) latifolia, Alopecurus alpinus, Graphephorum (Dupontia) Fischeri; and G. fulvum, Poa benisia, and P. arctica, also a true Colpodium, the species undetermined.

Dr. Farlow adds the following report upon the Lower Cryptogamia of the Point Barrow col.

lections:

I would make the following report on the cryptogams collected at Point Barrow and submitted to me for examination. The lichens consisted of three packages, each containing a single tuft of unpressed material. Two of the tufts were composed of Cetraria islandica Ach., var. Delisari Bor., and the third of Alectoria divergens (Ach.) Nyl., mixed with which were fragments of Cetraria arctica (Hook.) and Thannolia vermicularis (Sw.) Schaer. There was a quantity of fungi preserved in a jar of alcohol, but without notes of color, habit, &c., so that the specific determination is in their present condition impossible. The specimens, as far as could be told, seemed to include two species of Agaricus and one of Russula.

The Algae collected were in part marine and in part from fresh water, some of them roughdried, and others prepared on mica.

The marine species were as follows:

Phyllophora interrupta (Grev.) J. Ag., in excellent condition, with fully-developed nemathecia; Odonthalia dentata Lyngb., rather a broad form, with slender supra-axillary tetrasporie branchlets; fragments of a sterile species which possibly belonged to Rhodymenia pertusa (Bail, and Harv.) J. Ag.; and fragments of an Ulva which could not be determined.

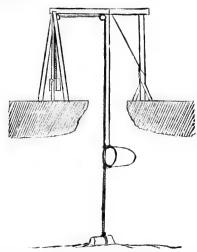
The fresh-water species included several specimens of a *Prasiola*, which may be referred with some doubt to *P. crispa* (Lightf.) Kg. The specimens were considerably larger than the type, some being nearly three inches long, but the habit was prostrate and bullate, and there was no distinct stipe as in *P. stipitata* Suhr., a species previously reported from the Arctic regions of America. It is possible that the species may prove to be new, but, as the specimens agree in microscopic structure with *P. crispa*, it would not be well without further information to separate them as a distinct species. Besides the *Prasiola* mentioned, the material on mica contained *Pediastrum Boryanum* Menegh, and two *Cyanophycea*, *Aphanothece stagnina* A. Br., and *Aphanacapsa Castagna* (Breh.).

# APPENDIX.

By John Murdoch, A. M., Sergeant Signal Corps, United States Army.

# A.—NOTES ON SURFACE LIFE UNDER THE SEA-ICE, FROM FEBRUARY 27 TO JUNE 8, 1883.

At the suggestion of Lieutenant Ray, a towing-net was arranged so that it could be attached to the line of the tide-gauge and set at different depths under the ice (see diagram). The water was about 17 feet deep. When a strong current was running in either direction the net was distended and many animals captured.



The net was visited generally every day, unless the weather was too severe to handle it. Early in the season the bucket of water containing the washings of the net was so full of ice-crystals that it had to be thawed before the stove before it could be examined.

February 27.--Current NE. Temperature of the water, 29°.1 F., net set near the bottom.

Small copepods resembling Cyclops, a few.

. Egina citrea, 2 small ones.

Turris? sp., a few small.

February 28.-Conditions as above.

Copepods; rather plenty.

Diastylis sp., 1, small.

Beroë roscola, 1, about 0.2 inch long.

.Egina citrea, 1 or 2, very small.

March 4.—Current and temperature as before, net set near surface.

Diastylis sp., 1, small.

Copepods; a few.

Beroë roscola, very abundant, from size of pin-head to about 0.3 inch in diameter.

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March 5,-Conditions as above.

Copepods; plenty.

Beroi roscola; abundant and small.

. Egina citrea, 1, rather larger than before.

March 6 .- Current SW.

Copepods; plenty.

Beroë roscola, plenty, same young brood.

March 7 .- Conditions as above.

Copepods; rather fewer.

Sagitta sp., 1, adult.

Beroë roscola; plenty, no larger.

Sarsia rosaria, 1, small.

March 8,-Conditions as above.

Copepods; a few.

Beroë roscola; a few.

March 9 .- Conditions as above, more life.

Copepods: a few.

Sagitta sp., 1, adult.

Beroë roscola; abundant, same brood.

Sarsia rosaria, 1, small.

March 10,-SW, current strong.

Copepods: a few.

Beroë roscola; plenty, same brood.

March 11.—SW, current very strong. Water very muddy.

Autolytus sp.; a few, very small.

Castalia multipapillata; a few, very small.

Copepods; a few.

Beroë roscola; a few.

March 12. - Conditions as above. Water still muddier.

Copepods; a few.

Autolytus sp., 1, small.

Beroë roscola, 1 or 2 apparently dead.

Noticed a Beroë in the tide-hole at least one inch long, and has

March 13.—Current NE. Water still muddy.

Copepods; rather abundant.

Autolytus sp., 1, rather larger than before

Beroë roscola; increasing in numbers, small.

Ægina citrea, 1, 3 inch in diameter, 1 very small.

Narsia rosaria; several small.

Turris? sp.; several small.

March 14.—Conditions as above. Water less muddy.

Copepods; a few.

Beroë roscola; a few.

Turris? sp., 1, about 0.4 inch in length.

March 15.-Strong SW. current. Water clear, very little life.

March 18. -Stack NE. current.

Copepods; a few.

Beroë roscota, 1 or 2 small.

.Egina citrea, 3.

March 19.—Strong SW. current.

Copepods; a lew.

? Clione borealis, larva, 1,

Sarsia rosaria, 1 or 2.

March 21.—Current slack.

Copepods; plenty.

Beroë roscola; plenty (one or two a little larger than before).

March 23.—Current NE.

Copepods; plenty.

Autolytus sp.; 2 egg-bearing females.

Beroë roscola; plenty; rather larger.

Legina citrea; 1 or 2.

Sarsia rosaria: 1.

March 24.—Conditions as above. Water muddy.

Copepods; very plenty.

Autolytus sp.; 2 egg-bearing females.

Beroë roseola; a few.

Sarsia rosaria: 1.

March 25.—Conditions as above. Life scanty.

March 28 .- Conditions as above, but water high.

Copepods; a few. Beroë roscola; a few.

Sarsia rosaria; 1, small.

Bursu rosurue; 1, smai

Murch 29.—Conditions as above.

Copepods; a few.

Autolytus sp.; 1 egg-bearing female.

.Egina citrea; 3 or 4.

April 4.- Net loaded with ice-crystals.

April 5.—Current SW. Temperature of water 299.1 F. Water muddy. Net clear of ice. Life scanty.

Beroë roscola; a few; small.

Sarsia rosaria; a few.

April 7.—Conditions as above. Life very scanty.

April 10 .- Conditions as above: Water muddy. Life scanty.

Copepods; a few.

Beroë roscola; a few and small.

.Egina citrea; 2 or 3; very small.

Sarsia rosaria; 1, small.

April 11.-Conditions as above. Life scanty.

. Egina citrea: 2, small.

Sarsia rosaria; 2 or 3 (one larger than usual, about 0.4 inch).

April 12.—Current NE., almost slack. Water muddy. Life very scanty.

April 14.--Current slack. Water and net very muddy. Life very scanty.

April 16.—Current slack. Water and net less muddy. Practically no life.

Until April 24 the current continued slack, and no life was observed. On that date there was a slight SW, current, but practically no life.

April 26.—Current NE., rather strong. Temperature continued the same.

Beroë roscola : 1: small.

. Egina citrea; 1; medium-sized.

Sarsia rosaria; rather plenty.

April 27.--Current NE., slight. Water decidedly milky.

Copepods: a few.

Beroë roscola; a few; small.

Conditions unfavorable for tending the net until May 6.

May 6.-Slight NF, current. Temperature unchanged. Water muddy. Lafe scanty.

Copepods: 1 or 2.

Sarsia rosaria; rather numerous.

May 8 .- NE, current, rather strong. Water muddy.

? Clione borealis, larva; 1.

Sarsia rosaria; rather plenty; very small.

May 10 .- Moderate NE. current. Water muddy. No life.

May 11.—Current slack.

May 14.-Current SW. in morning, slack at night.

Nothing in net. (Found a large Beröii roseola 4 inches long in tide hole, dead and much dilapidated.)

May 15,-Weak NE. current. Water very clear. No life.

May 18 .- Strong NE. current. Water muddy. Life scanty.

Copepods: a few.

Beroë roscola: a few: small.

.Egina citrea; 1 or 2. Sarsia rosaria; a few.

May 19,-Strong NE, current.

? Clione borealis, larva; a good many; no further developed.

Beroë roscola; plenty; very small.

Sarxia rosaria; 1 or 2.

May 21.-Strong NE. current. Water muddy.

? Clione borealis, larva: a few.

Beroë roseola; 2; about 4 inch long.

Sarsia rosaria: 1.

May 22.-No current.

May 23.-Strong NE, current. Life scanty.

? Clione borealis, larva; a few.

A few very small acalephs.

May 24.—Strong NE, current.

? Clione borealis, larva: plenty (some have grown larger).

Berow roscola; very abundant, from very small to size of filbert. (Saw one very large one, 6 or 7 inches long, dead, and somewhat broken.)

Egina citrea ; 1; large.

Melicertum sp.; 1.

Sarsia rosaria: plenty and large (about .75 inch).

May 26 .- Strong NE, current.

? Clione borealis, larva; a few.

. Egina citrea: 2 good-sized ones.

Narsia rosaria : a few.

May 27.-Strong NE, current. Water muddy. Life scanty.

Beroë roscola : 1 or 2.

Sarsia rosaria: 1 or 2.

May 30.—Current slack.

? Clione borealis, larva: a few.

May 31.—Current slack

. Egina citrea; 1; large.

June 2.—Rather strong NE, current. Life scanty.

? Clione borealis, larva; a few.

June 5.-Current slack. No life.

June 7 .- Strong NE. current. Life scanty.

? Clione borcalis, larva; a few.

June 8.-Current NE. Life scanty.

? Clione borealis, larva; a few. Net taken up.

During the whole period in which the net was set the surface temperature of the water remained very nearly constant at 29°.4 F.

The foregoing notes are presented as the first continuous series of observations on surface life during winter in the Arctic regions.

The only reference to any observation of the kind that I have been able to find in any of the accounts of Arctic exploration will be found in Dr. Sutherland's "Journal of a Voyage in Baffin's Bay and Barrow Strait," vol. 1, pp. 440-441. On December 3, 1850, the sea-water in the firehole was observed to be luminous, especially when agitated by the tide-line. \*\* \* \* \* A minute acaleph was discovered which seemed to possess cilia. \* \* \* \* The shape was perfectly globular, except when in a state of motion, and then it was rudely pyramidal." This was probably the young Beroi' roscola which we found so abundant under the ice.

B.—NOTES ON SURFACE LIFE OBSERVED DURING THE VOYAGE FROM SAN FRANCISCO TO POINT BARROW. AND DURING THE SEASON OF OPEN WATER AT POINT BARROW.

#### PACIFIC OCEAN.

#### 1881.

July 19.—Latitude 37° 6′ N.; longitude 124° 33′ W. (at noon). Large numbers of Velella sp. floated past the vessel.

July 20.—Latitude 36° 51′ N.; longitude 126° 33′ W. Velella sp.; less plenty.

July 21.—Latitude 37° 09′ N.; longitude 128° 44′ W. A few Velella sp.

July 23.—Latitude 38° 11' N.; longitude 134° 17' W.

Large numbers of *Lepas* sp. floating in bunches. July 24.—Latitude 39° 10′ N.; longitude 134° 54′ W.

Lepas sp.; plenty. July 25.—Latitude 41° 17' N.; longitude 135° 46' W.

Lepas sp.; plenty. July 26.—Latitude 42° 44′ N.; longitude 136° 18′ W.

Lepas sp. in unusually large numbers. July 28.—Latitude 45° 18' N.; longitude 136° 45' W.

Water filled with the shells of dead Velellw, to some of which were attached a single large blue barnacle (? Lepus sp.); Lepus sp.) plenty.

July 29.—Latitude 45° 02' N.; longitude 139° 37' 45" W.

Large numbers of Velella sp. dead or dying. July 30.—Latitude 45° 30' N.; longitude 141° 40' W.

Dead or dying Velella sp.; still very plenty.

August 4.—Latitude 42° 29' N.; longitude, no observation.

Salpa herculea; saw several.

August 11.—Latitude 54° 15' N.: longitude 158° 58' W.

Temperature of water at noon 52°.2 F. Water full of Medusar.

! Mertensia ovum; saw one.

? Aurelia labiata; plenty and small.

? Cyanea postelsii ; plenty.

? Pelania sp

Staurophora mertensii; very plenty and large.

In crossing Bering Sea we had rough weather and observed no surface life. Aurelia Inbiata was observed in Plover Bay, Eastern Siberia.

### ARCTIC OCEAN.

August 31.—Latitude 69° 01′ N.; longitude 166° 25′ W. Temperature of water, 47° F. Cyanca postelsii; rather plenty.

v large

d and

water

- September 4.—Latitude 70° 21′ N.; longitude 165° 16′ W. (80 miles west of Icy Cape). Temperature of water, 43°.8 F.
  - Water full of Beroë roseola.
- September 5.—Latitude 70° 21' N.; longitude 163° 43' W. Temperature of water, 44°.5 F.
  - Water full of Acatephs; large and healthy.
  - Beroë roscola; plenty.
  - Mertensia ovum; 1.
  - Pleurobrachia rhododactyla; very plenty.
  - Aurelia labiata; plenty.
  - Cyanca postelsii; plenty.
  - Staurophora mertensii; plenty.
- Noticed a few Pteropods.

### STATION, OOGLAAMIE, CAPE SMYTHE,

- September 16 .- Water full of Cyanca postelsii of large size and varying color.
- October 13.-Chrysaora melanaster washed up on the beach.
- November 10.—Water at noon filled with large medusæ, Aurelia labiata and Cyanca postelsii.

  Temperature of water, 29° F.
- November 11.—At noon observed one small living Cyanea postelsii. Temperature of water, 3000 F.
- November 28.—Cyanca postelsii and Aurelia labiata observed through a crack in the ice. Sea closed.

#### 1882.

- January 17.—Cyanca postelsii of large size observed in the hole cut for taking the temperature of the sea-water, which was 280.7 F.
- February 6.—Cyanea postelsii of large size taken in the temperature-hole. Temperature of water, 29° F.
- April 29.—Three living and healthy specimens of Beroi roscola about two inches long were taken in the temperature-hole. Temperature of water, 29° F.
- July 18.—Sea open between shore and grounded ice. Temperature of water, 39° F.
- Water swarming with a small nauplius (Balanus sp.). Observed a few pteropods (Limacina pacifica).
  - Beroë roscola; very bundant; mostly small.
  - Pleurobrachia rhododactyla; very abundant, of all sizes.
  - Aglantha camtschatica; very plenty.
- July 19.—Temperature of water, 40°.2 F.
  - Limacina pacifica; more abundant.
  - Beroë roscola; very abandant; mostly small.
  - Pleurobrachia rhododactyla; very abundant, of all sizes.
  - Chrysaora melanaster; two or three on bottom.
  - Aglantha camtschatica; quite plenty.
- July 24.-Limacina pacifica; rather plenty. Observed only one or two acalephs.
- July 31.—Temperature of water, 49° F. Observed comparatively few medusæ.
- August 19.—Large Chrysaora melanaster, 18 inches across umbrella, washed up on beach.
- August 29.—Picked up a large Aurelia labiata on the beach. Ovaries discharged.
- August 31.—Saw another large Aurelia on the beach,
- September 11 .- Observed one red Cyanea.
- September 15 .- Observed two Aurelia labiate.
  - Cyanca postelsii very abundant; mostly dead or dying. Observed one or two very
  - Two or three Staurophora mertensii washed up on the beach, rather mutilated.
- September 17.—Beroë roscola very plenty out among the loose ice, three or four miles from the shore.

September 20.—Observed a very large Beroë roscola, five inches long, and one Aurelia labicta, in the shoal water close to the shore.

September 28.-Much loose ice.

Beroë roscola and Cyanca postelsii abundant and large.

#### 1863

August 6 .- Water open inside "barrier."

Beroë roscola; about three inches long; very plenty in the pools along the shore.

August 8 .- Water outside the "barrier" full of acalephs. Strong NE. current.

Beroë roscola: large and very abundant.

Mertensia orum: large and very abundant.

Pleurobrachia rhododactyla: large and very abundant.

Sarsia rosaria; plenty and large.

Turris? sp.; plenty and large.

Appendicularia sp.; in enormous numbers of large size.

No acalephs were observed inside the grounded ice.

August 9.—Temperature of water, 34° to 36° F. Inside of grounded ice found surface life abundant.

Sagitta sp.; one taken.

Appendicularia sp.; in myriads.

Beroë roscola; large and small, abundant.

Pleurobrachia rhododactyla: abundant.

Cyanca postelsii; not plenty.

Sarsia rosaria: plenty and large.

Turris? sp.; plenty and large.

August 10 .- Strong NE. current. Temperature of water, 37° F.

Water filled with Appendicularia sp.; both animals and "houses."

Beroë roscola; large and small; very plenty.

Mertensia orum: not plenty.

Gemmaria? sp.; not plenty.

Sarsia rosaria; plenty, large, and flourishing.

August 11.—Beroë roscola; in myriads.

Chrysaora melanaster; abundant in all stages, from Ephyra, about 35 inches in diameter, to adult.

Turris? sp.; very plenty.

August 12.—Berov roscola; plenty. Water full of small white grains, apparently larvae of some description, though their structure could not be made out under the microscope.

August 15.—Very strong NE, current. Many "houses" of Appendicularia sp. drifting about and a good many of the animals free or partially extricated.

Beroë roscola; plenty.

Pleurobrachia rhododactyla; a few.

Bolina sp.; a few.

Cyanca postelsii; one or two small yellow ones.

Chrysaora melanaster; a few dead or dying at the bottom.

Gemmaria? sp.; plenty.

Sarsia rosaria; plenty.

Turris? sp.; plenty.

Sagitta sp.; a few specimens.

August 16.—Life in water as yesterday, but less plenty.

Until August 28, the time of the party was so occupied with the work of closing the station that no zoological observations could be made.

August 28.—Limacina pacifica; abundant, and myriads of the "white grains" above noted.

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August 29.—Crossing the mouth of Peard Bay. Temp. of water 42° F. Observed a few Limacina pacifica: "white grains" very plenty. Beroë roscola and other acalephs rather abundant at night.

#### BERING SEA.

September 4.-Latitude 65° 16' N., longitude 161° 30' W.

Aurelia labiata; not plenty.

Cyanca postelsii; not plenty.

Staurophora mertensii; not plenty.

September 8 .- Anchored off St. Michael's.

Aurelia labiata; not plenty.

Cyanea postelsii; not plenty.

September 9,-Anchored off St. Michael's.

Aurelia labiala; not plenty.

Cyanca postelsii; not plenty (one red one).

September 12.—In Norton Sound. Water at noon full of Aurelia labiata of large size and apparently spawning. A few Cy.inco postelsii observed.

September 13.—In Norton Sound. A few acalephs only observed. We had very rough weather from Norton Sound to Unalaska and observed no surface life.

September 21.—Unalaska. Observed in shoal water close to the beach a peculiar large acaleph about a foot across the umbrella. Closely allied to Aurelia, with very short marginal tentacles, and rather short labial happets. Color, a rich violet blue.

The weather in crossing the Pacific Ocean from Unalaska to San Francisco was generally rough and no observations of any importance could be made.

### C.—LIST OF BIRDS NOTICED AT PLOVER BAY, EASTERN SIBERIA, AUGUST 21 TO 25, 1881.

Anthus sp.; \* rather common round the Eskimo village.

Corvus corax; abundant and remarkably tame round the houses.

Strepsilus interpres; fairly abundant.

Actodromas maculata: one taken.

Actodromas bairdi; one taken badly mutilated.

Pelidna alpina americana?; one immature male taken.

Erewnetes pusitlus; fairly abundant in small flocks.

Phalaropus fulicarius; one small flock seen.

Somateria v-nigra; quite plenty; mostly females and young two-thirds grown,

Phalacrocorax dilophus? ; very plenty.

Rissa tridactyla : plenty.

Larus cachinnans ?;\* plenty and very tame.

Stercorarius parasiticus; several seen flying around the bay in clear weather.

Fratercula corniculata; plenty; one taken.

Lunda cirrhata; plenty.

Ciceronia pusilla? ;\* very numerous in good-sized flocks.

Uria grylle; very numerous.

Lomeia arra?; \* plenty.

These observations were confined to the immediate neighborhood of the "sandspit," where we lay waiting for clear weather to make time-observations at the United States Coast and Geodetic Survey station.

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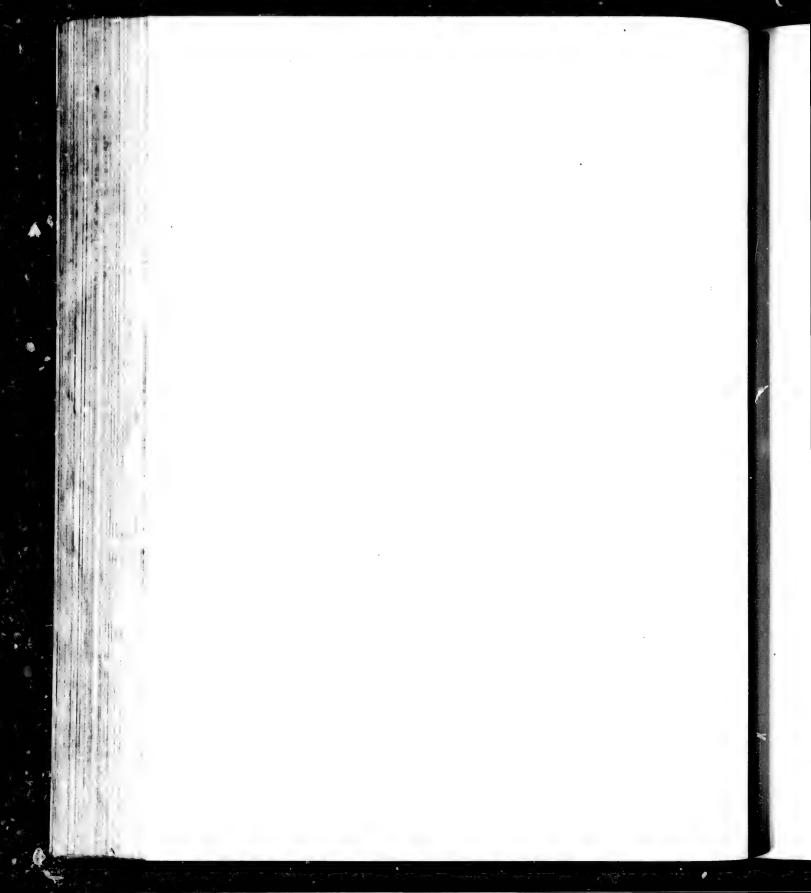
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METEOROLOGY.

H. Ex. 44--26

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## METEOROLOGY.

#### INTRODUCTORY.

I. Meteorological observations were begun on October 18, 1881, and continued without interruption until the station was closed on August 27, 1883. They were then renewed on board of the schooner Leo, and continued till 1 a. m., October 7, 1883, when the vessel was inside the Golden Gate.

From the opening of the station until June 5, 1882, the thermometers and hygrometers were exposed in a shelter placed on the north side of the back storm-porch (see plan of station, pl. 2). This consisted of a box of galvanized iron louvre-work, with a flat roof of the same material, 5 feet long and 4 feet broad, mounted on posts 3 feet above the ground. This was inclosed by wooden louvre-work blinds on the three exposed sides, reaching to the ground, and had a wooden floor. On June 5, 1882, the instruments were removed to a larger and more convenient shelter, farther away from the quarters, extending along the northern side of the building from the northwest corner, and entered by a door at this corner (see plan, as above). This was made of wooden louvrework blinds, fastened to studding, with sealskin deprived of the hair fastened up inside, so as to inclose an air-space of 4 inches open above and below. The roof was of walrus-hide. The shelter was 16 feet long by 4 feet broad, and reached up to the eaves of the building.

The thermometers, &c., used in the observations on the voyage home, were mounted in a shelter of galvanized iron louvre-work, lashed on the starboard side of the quarter-deck.

The barometers were hung in the southeast corner of the quarters, near the window. The wind-vane was placed on the roof, north of the ridge-pole, so that the rod passed down through the ceiling of the wash-room. The anemometer was first mounted on the ridge-pole, at the west end of the building, but on the completion of the bastion, June 15, 1882, was removed to the top of this. The self-register of the anemometer was on the mantel-shelf in the quarters, and the batteries on the shelf in the wash-room. The rain-gauge occupied the place of the anemometer when this was removed.

During the extremely low temperatures it was found impossible to get satisfactory results with the wet- and dry-bulb hygrometer, and the relative humidity was accordingly observed with the hair hygrometer.

The highest temperature observed during the occupation of the station was 60 $^{\circ}$ .5, the lowest  $-52^{\circ}$ .6, giving a range of 113 $^{\circ}$ .1.

Tables showing pressure of air at Ugloamie from October, 1881, to August, 1883,

 $[Barometer\,above\,sea, 17\,feet, -Washington\,mean\,time, -Correction\,for\,mean\,local\,time, --5\,hours\,47\,minutes,]$ 

Date.	1 0.10	9 a.m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	. 5 a. m.	9 a m.	10 a. m.	Ha. m.	12 m.	( t n. m. )	9 11 111
	•	•	.,				•	1			••			- p. m.
1861.														
Oct. 18	20.845	10 ~26	29, 816	29 747	29, 122	29, 713	29,783	29, 770	19, 735		29, 769	29 766	29, 812	29, 69
Oct. 19 .	29, 662	19. 6eB	29, 7.39	29, 757	29, 865	29, 825	29, 828	29, 930	29, 838	29, 858	20, 873	19, 857	29, 961	50, 60
Oct. 20 Oct. 21	29, 952 29, 828	29, 953	29, 963	29, 963	29, 845	20, 856	29, 828	29, 822	29, 838	29, 922 29, 848	29, 910 29, 853	29, 853 29, 853	29, 897	29, 89
Oct. 22	20, 858	29 893	29, 908	29, 926	29, 921	29, 915	29, 860	29.857	29, 835	29, 830	29, 825	29, 823	29, 841	29, 85
Oct. 23	19.763	29, 749	29, 730	29, 709	29, 740	29, 763	29, 718	29, 726	20, 726	29, 720	29, 716	29, 729	29, 738	29, 716
Oct. 24	29, 711	29, 707	1.9, 703	19,699	29,729	29, 709	29, 689	29, 655	29, 618	29, 556	29, 597	29, 628	29, 615	_9, 63
Oct. 25	29, 517	29, 512	29, 516	29, 518	29, 511	29, 499	29, 494	29, 480	29, 406	29, 465	29, 486	29, 472	29, 472	29, 47,
Oct. 26	29, 453	29, 450	29, 471	22, 470	29, 473 29, 695	29, 460 29, 741	29, 428 29, 723	29, 423 29, 727	29, 108 29, 734	29, 402 · 29, 742	29.397 29.751	29, 427	29, 432	29, 42
Oct. 27	29, 660	29 67)	29, 680	.9, 683	20, 0003	20. 741	29, 424	20, 727	239, 1414	200, 7,422	29. 751	29, 771	20, 772	29, 77
Oct. 28 . 3	29, 752	29, 751	21,772	29 759	29, 761	29, 745	29, 740	29, 740	29, 709	29, 722	29, 717	29, 707	29, 698	29, 67
Oct. 20	29,712	29, 714	25, 699	29, 657	29, 695	29, 685	29, 701	29, 697	29, 694	29, 604	29, 761	29, 702	29, 707	29, 76
Oct. 30 Oct. 31	5.3, 746	29, 762	23, 736	29, 773	29, 823 30, 028	29, 834 30, 024	29, 828	29, 835	20, 828	29, 843	29, 828	20, 846	20, 870	29, 85
Oct. 31	29, 985	00, 002	30, 005	30, 943	10, 028	30. 024	30, 034	30 049	30. 053	30.037	30. 071	.,0. 044	30, 089	30, 09
Means.	29, 747	29 750	29, 755	29, 756	29, 765	29, 766	29, 756	29, 753	29, 747	29,743	29, 745	29, 754	29,769	29, 76
Date.	3 15. 311.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m	15 p. m.	12 p. m.	Daily	Max.	Min.	Range.
											means.			
1881.														
Oct. 18	29, 689	29, 689	29, 681	29, 660	29, 654	29, 661	29, 645	29, 640	29, 649	29, 647	29,723	29, 826	29 640	. 18
Oct. 19	29, 933	29, 943	29, 954	29, 961	29, 949	29, 956	29, 978	29, 940	29, 962	29, 956	29,879	30, 038	29, 662	. 17
Oct. 20	29, 875	29, 879	20,862	29, 851	29, 841	29, 853	29. ≥53	29. 844	29, 556	29, 832	29, 900	29, 963	29, 132	13
Oct. 21	29, 860	23, 867	29, 871	29 869	29, 877	29, 864	29, 887 29, 783	29, 897 29, 775	29, 898 29, 761	29, 895 29, 776	29, 858 ° 29, 831	29, 898	29, 817	. 68
Oct. 22	29, 703	29, 787	29, 785	29, 780	20. (89	29, 782	20, 10-3	20, 111	29, 791	20, 7, 6	29, 8.01	29, 926	29, 756	. 17
Oct. 23	29, 741	29, 727	29, 725	29, 735	29, 734	29, 728	29, 721	29, 720	29, 709	19, 709	29, 730	29 763	29, 709	0.5
Oct. 24	29, 589	29, 594	29, 589	29, 581	29, 569	29, 578	29, 574	29, 564	29, 503	29, 539	29, 625	20, 729	29, 533	. 19
Oct. 25	29, 450	29, 457	29, 449	29, 411	29, 442	29, 447	29, 451	29, 412	29, 450	29, 450	29,474	29, 518	29, 441	. 07
Oct. 26	29. 450	29, 471	29, 493	29, 523	29, 548 3 29, 767 3	29, 559 29, 755	29, 570 29, 755	29, 593 29, 753	29, 633	29. 612	29, 484	29, 642	29,397	24
Oct. 27	29, 793	29, 785	29, 779	29, 767	20. (01)	29, 100	29. 433	235, 7433	20. 703	29, 756	29, 744	29, 793	29, 669	. 13
Oct. 28	29, 687 .	29,674	29, 678	29, 669	29, 608	29, 676	29, 674	29, 695	29, 694	29, 711	29, 712	29, 772	29, 666	. 10
Oct. 29	29, 719	20, 717	29, 720	29, 721	20.717	29, 726	29, 737	29, 728	29, 735	29, 743	29, 711	20, 743	20, 685	61.75
Oct. 30	29, 890	29, 901	20, 908	29, 929	29, 932	29, 935	29, 954	20, 973	29, 972	29, 981	29, 866	29, 981	29, 7,66	. 24
Oct. 31	30, 100	30, 100	30. 108	30, 121	30, 117	30. 106	30, 122	30, 125	30, 138	30,149	30.074	30.149	29, 985	. 16
Means	29, 755	29, 756	29, 758	29, 757	29,757	29,759	29,764	29.764	29.768	29.769	29, 758	29, 530	29.680	. 15
													4	

b. Gravity correction.

28 - 10,056 29 - 10,060 30 - 10,060

### EXPEDITION TO POINT BARROW, ALASKA.

## Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

 $[Barometer\ above\ sea, 17\ feet.\quad Washington\ mean\ time.\quad Correction\ for\ mean\ local\ time_i = 5\ hours\ 17\ minutes.]$ 

29, 67 (c) 29, 760 (c) 856 (d) 695 (d) 761 (d) Range .

_		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			11,922112,850									_
Date.	f a. m.	2 a. m.	3 a. m.	4 a.m.	5 a. m.	6 a. m.	7 a. m.	8 n. m.	9 a. m	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1881. Nov. 1	30, 150	30, 153	10, 157	33, 155	30, 150	30, 173	30. 145	30, 133	30.113	30, 105	30, 078	30, 077	30. 07.1	00.001
Nov. 2	129, 860 29, 600	29, 845 29, 603	29, 835 29, 632	29, 817 29, 636	29, 806 29, 654	29, 796 29, 648	29, 751 29, 600	29, 722 29, 597	29, 706 29, 597	29, 686 29, 610	20, 674 20, 622	29, 664 29, 666	29, 670 29, 617	19, 663 29, 616
Nov. 5	29. 618 29. 487 29. 677	29, 608 29, 473 29, 694	29, 614 29, 476 29, 708	29, 601 29, 477 29, 723	29, 583 29, 476 29, 746	29, 571 29, 480 29, 777	29, 578 29, 480 29, 799	29, 579 · 29, 480 29, 803	29, 572 29, 179 29, 821	29, 551 29, 470 29, 864	29, 549 . 29, 478 ! 29, 875	29, 546 29, 451 29, 870	29, 543 29, 493 29, 890	29, 55 <b>F</b> 29, 497, 29, 898
Nov. 7	30, 085	30, 085 30, 170	30, 083 30, 157	30, 085 30, 149	30, 089 30, 141	30, 131 30, 131	30, 145 30, 116	30, 158 30, 108	30, 170	30, 165 30, 083	30, 183	30, 442 30, <b>0</b> 80	30, 17d 30, 682	30, 180 30, 078
Nov. 8 Nov. 9 Nov. 10 Nov. 11	30, 175 29, 948 29, 942 30, 254	29, 937 29, 955 39, 277	29, 953 29, 966 30, 292	29, 956 29, 968 39, 313	29, 947 29, 981 30, 310	29, 932 29, 987 30, 325	29, 891 30, 014 30, 325	29, 873 30, 628 30, 335	29, 889 30, 042 30, 346	29, 875 30, 041	29, 867 30, 078 30, 378	29, 868 30, 079 30, 396	20, 877 30, 081 30, 383	20, 872
Nov. 12 Nov. 13 Nov. 14 Nov. 15 Nov. 16	30, 539 <b>30,686</b> 30, 431 29, 954 29, 986	30 551 30, 683 30, 404 29, 949 29, 993	30, 561 30, 672 30, 382 29, 969 29, 980	30, 564 30, 675 30, 369 29, 958 29, 992	30, 555 30, 670 30, 360 29, 964 30, 003	30, 337	30, 579 30, 668 30, 308 29, 939 30, 029	30, 501 30, 664 50, 284 29, 941 30, 043	30, 592 30, 643 30, 245 29, 928 30, 063	30, 585 30, 649 30, 215 29, 922 30, 073	30, 596 30, 662 30, 197 29, 910 30, 073	30, 597 50, 642 30, <b>191</b> 29, 907 30, 095	30, 600 30, 612 30, 143 29, 897 30, 109	30, 619, 30, 586 30, 120, 13, 880 50, 111
Nov. 17 Nov. 18 Nov. 19 Nov. 20 Nov. 21	30, 290 30, 133 29, 631 29, 427 29, 530	39, 301 30, 122 19, 623 29, 414 19, 546	30, 317 30, 681 29, 630 29, 398 20, 569	30, 317 30, 645 29, 617 26, 385 29, 588	30, 327 30, 048 29, 607 29, 374 29, 314	30, 321 30, 048 29, 596 29, 365 29, 647	30, 319 30, 020 29, 582 29, 390 29, 714	30, 304 29, 903 29, 577 29, 380 29, 749	30, 325 29, 979 29, 563 29, 372 29, 752	30, 357 29, 368 29, 533 29, 372 29, 846	30, 334 29, 952 29, 530 29, 374 29, 874	30, 314 29, 945 29, 516 29, 374 29, 905	30, 264 29, 941 29, 490 29, 377 29, 937	00, 291 29, 926 29, 484 29, 389 29, 969
Nov. 22 Nov. 21 Nov. 24 Nov. 25 Nov. 26	59, 506 ° 59, 501 29, 989 29, 763 29, 6°8	30, 318 30, 286 29, 989 29, 760 29, 611	30, 321 30, 279 29, 992 29, 748 29, 597	30, 326 39, 276 29, 967 29, 740 29, 598	20, 325 30, 263 29, 917 29, 728 29, 607	30, 350 30, 259 29, 880 29, 722 29, 666	30, 585 30, 227 29, 888 29, 698 29, 610	30, 394 30, 196 29, 893 29, 686 29, 619	30, 396 30, 204 29, 871 29, 691 29, 605	30, 404 30, 195 29, 869 29, 674 29, 602	30, 406 30, 160 29, 881 29, 436 29, 598	30, 411 30, 150 29, 851 29, 641 29, 590	30, 418 30, 440 29, 831 29, 615 29, 587	30, 410 30, 122 29, 822 29, 615 19, 592
Nov. 27 . Nov. 28 Nov. 29 Nov. 30	29, 466 29, 230 29, 112 29, 441	29, 457 29, 230 29, 114 29, 429	29, 444 29, 219 29, 118 29, 424	29, 437 29, 212 29, 118 29, 423	29, 413 29, 201 29, 114 29, 430	29, 378 29, 200 29, 112 29, 444	29, 350 29, 200 29, 124 29, 459	29, 329 29, 191 29, 119 29, 170	29, 298 29, 184 29, 094 29, 169	29, 271 29, 171 29, 100 29, 177	29, 225 29, 167 29, 125 29, 496	29, 207 20, 154 29, 180 29, 505	29, 216 29, 143 29, 253 29, 525	29, 192 29, 146 29, 369 29, 547
Means	29,887	29, 886	23, 586	29, 883	29, 889	29, 851	10, 878	29, 874	29, 871	19, 867	29,862	20, 866	29, 867	29, 868
Date.	3 p. m.	1 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 р. ш.	11 p. m.	<b>t2</b> p. m.	Daily means,	Max.	Min.	Rangel
1881 Nov. 1	30,627	00.024	20, 013	29, 996	29, 982	29, 979	29, 963	29, 940	20, 878	29, 857	30, 056	30.173	13.837	. 311
Nov. 2 Nov. 3 Nov. 1 ov. 5 Nov. 6	29, 637 29, 621 29, 554 29, 509 29, 919	29, 626 29, 631 29, 523 29, 528 29, 935	29, 609 29, 624 29, 518 29, 502 29, 948	29, 608 29, 630 29, 507 29, 550 29, 966	29, 607 29, 632 29, 510 29, 561 29, 976	29, 597 29, 634 29, 501 29, 577 29, 997	99, 602 49, 633 29, 488 29, 571 30, 013	29, 587 29, 683 29, 478 29, 574 50, 015	29, 594 29, 626 29, 492 29, 640 30, 037	29, 597 29, 616 29, 483 29, 649 30, 056	29, 699 29, 622 29, 546 29, 518 29, 874	29, 86) 29, 654 29, 618 29, 649 30, 656	29, 587 29, 597 29, 483 29, 470 29, 677	. 273 . 057 . 135 . 173 . 379
Nov. 7 Nov. 8 Nov. 9 Nov. 10 Nov. 11	30, 208 30, 041 29, 893 30, 128 30, 113	50, 216 50, 005 29, 891 50, 152 30, 411	30, 220 30, 025 29, 901 30, 158 30, 163	00, 223 29, 994 29, 894 20, 163 30, 470	00, 218 20, 989 50, 898 60, 167 00, 188	50, 221 29, 957 29, 911 30, 187 39, 487	30, 218 29, 958 29, 912 30, 189 38, 450	30, 225 29, 955 29, 941 30, 201 30, 504	30, 198 23, 948 29, 953 50, 250 77, 523	30, 177 29, 949 10, 936 30, 242 30, 553	90, 167 90, 661 20, 909 30, 087 10, 4 8	90, 925 90, 175 90, 956 90, 942 10	10, 083 29, 949 29, 547 23, 547 10, 173	. 142 . 227 . 089 . 100 . 270
Nov. 12 Nov. 17. Nov. 11. Nov. 11. Nov. 15.	00, 637 30, 591 30, 095 19, 896 30, 179	30, 042 50, 567 50, 650 29, 963 50, 154	30, 641 30, 567 30, 654 29, 921 30, 175	39, 637 30, 548 30, 643 29, 941 50, 170	30, 648 30, 535 30, 008 29, 981 50, 182	30, 659 30, 533 29, 999 29, 975 30, 290	50, 650 30, 526 29, 985 29, 967 50, 212	00, 659 00, 559 20, 972 20, 983 00, 236	1at, 676 59, 489 29, 973 29, 56 5 30, 255	30 (75) 50, 450 29, 931 29, 95 30, 270	30,039 50,634 50,172 53,943 53,168	20,000 20,000 20,000 20,000 20,000		1.7
Nov. 17 Nov. 18 Nov. 19 Nov. 29 Nov. 21	20, 275 29, 870 29, 498 29, 399 30, 045	10, 272 29, 849 29, 496 29, 410 40, 091	20, 151 29, 811 29, 487 29, 421 39, 108	50, 246 29, 774 29, 486 29, 425 50, 129	30, 249 29, 754 29, 487 29, 427 30, 146	30, 200 29, 735 29, 485 29, 439 30, 170	50, 205 29, 712 29, 473 29, 452 50, 176	30, 155 29, 678 29, 453 29, 170 20, 211	30, 172 29, 668 29, 442 29, 490 30, 247	30, 154 29, 630 29, 423 29, 550 30, 273	00, 274 20, 564 20, 529 29, 446 29, 964	0 128 0 131 20 131 10 130 13 201		10:1 40:1 11:1
AUA		1	20, 286	20, 387	30, 366	30, 334 30, 067	30, 320 30, 055	30, 304 30, 036	20, 314 29, 995	30, 502 29, 996	30 561 30, 155 29, 852	03.41% 104.161 23.892		117
Nov. 22 . Nov. 23 . Nov. 24 Nov. 25 Nov. 26	30, 111 30, 137 29, 817 29, 619 29, 583	30, 432 30, 120 29, 806 29, 623 29, 636	29, 818 29, 611 29, 581	20, 686 29, 812 29, 616 29, 575	30, 078 29, 776 29, 620 29, 551	29, 765 29, 608 29, 751	29, 754 29, 607 29, 514	29, 753 29, 614 29, 521	29, 762 29, 616 20, 510	29, 767 29, 611 29, 496	20, 653 20, 581	20, 119	19	1.
Nov. 22 . Nov. 23 . Nov. 24 Nov. 25	30, 137 29, 817 29, 619	30, 120 29, 806 29, 623	29, 818 29, 611	20, 086 29, 812 29, 616	29, 776 29, 620	29, 765 29, 608	20, 607	-29.614	29, 616	29, 611	20,652	. 1, 764	11.00	
Nov. 22 Nov. 23 Nov. 24 Nov. 25 Nov. 26 Nov. 27 Nov. 28 Nov. 28	20, 137 29, 817 29, 619 29, 583 29, 188 29, 141 29, 347	20, 120 29, 806 29, 623 29, 636 29, 136 29, 138 29, 407	29, 614 29, 818 29, 614 29, 581 29, 179 29, 135 29, 435	20, 086 29, 812 29, 616 29, 575 29, 484 20, 130 29, 438	29, 776 29, 620 29, 551 20, 182 29, 113 29, 454	29, 765 29, 608 29, 551 29, 186 29, 110 29, 460	29, 607 29, 544 29, 186 29, 105 29, 470	29, 614 29, 524 29, 188 29, 103 29, 465	29, 616 20, 510 29, 200 29, 105 29, 454	29, 611 29, 496 29, 269 29, 196 29, 147	20, 652 20, 581 29, 274 29, 160 20, 264	20, 763 20, 110 20, 406 20, 230 20, 470	29.10.1 29.10.1 29.091	12. 12. 12. 12.

## Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

 $\{Barometer\ above\ sea,\ 17\ f.ect.\quad Washington\ mean\ time.\quad Correction\ for\ mean\ local\ time,\ -5\ bours\ 17\ minutes.\}$ 

									,					Arm may
Date.	4 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m
1881. Dec. 1	29. 929	29, 958	29, 577	30, 021	30, 040	30, 084	30. 080	30. 085	30. 100	30, 121	20. 115	30, 117	20, 111	30, 112
Dec. 2 Dec. 3 Dec. 4 Dec. 5 Dec. 6	30, 039 20, 259 29, 890 29, 690 29, 902	30, 021 29, 251 29, 865 29, 694 29, 910	29, 672 29, 265 29, 869 29, 697 29, 928	29, 974 29, 267 29, 849 29, 700 29, 957	29, 949 29, 259 29, 854 29, 710 29, 927	29, 935 29, 272 29, 849 29, 715 29, 953	29, 910 29, 288 29, 828 29, 725 29, 956	29, 883 29, 300 29, 862 29, 736 29, 968	29, 844 29, 328 29, 794 29, 736 29, 973	29, 825 29, 394 29, 775 29, 748 29, 983	29, 788 29, 397 29, 772 29, 758 29, 985	29, 728 29, 475 29, 754 29, 763 29, 996	29, 691 29, 537 29, 745 29, 770 29, 997	29, 660 29, 564 29, 738 29, 773 30, 666
Dec. 7 Dec. 8 Dec. 9 Dec. 10 Dec. 11	30, 000 30, 129 30, 171 30, 083 30, 103	30, 011 30, 129 30, 176 30, 066 30, 117	29, 090 30, 127 30, 159 30, 058 30, 108	30, 006 30, 138 30, 169 30, 052 30, 163	30, 010 30, 138 30, 178 30, 049 30, 102	30, 020 30, 149 30, 171 30, 044 30, 103	30, 029 30, 147 30, 171 30, 046 30, 100	30, 037 30, 161 30, 168 30, 049 30, 097	30, 032 30, 167 30, 151 30, 044 30, 688	30, 027 30, 163 30, 150 30, 053 30, 076	30, 037 30, 163 30, 141 30, 048 30, 047	30, 030 30, 169 30, 129 30, 052 30, 035	30, 632 30, 171 30, 115 30, 042 30, 028	30, 047 30, 175 30, 124 30, 048 30, 044
Dec. 12 Dec. 13 Dec. 14 Dec. 15 Dec. 16	29, 776 29, 703 29, 879 29, 746 29, 739	29, 774 29, 694 29, 887 29, 753 29, 724	29, 758 29, 086 29, 856 29, 754 29, 715	29, 767 29, 697 29, 868 29, 755 29, 704	29, 708 29, 703 29, 868 29, 776 29, 704	29, 760 29, 696 29, 872 29, 770 29, 686	29, 781 29, 710 29, 851 29, 776 29, 674	29, 781 29, 724 29, 843 29, 778 29, 663	29, 782 29, 729 29, 829 29, 768 29, 652	29, 789 29, 743 29, 826 29, 776 29, 641	29, 789 29, 743 29, 805 29, 759 29, 635	29, 791 29, 759 29, 804 29, 763 29, 628	29, 796 29, 766 29, 811 29, 772 29, 627	29, 787 29, 787 29, 797 29, 773 29, 609
Dec. 17 Dec. 18 Dec. 19 Dec. 20 Dec. 21	29, 501 29, 816 30, 123 39, 013 30, 095	30, 129	29, 506 29, 849 30, 136 29, 909 30, 092	29, 582 29, 864 30, 134 29, 998 30, 097	29, 582 29, 884 39, 139 29, 985 30, 102	29, 582 29, 897 39, 136 29, 986 30, 694	29, 588 29, 923 30, 131 29, 981 30, 103	29, 600 20, 012 30, 137 29, 976 30, 107	29, 602 29, 930 30, 128 20, 979 30, 161	29, 603 29, 949 30, 091 29, 969 30, 116	29, 602 29, 953 39, 088 29, 959 30, 081	29, 601 29, 963 30, 081 29, 978 30, 067	29, 611 29, 984 30, 074 29, 990 39, 064	29, 631 29, 989 30, 962 29, 999 30, 666
Dec. 22 Dec. 23 Dec. 24 Dec. 25 Dec. 26	29, 898 29, 475 29, 405 29, 389 29, 213	29, 878 29, 439 29, 107 29, 377 29, 218	29, 857 29, 424 29, 467 29, 368 29, 208	29, 831 29, 415 29, 107 29, 336 29, 212	29, 808 29, 408 29, 409 29, 339 29, 218	29, 772 29, 400 29, 417 29, 339 29, 218	29, 769 29, 463 29, 452 29, 324 29, 226	29, 744 29, 383 29, 456 29, 325 29, 231	29, 722 29, 368 29, 456 29, 330 29, 230	29, 713 29, 366 29, 452 29, 322 29, 251	29, 699 29, 355 29, 454 29, 287 2 1 241	29, 670 29, 345 29, 459 29, 271 29, 240	29, 649 29, 329 29, 462 29, 254 29, 239	29, 645 29, 342 29, 464 29, 256 29, 242
Dec. 27	29, 415 30, 023 30, 324 20, 931 30, 03-	29, 444 30, 659 30, 320 29, 913 30, 639	29, 451 20, 079 33, 280 29, 899 30, 040	29, 476 35, 125 30, 276 29, 898 30, 044	29, 488 30, 143 30, 266 29, 905 30, 052	29, 517 30, 163 30, 264 29, 915 30, 057	29, 552 30, 197 30, 260 29, 947 30, 046	29, 575 30, 215 30, 235 29, 941 30, 047	25, 597 30, 241 30, 221 29, 948 30, 045	25, 609 30, 269 30, 215 29, 966 30, 040	29, 634 30, 276 39, 180 29, 969 30, 035	29, 668 30, 281 30, 155 29, 870 30, 033	29, 677 30, 282 30, 151 29, 972 30, 035	29, 716 30, 310 30, 134 29, 978 30, 647
					00	29, 834	29, 838	110 117	29, 836	29, 839	29, 832	29, 831	29, 832	29, 834
Means	29, 832	29, 832	29.526	29, 829	29, 831	20.834	20.000	29, 837	217, 600	29. 609	215, 602	20, Col	20.002	20,000
Moans : Date.	29, 832 3 p. m.	29, 832 1 p. m.		29. 829 6 p. m.		5 p. m.		10 p. m.		12 p. m.	Daily means.	Max.	Min.	Range.
:										. !	Daily		!!!	Range.
Date.	3 p. m.	1 p. m.	5 р. т.	6 p. m.	7 p. m.	5 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Range.
Date.  1881. Dec. 1  Dec. 2 Dec. 3 Dec. 4 Dec. 5	3 p. m. 3 30, 123 29, 606 29, 654 29, 723 29, 791	1 p. m. 50, 159 29, 566 29, 766 29, 729 29, 729	5 p. m. 30, 155 29, 514 20, 766 29, 709 19, 816	8 p. m. 30, 455 29, 477 29, 793 29, 714 29, 823	7 p. m. 20, 406 20, 803 29, 710 29, 823	5 p. m. 30, 130 29, 569 29, 842 29, 693 29, 849	9 p. m. 30, 101 29, 349 29, 678 29, 678 29, 863	30, 120 29, 324 29, 877 29, 678 20, 863	1f p. m. 50, 098 29, 307 29, 900 29, 683 29, 877	12 p. m. 30, 696 29, 276 29, 880 20, 676 29, 896	Daily means. 30, 089 29, 684 29, 558 29, 766 20, 776	Max. 30, 159 30, 039 20, 900 29, 890 29, 896	Min. 29, 929 29, 276 20, 251 20, 676 20, 690	Range, . 22a
1881. Dec. 1 Dec. 2 Dec. 3 Dec. 5 Dec. 6 Dec. 6 Dec. 7 Dec. 9 Dec. 10	3 p. m. 3 29, 606 29, 654 29, 794 30, 626 30, 175 80, 136 1 30, 064 50	1 p. in. 20, 159 29, 566 29, 708 29, 798 29, 798 39, 020 00, 079 00, 137 30, 064	5 p. m. 30, 155 29, 514 29, 766 29, 709 19, 816 30, 019 20, 083 30, 185 30, 133 30, 658	8 p. m. 30, 455 29, 477 29, 793 29, 714 29, 823 30, 019 30, 689 30, 135 30, 071	7 p. m. 20 138 29, 406 29, 803 29, 710 20, 823 50 001 30, 086 30, 132 50, 071 39, 086 30, 132 50, 071	\$ p. m.  20, 130  29, 369  29, 842  29, 693  30, 106  30, 683  30, 168  30, 683	9 p. m. 30, 101 29, 349 29, 673 29, 863 39, 000 30, 098 50, 167 50, 078	39, 120 29, 324 29, 877 29, 678 29, 863 29, 995 30, 114 39, 175 30, 094	14 p. m. 20, 098 29, 007 29, 000 29, 683 29, 877 20, 012 40, 117 70, 157 30, 090 29, 819 29, 819 29, 819	30, 696 29, 276 29, 880 29, 676 29, 896 30, 600 30, 124 30, 160 30, 083 30, 089	Daily means.  30, 089  29, 684 29, 558 29, 766 29, 980  30, 052 30, 130 30, 062	Max.  30, 159  30, 039  29, 890  29, 896  30, 026  30, 124  30, 185  30, 178  30, 178	29, 929 29, 276 20, 276 20, 676 29, 690 29, 902 29, 909 30, 127 30, 078 30, 042	Range,  , 250 , 669 , 214 , 206 , 121 , 125 , 058 , 100 , 057 , 526 , 197 , 106 , 648
Date.  1881. Dec. 1  Dec. 2 Dec. 3 Dec. 4 Dec. 4 Dec. 5 Dec. 6 Dec. 7 Dec. 9 Dec. 11 Dr. 12 Dec. 14 Dr. 12 Dec. 14 Dr. 13 Dr. 14 Dr. 15	3 p. m. 30, 123 20, 606 29, 654 29, 724 29, 724 30, 064 30, 175 30, 064 29, 789 20, 789 20, 789 20, 789	1 p. m. 20, 150 20, 566 20, 706 20, 729 20, 729 20, 177 30, 177 30, 674 10, 964 10, 978 20, 782 20, 782 20, 788 20, 789 20, 778	5 p. m. 30, 155 29, 514 29, 769 29, 769 19, 819 20, 083 30, 183 30, 183 30, 183 30, 183 20, 98 29, 782 29, 782 29, 782 20, 782 20, 782 20, 782 20, 782	6 p. m. 30, 155 29, 477 29, 703 29, 714 29, 823 30, 168 30, 168 30, 168 30, 175 20, 671 19, 039 29, 787 29, 787 29, 787	7 p. m. 20 406 29, 803 29, 710 29, 823 30 403 30, 103 30, 103 29, 773 29, 773 29, 773 29, 774 29, 775	\$ p. m.  30, 130  29, 369  29, 842  29, 693  30, 106  30, 683  30, 683  30, 683  30, 684  29, 878  29, 751  29, 768  29, 768  29, 719  30, 608  30, 611  30, 621  30, 631  30, 641  30, 643  30, 641  30, 643  30, 641  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648  30, 648	9 p. m. 29, 340 29, 349 29, 678 29, 863 30, 090 30, 098 30, 167 30, 098 30, 084 29, 744 10, 866 29, 763 29, 763 29, 763 29, 763	30, 120 29, 324 29, 877 29, 678 29, 867 29, 905 30, 114 30, 175 30, 091 30, 095 29, 816 20, 754 20, 754 20, 754	14 p. m. 20, 098 29, 307 29, 900 29, 877 50, 012 50, 117 70, 157 70, 090 29, 819 29, 711 29, 833 29, 756	12 p. m. 30, 096 29, 276 29, 880 29, 676 29, 800 30, 124 30, 160 30, 083 30, 099 29, 791 29, 708 29, 868 29, 751 29, 751 29, 751	Daily means. 30, 089 29, 684 29, 766 29, 776 29, 976 30, 052 30, 159 30, 062 20, 768 29, 778 29, 814 29, 814 29, 744	Max.  90, 150  90, 039  29, 800  92, 890  93, 896  30, 124  90, 185  30, 178  90, 099  90, 117  29, 893  20, 883  20, 887  27, 783	Min.  29, 929 29, 276 29, 251 29, 676 29, 690 29, 999 30, 127 30, 078 30, 042 29, 791 29, 686 29, 751 29, 751	Range,  , 250 , 669 , 214 , 206 , 121 , 125 , 058 , 100 , 057 , 526 , 197 , 106 , 648
1881, Dec. 1.  1881, Dec. 1.  Dec. 2.  Dec. 2.  Dec. 3.  Dec. 4.  Dec. 5.  Dec. 6.  Dec. 10.  Dec. 10.  Dec. 11.  Dec. 12.  Dec. 13.  Dec. 14.  Dec. 15.  Dec. 16.  Dec. 19.  Dec. 10.  Dec. 20.	3 p. m. 30, 123 29, 600 29, 634 29, 784 39, 625 30, 175 30, 175 30, 176 29, 789 29, 789 29, 789 29, 780 29, 620 29, 630 00, 031 00, 033	1 p. m.  00, 150  29, 566  29, 766  29, 768  59, 029  29, 178  50, 157  50, 157  50, 157  50, 157  50, 157  50, 167  50, 167  50, 167  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670  50, 670	5 p. m. 30, 155 29, 514 29, 766 29, 709 19, 816 30, 185 30, 183 30, 183 30, 183 30, 183 30, 183 30, 183 30, 183 30, 183 30, 183 30, 183 29, 86 29, 86 20, 792 20, 792 20, 622 19, 622 19, 63 30,  6 p. m. 30, 155 29, 477 29, 774 29, 783 30, 195 30, 19	7 p. m. 20 108 29, 406 29, 803 29, 804 60 601 122 60, 607 122 60,	\$ p. m.  00, 100  29, 069  29, 842  29, 693  29, 849  30, 103  30, 661  29, 878  20, 716  20, 768  20, 768  20, 768  20, 768  20, 768  20, 768  20, 768  20, 768  20, 768  20, 600  20, 718	9 p. m. 20, 101 29, 349 29, 678 29, 863 29, 863 39, 606 30, 107 30, 081 29, 763 29, 763 20,	50, 120 29, 324 29, 877 29, 673 29, 663 29, 995 30, 175 50, 091 30, 685 29, 816 20, 719 20, 754 20, 759 20, 761 20, 089 30, 014 30, 068	14 p. m. 50, 098 29, 307 29, 800 29, 883 29, 877 50, 012 50, 157 50, 090 50, 090 50, 819 50, 756 50, 776 50, 756 50,  12 p. m. 30, 696 29, 276 29, 880 29, 896 30, 092 30, 163 30, 083 30, 089 20, 791 29, 793 29, 868 29, 751 29, 586 29, 751 29, 586 20, 751 20, 756 20, 600 20, 6	Daily means. 30, 089 29, 684 29, 558 29, 766 29, 776 29, 98, 159 30, 159 30, 159 30, 103 29, 778 29, 811 29, 644 29, 644 29, 647 30, 083 30, 013	Max.  00, 159  00, 039  29, 900  19, 896  30, 024  30, 185  30, 178  30, 187  29, 791  29, 896  30, 020  30, 117	Min.  29, 929  29, 276  29, 251  29, 696  29, 999  29, 999  30, 127  30, 642  29, 791  29, 794  29, 784  29, 785  29, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586  20, 586	Range,  250  763  649  244  206  127  125  058  197  106  198  1 197  106  114  224  224  231  123  148		
Date	3 p. m. 20, 654 29, 723 29, 664 29, 723 30, 625 30, 115 30, 125 30, 126 29, 784 29, 784 29, 667 20, 66	1 p. in.  20, 159 29, 566 29, 766 29, 766 20, 729 29, 788 30, 020 33, 677 30, 1374 10, 974 10,	30, 155 29, 514 29, 769 29, 769 29, 709 20, 818 30, 193 30, 183 30, 183 30, 183 20, 886 20, 88	6 p. m.  30, 155 29, 477 29, 704 29, 704 29, 714 29, 714 29, 823 30, 019 30, 088 30, 168 30, 168 20, 847 20, 797 20, 797 20, 797 20, 797 20, 686 30, 029 30, 029 20, 500 20, 5	7 p. m.   100 to8   20, 466   20, 863   20, 710   20, 863   30, 10	\$ p. m.  50, 150 29, 693 29, 842 29, 693 30, 106 30, 083 30, 106 30, 661 29, 878 40, 719 50, 068 30, 071 50, 766 29, 776 20, 768 20, 776 20, 768 20, 776 20, 768 20, 776 20, 768 20, 776 20, 768 20, 776 20, 768 20, 776 20, 768 20, 776 20, 7	9 p. m.  30, 101  29, 340  20, 830  29, 678  29, 863  30, 000  30, 107  30, 081  20, 852  20, 750	50, 120 29, 324 29, 877 29, 678 20, 863 30, 995 30, 1145 30, 693 30, 175 30, 691 30, 695 29, 816 20, 749 20, 754 20, 7	14 p. m.  50, 098 29, 307 29, 900 29, 683 29, 877 50, 012 50, 115 50, 100 20, 819 29, 714 29, 753 30, 102 30, 102 30, 102 30, 102 30, 102 30, 022 29, 911 29, 756 30, 102 30,	30, 096 29, 276 29, 826 29, 836 30, 000 30, 129 30, 083 30, 083 30, 083 29, 868 29, 701 20, 701 20, 705 29, 868 30, 120 30, 083 30, 083 29, 868 29, 548 29, 548 29, 485 29, 485 29, 395 29, 395 29, 395	Daily means. 30, 089 29, 684 29, 558 29, 766 29, 766 29, 766 29, 766 29, 776 30, 159 30, 130 3	Max.  90, 159  90, 039  29, 890  29, 890  30, 124  30, 187  30, 197  30, 117  30, 19	Min.  29, 929  29, 276  20, 251  20, 676  20, 690  29, 992  20, 999  30, 048  20, 791  29, 794  29, 794  29, 795  29, 816  29, 586  29, 586  29, 587  20, 816  29, 588  20, 816  20, 581  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 582  20, 816  20, 81	Range,  250 - 562 - 649 - 214 - 206 - 121 - 125 - 058 - 106 - 057 - 056 - 058 - 197 - 106 - 048 - 103 - 224 - 304 - 123 - 148
Date	3 p. m.  30, 123  20, 600  20, 604  20, 723  20, 723  30, 021  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  30, 123  20, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 672  30, 673  30,	1 p. in.  20, 159  29, 566  29, 768  20, 778  30, 177  30	5 p. m. 30, 155 29, 514 29, 746 29, 746 29, 746 29, 746 30, 183 30, 183 30, 638 29, 746 20, 77	8 p. m. 30, 155 29, 477 29, 703 1 29, 774 29, 703 1 29, 829 30, 168 1 30, 671 1 29, 767 29, 777 29, 777 29, 777 29, 674 29, 777 29, 674 29, 777 29, 674 29, 777 29, 674 29, 675 29, 67	7 p. m.   20 108   20 406   20 406   20 803   20 710   20 803   20 10 00   10 20 803   20 10 20   20 1	\$ p. m.  29, 369 29, 869 29, 869 30, 106 30, 088 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 168 30, 169 30, 169 30, 169 30, 169 30, 169 30, 169 30, 170 30, 189 30, 1	9 p. m. 30, 101 29, 340 29, 678 29, 678 29, 678 30, 000 30, 098 30, 107 30, 078 30, 107 30, 078 30, 000 29, 740 29, 740 29, 740 29, 740 29, 740 29, 740 29, 740 20, 20 29, 20 29, 20 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 20, 30 30, 40 30,	50, 120 29, 324 29, 877 29, 678 20, 863 20, 995 30, 114 30, 175 30, 091 30, 175 30, 091 30, 685 29, 816 20, 820 400 400 400 400 400 400 400 400 400 4	14 p. m.  20, 098  29, 307  29, 900  29, 683  29, 877  30, 090  20, 819  20, 776  30, 102  30, 103  30, 102  30, 102  30, 102  30, 102  30, 102  30, 102  30, 103  30, 102  30	30, 696 29, 276 29, 826 29, 830 20, 676 29, 896 30, 000 30, 124 30, 163 30, 083 30, 083 30, 083 20, 701 29, 708 29, 868 30, 120 30, 046 30, 120 30, 046 30, 120 30, 047 20, 232 20, 232 20, 232 20, 232 20, 232 20, 232 20, 33	Daily meuns. 30, 089 29, 684 29, 558 29, 766 29, 766 29, 766 29, 760 30, 052 30, 130 3	Max.  00, 159 00, 039 29, 890 39, 890 30, 124 30, 178 30, 178 30, 179 30, 177 29, 783 20, 883 30, 120	Min.  29, 929  29, 276  29, 251  20, 676  29, 992  20, 999  30, 078  30, 042  20, 791  29, 791  29, 793  20, 816  30, 512  20, 816  30, 512  20, 512  30, 513  30, 51	Range,  220  - 563  - 649  - 214  - 206  - 121  - 125  - 058  - 105  - 058  - 107  - 106  - 107  - 107  - 108  - 107  - 1

Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

cter above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes.]

	{ Birr	ometer ab	ove sea, 1	7 feet.	Vashingt	on mean t	ime. Cor	rection f	or mean l					
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
18-2. Jan. 1 Jan. 2 Jan. 3 Jan. 4	29, 963 29, 906 29, 707 29, 754 29, 754	20, 957 29, 964 29, 761 29, 761 19, 792	29, 933 29, 907 19, 763 29, 759 29, 784	29, 935 29, 907 29, 749 29, 770 29, 785	29, 952 29, 909 29, 761 29, 769 29, 789	29, 920 29, 913 29, 767 29, 768 29, 801	20, 926 29, 912 29, 764 29, 759 29, 810	29, 909 29, 892 29, 751 29, 773 29, 818	20, 909 29, 897 29, 759 29, 764 29, 814	29, 695 29, 888 29, 753 29, 753 29, 753 20, 818	29, 923   29, 857   29, 749   29, 767   29, 814	29, 897 29, 845 29, 749 29, 754 29, 820	29, 918 29, 869 29, 747 29, 758 20, 832	29, 88 29, 87 29, 73 29, 76 29, 82
fan. 6 fan. 7 fan. 8 fan. 9	29, 759 29, 858 29, 978 30, 051 30, 163	29, 755 29, 871 29, 987 39, 983 30, 167	29, 774 29, 873 29, 903 30, 085 33, 176	29, 795 29, 861 29, 609 30, 684 50, 189	29, 822 29, 870 29, 995 30, 693 30, 184	29, 842 29, 871 30, 007 30, 093 30, 184	20, 861 29, 888 30, 027 30, 108 30, 185	29, 851 29, 802 30, 016 30, 109 30, 171	29, 838 29, 887 30, 015 30, 166 30, 153	19, 834 29, 833 30, 022 30, 115 30, 139	29, 820 29, 943 30, 626 30, 108 30, 138	29, 820 29, 948 30, 028 30, 100 30, 145	29, 825 29, 949 30, 033 30, 112 30, 151	29, 83 29, 93 30, 03 30, 12 30, 14
ten. 11 in. 12 fan. 13 fan. 11 fan. 15	20, 068 26, 821 28, 756 29, 896 20, 175	00, 063 13, 770 28, 797 10, 930 10, 152	00, 046 28, 721 28, 807 29, 997 30, 146	20, 017 28, 662 28, 874 30, 056 30, 430	29, 978 28, 597 28, 918 30, 102 30, 425	29, 950 28, 548 28, 970 30, 451 30, 412	20, 892 28, 488 28, 999 30, 166 30, 396	20, 848 28, 413 29, 046 30, 225 30, 374	29, 801 28, 364 23, 094 30, 271 30, 353	29, 726 28, 354 29, 131 30, 286 30, 344	29, 605 28, 276 29, 169 30, 326 30, 316	23, 590 28, 266 29, 209 30, 370 30, 295	29, 540 28, 298 29, 246 30, 402 30, 281	29, 47 28, 32 29, 28 30, 42 30, 24
lan. 16 lan. 17 lan. 18 lan. 19 lan. 20	29, 786 29, 777 29, 529 29, 775	10,967 19,787 19,479 29,523 29,794	29, 965 19, 786 29, 776 19, 513 29, 809	29, 935 19, 789 29, 777 29, 515 19, 850	29, 927 29, 768 29, 769 29, 523 19, 861	29, 519 29, 764 29, 747 29, 532 29, 839	29, 896 29, 770 29, 744 29, 524 29, 688	29, 8±0 29, 734 29, 708 29, 532 29, 905	29, 874 29, 724 29, 689 29, 535 29, 911	29, 836 ; 29, 717 ; 29, 652 ; 29, 542 ; 19, 331	29, 834 29, 717 29, 620 29, 548 29, 951	29, 822 29, 723 29, 605 29, 555 20, 968	29, 819 29, 713 29, 602 29, 570 29, 568	29, 81 29, 72 29, 51 29, 57 30, 00
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an 26 lan 27 an 28 lan 29 lan 30	29, 63 ) 29, 736 29, 986 29, 993 30, 113	29, 633 29, 728 29, 984 29, 984 30, 125	29, 628 29, 784 29, 5, 9 29, 978 30, 134	1.9, 633 29, 744 29, 996 29, 976 30, 133	29, 641 29, 750 30, 006 29, 985 30, 149	29, 656 29, 757 30, 617 29, 9,5 30, 161	29, 656 29, 754 30, 649 29, 985 30, 161	29, 666 29, 753 30, 069 29, 972 30, 158	29, 681 29, 753 39, 004 29, 9e0 50, 173	29, 697 19, 759 50, 604 29, 980 30, 159	29, 719 29, 774 29, 983 29, 981 20, 155	29, 724 29, 788 29, 989 29, 981 30, 144	29, 741 29, 799 29, 983 29, 998 30, 131	29, 74 29, 80 29, 93 30, 00 30, 11
lan. 31	29, 870	29, 837	29, 797	29, 756	29, 722	29, 6:6	29, 628	29, *66	29, 539	29, 501	29, 472	29, 438	29, 408	29. 3
Means	29,434	29, 837	29, 835	29, 835	29, 835	29, 835	29, 828	29, 817	29, 812	29, 801	29, 862	29, 795	29, 800	29.79
Date.	3 p. m.	<b>t</b> p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Range
1882 an. 1 an. 2 an. 3 an. 1	29, 869 29, 726 29, 775	20, 882 29, 854 29, 734 29, 776 29, 854	29, 906 29, 857 29, 745 29, 780 29, 851	29, 905 29, 859 29, 755 29, 788 29, 846	20, 300 29, 848 29, 744 29, 774 20, 845	29, 504 29, 800 29, 740 29, 779 29, 813	29, 8-9 29, 819 29, 743 29, 780 29, 841	20, 904 29, 823 29, 743 29, 803 20, 840	29, 911 29, 809 29, 751 29, 799 29, 851	29, 915 29, 817 29, 753 29, 799 29, 859	29, 915 29, 869 29, 752 29, 776 29, 824	29, 968 29, 912 29, 797 29, 803 29, 859	29, 882 29, 869 29, 726 29, 753 29, 784	. 0
an. 6 an. 7 an. 8 an. 9 an. 19	30. 125	29, 850 29, 924 30, 063 30, 140 30, 131	29, 854 29, 936 30, 071 30, 142 30, 133	29, 851 29, 936 30, 069 30, 146 30, 128	29, 850 29, 934 30, 064 30, 145 30, 129	29, 850 29, 940 30, 063 20, 139 30, 113	29, 850 29, 949 30, 063 30, 147 30, 109	29, 547 29, 942 30, 674 30, 165 30, 093	29, 856 29, 958 30, 089 30, 156 30, 682		29, 831 29, 915 30, 634 30, 119 30, 142	29, 863 29, 970 30, 072 30, 162 30, 185	29, 755 29, 858 29, 978 30, 051 30, 075	. 0
lan 11 lan 12 lan 13 lan 14 lan 15	29, 431 28, 354 29, 348 30, 462 30, 222	29, 374 28, 396 29, 399 30, 485 50, 212	29, 032 28, 447 29, 441 30, 488 30, 182	29, 262 28, 485 29, 501 50, 489 50, 145	29, 205 28, 517 29, 551 30, 515 30, 146	29, 151 28, 536 29, 610 30, 516 30, 111	29, 084 1 28, 590 29, 660 1 00, 530 30, 100	29, 618 28, 642 29, 726 30, 519 30, 160	28, 939 28, 699 29, 792 <b>39,543</b> 30, 655	28, 905 28, 716 29, 897 30, 516 30, 627	29, 558 28,511 29, 258 30,325 50, 174	30, 068 28, 821 29, 837 30,543 30, 482	28, 905 28, 266 28, 756 29, 890 30, 027	. 1 . 5 . 6 . 6 . 4
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96 14 19 27 16 28	30, 023	29, 759 29, 870 30, 005 39, 620 50, 119	29, 752 29, 888 29, 994 30, 047 10, 000	19, 749 29, 898 29, 984 30, 046 30, 071	29, 751 29, 914 29, 984 30, 053 50, 048	29, 750 29, 929 29, 980 30, 061 30, 023	29, 750 29, 951 29, 979 39, 678 59, 111	29, 7.10 29, 945 20, 989 30, 679 19, 986	19, 741 29, 969 29, 908 30, <b>104</b> 19, 955	29, 734 29, 979 29, 996 30, 113 19, 923	29, 705 29, 826 29, 993 30, 617 70, 096	29, 75 ) 29, 979 30, 917 30, 113 30, 161	29, 977	
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29 29	29, 367	29, 374	29, 561	29, 322	20, 038	. 20, 337	29, 551	20, 147	29, 550	29, 374	20, 505	29, 873	29, 132	

30, 112

29, 836

Range.

Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

{Barometer above sea, 47 feet. Washington mean time. Correction for mean local time, ~5 hours 17 minutes.}

Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	3 a. m.	6 a. m.	7 n. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	I p. m.	2 n. m
1882. Fob. 1 Feb. 2 Feb. 3 Feb. 4	29, 379 20, 432 29, 313 29, 413	29, 389 29, 417 29, 309 29, 115	29, 397 29, 414 29, 310 29, 427	29, 410 29, 407 29, 310 29, 412	29, 428 29, 418 20, 316 29, 452	29, 433 29, 418 20, 328 29, 470	29, 452 29, 411 13, 323 29, 470	29, 450 29, 393 29, 325 29, 479	29, 456 29, 383 29, 323 29, 501	29, 458 29, 370 29, 332 29, 532	29, 468 29, 355 29, 335 29, 532	29, 465 19, 346 29, 344 20, 549	29, 475 29, 500 29, 345 29, 574	19 470 29, 925 29, 955 29 449
Feb. 5 Feb. 7 Feb. 8 Feb. 9	29, 836 29, 522 29, 577 29, 650 29, 641	29, 834 29, 520 29, 582 29, 611 20, 635	29, 807 29, 520 29, 574 29, 641 29, 620	29, 829 29, 510 29, 569 29, 622 29, 624	29, 826 29, 531 29, 576 29, 636 29, 625	29, 811 29, 530 20, 589 20, 632 20, 629	20, 793 29, 523 29, 589 29, 621 29, 619	29, 794 29, 545 29, 584 29, 624 29, 614	29, 769 29, 515 29, 587 29, 631 29, 617	29, 751 29, 516 29, 593 29, 635 29, 622	29, 714 29, 501 29, 576 29, 635 29, 617	29, 704 29, 500 29, 571 29, 635 29, 621	29, 689 29, 501 29, 583 29, 631 29, 630	19, 667 29, 514 29, 504 19, 654 29, 611
Feb. 10 Feb. 11 Feb. 12 Feb. 13 Feb. 14	29, 656 29, 819 30, 983 29, 830 29, 962	29 631 29, 833 30, 971 29, 820 29, 976	29 624 29, 849 50, 076 29, 814 29, 991	29, 602 29, 869 20, 073 29, 807 30, 016	29, 588 29, 880 30, 074 29, 807 30, 051	29, 577 29, 964 50, 065 29, 803 50, 086	29, 563 29, 915 30, 049 29, 796 30, 084	29, 554 29, 925 30, 040 29, 796 30, 100	29, 548 29, 927 30, 029 29, 804 30, 119	29, 544 29, 949 30, 016 29, 819 30, 125	29, 542 29, 950 29, 993 29, 812 30, 424	29, 528 ; 29, 953 29, 960 20, 821 30, 130	29, 540 29, 981 29, 969 29, 803 30, 142	29, 50 ( 29, 50 ( 29, 50) 29, 829 30, 149
Feb. 13 Feb. 16 Feb. 17 Feb. 18 Feb. 19	30, 237 29, 973 29, 476 29, 482 29, 269	20, 236 29, 986 29, 477 29, 450 29, 271	20, 240 29, 956 29, 459 29, 420 29, 294	90, 230 99, 928 99, 476 29, 376 29, 311	80, 237 29, 914 29, 490 19, 364 29, 350	30, 219 29, 873 29, 485 29, 324 29, 368	30, 194 20, 539 20, 542 20, 300 29, 385	30, 170 29, 477 29, 538 29, 266 29, 102	30, 142 29, 719 29, 577 29, 224 29, 426	30, 699 29, 685 29, 613 29, 269 20, 112	30, 078 29, 624 29, 620 29, 174 29, 464	30, 084 29, 614 29, 650 29, 153 20, 479	30, 064 29, 589 29, 673 29, 145 29, 513	50, 64 29, 650 29, 690 29, 147 29
Feb. 20 Feb. 21 Feb. 22 Feb. 23 Feb. 24	29, 658 29, 885 30, 113 30, 254 30, 653	29, 660 29, 894 30, 107 30, 263 50, 646	29, 664 29, 902 50, 101 30, 261 30, 034	29, 676 29, 915 30, 101 30, 257 70, 030	29, 703 29, 021 29, 108 30, 257 30, 021	29, 712 29, 931 30, 119 30, 262 30, 013	29, 717 29, 946 30, 126 30, 268 30, 603	29, 725 29, 965 30, 126 30, 269 30, 004	29, 727 29, 982 30, 134 30, 259 19, 987	29, 744 29, 984 30, 142 30, 270 29, 988	29, 741 29, 989 30, 149 30, 232 29, 988	29, 736 29, 994 30, 155 36, 211 29, 979	29, 758 29, 994 30, 458 30, 193 29, 963	79, 750 79, 908 50, 161 50, 11 -
Feb. 25 Feb. 26 Feb. 27 Feb. 28	29, 935 - 29, 677 - 29, 348 29, 604	29, 933 29, 668 19, 333 29, 5,0	1,670	20, 923 20, 665 20, 333 23, 543	29, 926 29, 665 19, 330 29, 480	29, 919 10, 667 10, 314 29, 434	29, 991 29, 662 29, 432 29, 389	29, 887 29, 662 29, 353 29, 337	29, 878 29, 654 29, 387 29, 289	29, 856 29, 637 29, 429 29, 237	29, 820 29, 621 29, 451 29, 451 29, 168	20, 802 29, 608 20, 494 20, 109	29, 785 29, 581 29, 529 19, 002	90 0.2 29 549 19 562 29 651
Means.	29, 712	29,714	29, 712	29 718	29, 714	29, 712	29, 706	29, 703	29, 761	29, 609	29, 688	29,686	29,656	, 9, 657
Pate. 1	0										Daily		241	11
1 4110	9 p. 111.	4 p. m.	5 p. m.	6 p. m.	4 11. 111.	% Jr. 111.	9 p. m.	10 p. m.	H p. m.	12 p. m.	means.	Max.	Min	M. s., c
188%. Feb. 2 Feb. 3 Feb. 4	29, 443 29, 332 29, 378 29, 630	20, 470 20, 470 20, 146 20, 646	29, 470 29, 470 29, 574 29, 691	9 p. m.	1 5 476 1 5 5 4 1 0 5 5 4 1 0 7 18	19, 178 29, 245 29, 265 29, 760	29, 476 29, 476 29, 341 29, 402 29, 788	29, 467 29, 467 29, 503 29, 806	11 p. m. 19, 437 29, 416 29, 412 29, 812	29, 439 29, 439 29, 316 21, 402 29, 831		Max. 29, 483 20, 432 29, 412 29, 831	29, 379 29, 316 29, 309 29, 413	. let   116   116   117
1889, Peb. 1 Feb. 2 Feb. 3	20, 443 29, 332 29, 378	29, 470 29, 346 29, 367	29, 470 29, 530 29, 574	99 (81 51,893 91,190	1.4.476	19, 178 29, 145 29, 305	19, 176 29, 341 29, 402	29, 467 29, 52 29, 403	29, 437 23, 316 29, 412	29, 439 29, 316 2 1 402	29, 449 29, 367 29, 353	29, 483 23, 432 29, 412	29, 379 29, 316 29, 309	. let
1882, Feb. 2 Feb. 3 Feb. 4 Feb. 6 Feb. 7 Feb. 8	20, 443 20, 332 29, 378 29, 600 20, 642 29, 526 29, 503 29, 637	29, 470 29, 946 29, 946 20, 640 20, 627 20, 538 29, 594 20, 669	29, 470 29, 530 29, 574 29, 691 20, 614 20, 537 1 29, 666	Val. 18.1 14.6.63 20.100 20.721 23.667 29.662 10.612 23.764	1.4.476 1.4.5.4 10.504 1.748 20.587 19.568 19.601	19, 178 29, 745 29, 305 29, 700 29, 579 29, 572 29, 572 20, 689	29, 476 29, 341 29, 402 29, 788 29, 576 29, 576 29, 685	29, 467 29, 402 29, 403 29, 806 29, 563 29, 647 29, 670 19, 761 29, 762 36, 683 29, 84	29, 437 29, 416 29, 412 29, 542 29, 549 29, 569 29, 628 29, 636	29, 489 29, 316 21, 402 29, 831 20, 537 29, 651 29, 611	29, 449 29, 367 29, 363 29, 706 29, 535 29, 508 29, 603	20, 483 23, 432 29, 412 29, 831 29, 837 29, 580 29, 654 29, 704	29, 379 29, 346 29, 369 29, 413 29, 535 29, 500 20, 669	. 101 116 . 101 . 1 - 1 . 0 - 0 . 0 - 0 . 0 - 0
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Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883--Continued.

(Barometer above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes.)

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Date	I a. m.	2 a. m.	3 a. m.	4 a. m. !	5 a. m.	6 a. m.	7 a. w.	§a. m.	9 a. m.	10 n. m.	H a. m.	12 m.	1 p. m.	2 p. m.
1882. Mar. 1	29.072	29, 091	29. 111	29, 137	29, 156	29, 152	29, 220	29, 226	20, 257	29, 285	29, 290	29, 316	29, 881	20, 357
Mar. 3 Mar. 4 Mar. 5 Mar. 6	29, 394 29, 762 29, 951 29, 962 29, 945	29, 416 20, 746 29, 980 29, 966 29, 956	29, 411 29, 735 29, 973 29, 886 29, 962	20, 461 29, 720 29, 983 29, 887 29, 968	29, 505 29, 731 29, 981 29, 901 29, 983	29, 544 29, 721 29, 901 29, 881 20, 990	29, 574 29, 716 29, 699 29, 677 30, 605	29, 600   29, 711   30, 602   29, 867   30, 666	29, 628 29, 709 30, 007 29, 865 30, 011	29, 653 29, 725 30, 001 29, 846 30, 011	29, 655 29, 721 20, 993 29, 841 30, 995	29, 667 29, 723 29, 690 29, 851 29, 984	20. 6a1 29. 711 29. 900 29. 840 29. 988	29, 707 29, 754 29, 989 29, 844 29, 984
Mar. 7 Mar. 8 Mar. 9 Mar. 10 Mar. 11	20, 992 29, 980 29, 777 29, 776 29, 786	30, 005 - 29, 963 29, 785 29, 782 29, 806	30, 013 29, 954 29, 767 29, 773 29, 827	30, 036 29, 934 29, 775 29, 773 29, 852	30, 045 20, 019 29, 785 29, 782 29, 875	30, 054 29, 801 29, 785 29, 784 29, 908	30, 067 20, 878 29, 759 29, 777 29, 925	20, 088 29, 851 29, 743 20, 780 29, 913	30, 088 29, 834 29, 734 29, 786 29, 967	30, 096 29, 813 29, 724 29, 789 29, 992	30, 096 29, 786 ( 29, 702 ) 29, 751 ( 20, 026 )	30, 071 29, 776 29, 689 29, 776 30, 051	30, 070 23, 534 29, 693 10, 779 10, 779	30, 003 29, 746 29, 74 21, 155 30, 113
Mat. 12 - Mar. 13 Mar. 15 Mat. 15 Mat. 16 -	30, 326 30, 201 30, 188 30, 246 30, 688	80, 320 30, 286 30, 167 30, 380 30, 600	30, 328 30, 351 30, 160 30, 415 30, 683	30, 321 30, 411 30, 148 30, 456 30, 680	50, 523 30, 459 50, 155 30, 566 30, 680	30, 314 30, 508 30, 151 30, 534 30, 664	30, 285 30, 542 30, 141 20, 552 30, 660	30, 255 30, 583 30, 131 30, 586 30, 642	30, 215 30, 597 30, 122 50, 618 50, 651	30, 1~9 30, 601 30, 113 30, 617 30, 631	50, 145 50, 589 50, 097 50, 643 50, 651	30, 124 30, 574 30, 679 30, 649 30, 646	50-656 50,563 50-674 50,674 50,600	10, 055 40, 554 50, 051 10, 689 20, 596
Mar. 18 Mar. 19 . Mar. 20 Mar. 21	30, 517 50, 286 19, 998 50, 939 50, 470	30, 510 50, 257 50, 027 30, 586 30, 451	30, 4+9 30, 243 30, 632 31, 373 30, 443	39, 055	30, 49 <b>6</b> 30, 208 30, 087 30, 424 30, 435	30, 502 30, 187 30, 112 30, 138 30, 143	30, 470 30, 153 30, 135 30, 470 30, 131	30, 463 30, 135 30, 162 50, 489 50, 426	30, 463 30, 117 30, 184 30, 513 30, 406	30, 447 30, 092 30, 124 30, 525 31, 386	59, 454 ; 60, 008 50, 242 ; 69, 625 50, 574	30, 413 30, 056 30, 267 50, 529 50, 573	30, 424 30, 629 30, 2×1 30, 542 30, 361	50,598 50,019 30,295 50,542 50,565
M c (2) Mar. 24 Mar. 24 Mar. 26	10, 652 29, 734 29, 710 29, 950 30, 053	30, 017 29, 728 1 29, 715 19 266 70, 016	29, 997 29, 769 29, 742 29, 563 39, 650	29, 692 29, 740 29, 974 29, 974 20, 942	29, 964 29, 682 29, 752 29, 962 50, 639	19, 914 29, 662 29, 785 29, 997 50, 657	29, 879 29, 618 29, 863 29, 963 20, 927	29, 867 29, 645 29, 818 29, 997 20, 915	29, 854 29, 636 29, 624 30, 005 29, 994	29, 842 29, 627 29, 827 50, 012 19, 983	29, 832 29, 625 19, 834 30, 609 _9, 988	29, 814 29, 647 29, 839 30, 668 19, 991	29, 796 19, 667 29, 846 90, 664 29, 964	1 0,480 29,594 29,804 29,804 30,044 50,064
Mar 28 Mar 28 Mar 20 Mar 30	29, 943 30, 319 30, 139 29, 877 30, 36 <b>6</b>	29, 973 30, 335 30, 120 29, 941 30, 317	29, 988 30, 358 30, 115 29, 924 30, 323	30, 002 30, 361 30, 108 20, 941 30, 320	30, 634 30, 380 30, 089 29, 967 30, 325	30, 045 30, 381 30, 082 30, 000 30, 324	30, 653 30, 372 30, 669 30, 614 30, 317	1.0, 063 1.0, 084 1.0, 057 30, 032 30, 312	30, 0#5 30, 0#6 30, 029 30, 662 30, 313	30, 101 30, 1.50 30, 014 30, 075 30, 296	30, 115 50, 369 29, 979 50, 689 30, 155	50, 153 30, 356 29, 957 39, 089 50, 277	30, 179 30, 210 29, 935 30, 121 30, 270	50, 16 ± 30, 305 ± 29, 92 ± 50 ± 116 ± 30, 262
Menns	30.026	30, 032	30, 035	30, 041	30, 053	30, 059	30. 059	30, 061	30, 063	30, 002	30, 058	30, 053 )	30.051	30, 005
Date:	3 p. 10.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	<b>10</b> թ. ա.	H p. m.	12 p. m.	Daily means.	Max.	Min.	Range.
1882. Mar. 1	29, 173	29, 375	20, 402	29, 402	29, 399	29, 109	29, 402	29, 400	19, 383	. 29, 353	20.291	29, 409	20,072	. 1117
Mar. 3   Mar. 4   Mar. 5 Mar. 6	29, 737 29, 788 29, 997 29, 856 20, 984	29, 744 29, 795 29, 888 29, 855 29, 956	29, 756 29, 821 29, 980 29, 857 23, 961	29, 760 29, 842 29, 976 29, 859 29, 971	29, 771 29, 862 29, 973 29, 868 29, 979	29, 777 29, 885 29, 969 29, 892 29, 979	29, 786 29, 903 29, 954 29, 965 29, 979	29, 793 29, 921 29, 916 29, 914 29, 9×5	29, 788 29, 914 29, 912 29, 915 29, 967	29, 767 29, 937 29, 923 29, 905 29, 971	29, 649 29, 787 29, 977 29, 876 29, 984	29, 703 29, 937 30, 007 29, 915 30, 006	29, 594 29, 769 29, 912 29, 840 29, 945	.319 .228 .685 .075
Mar. 7 Mar. 8 Mat. 9 Mat. 10 Mat. 11	20, 668 29, 749 29, 744 29, 795 30, 138	29, 754 29, 762 29, 762 29, 791 50, 175	29, 764 29, 764 29, 814 29, 796 20, 200	30, 074 29, 763 29, 816 29, 795 50, 235	30, 061 20, 773 29, 812 29, 703 30, 259	30, 055 29, 776 29, 832 29, 793 50, 276	30, 046 29, 776 29, 836 19, 793 50, 285	30, 039 29, 781 29, 816 29, 792 50, 302	20, 610 29, 796 19, 756 29, 790 50, 507	29, 995 29, 801 23, 779 29, 787 50, 325	30, 053 ( 29, 826 ) 19, 768 19, 785 1 1 (79	30, 006 29, 980 29, 832 29, 796 30, 525	29, 992 29, 746 29, 6+ ) 29, 776 19, 7+6	.101 .231 .144 .026
May, 12 May, 13 May, 14 May 14 May 15	30, 600 30, 51 <b>6</b> 50, 067 30, 696 30, 587		1.9, 569 30, 429 30, 676 30, 715 30, 586	20, 922 30, 371 30, 091 30, 718 50, 573	29, 904 30, 303 30, 100 30, 723 30, 570	29, 877 30, 283 30, 138 30, 716 30, 553	29, 896 30, 248 30, 177 30, 713 30, 541	29, 954 50, 227 30, 216 30, 703 30, 538	80, 054 50, 189 50, 251 50, 701 30, 721	0 131 30, 175 30, 106 50, 697 30, 519	00, 416 00, 417 00, 106 00, 614 00, 612	00, 028 00, 604 00, 006 00, 523 50, 650	29, 477 00, 175 19, 651 39, 346 59, 519	.451 .496 .375 .377 .377
Mar. 17 Mar. 18 Mar. 19 Mar. 19 Mar. 11	30, 088 30, 009 30, 509 30,533 30, 558	30, 313	30, 405 29, 909 30, 332 30, 535 30, 335	30, 407 29, 987 30, 340 30, 534 30, 316	30, 403 29, 978 30, 343 30, 534 30, 307	30, 2-3 29, 978 30, 347 30, 534 30, 278	30, 349 29, 981 30, 346 30, 522 30, 244	30, 357 29, 986 30, 243 50, 504 50, 203	30, 316 29, 991 30, 332 30, 482 30, 127	10, 198 20, 600 30, 339 30, 469 30, 102	30, 425 30, 682 30, 227 <b>30, 187</b> 30, 361	30, 517 30, 256 70, 317 <b>30, 513</b> 30, 470	50, 258 29, 978 29, 528 10, 254 50, 1-2	. 219 . 308 . 219 . 49
Mar. 22 Mar. 23 Mar. 24 Mar. 25 Mar. 26	29, 868	29, 594 29, 871 30, 057	29, 766 29, 669 29, 876 36, 064 29, 977	29, 764 29, 609 29, 882 30, 067 29, 972	29, 759 29, 614 29, 883 30, 063 29, 971	29, 757 29, 630 20, 899 30, 061 29, 969	29, 756 29, 645 29, 909 30, 061 20, 972	29, 751 29, 665 29, 937 30, 662 29, 977	29, 749 29, 680 29, 932 30, 056 29, 958	29, 734 29, 697 29, 956 30, 050 29, 959	20, 830 29, 647 29, 838 50, 092 29, 997	00, 052 29, 754 29, 956 30, 067 50, 073	29, 734 29, 584 29, 710 29, 950 20, 959	
Mar. 27 Mar. 28 Mar. 29 Mar. 30 Mar. 31	**** ****	30, 312 20, 913 30, 201	30, 228 30, 309 29, 905 30, 226 30, 265	30, 258 30, 293 29, 902 30, 248 30, 261	30, 260 30, 270 29, 905 30, 265 30, 252	30, 268 30, 249 29, 899 30, 275 30, 241	29, 901	30, 294 30, 213 29, 891 30, 295 50, 229	30, 293 30, 171 29, 867 30, 293 30, 225	30, 323 10, 145 29, 865 50, 295 30, 234	30, 144 30, 316 29, 983 30, 117 30, 280	50, 523 30, 356 30, 179 50, 255 30, 325	29, 542 39, 145 29, 865 29, 877 39, 225	. 271
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Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

Barometer above sea, 17 feet. Washington mean time. Correction for mean local time. —5 hours 17 minutes.]

Date.	form.	$2\ a.\ m.$	3 a. m.	<b>\$</b> 11. 311.	5 a. m.	6 a. ni.	7 a. m.	8 alm.	9 a. m.	10 a. m.	$\mathbf{H} \text{ a. m.}$	12 m.	1 p. m.	2 p - 0
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$egin{array}{cccccccccccccccccccccccccccccccccccc$	19,8,5 19,641 19,641 2010 1010			1 8 4 1 8 4 1 4 1 2 20 - 01	10, 5, 3 5, 0,841 7, 0,656 1, 0,967 1,0,800	1 1,803 20,851 15,677 19,912 10,768	20,801 1 (879 50 044 21 900 23,789	19,755 19,866 00,027 19,893 20,757	19 791 29,877 29 0 3 23,185 29,754	29, 784 29, 829 10, 025 10, 836 29, 771	29,774 9,915 90,029 29,877 29,786	1 0.700 2 0.909 3 0.00 1 0.00 1 0.709	1.697 ) 20.604 1.604 1.506 16.715	
	67 / 3 / 1, 3 / 1, 5 / 1, 7 / 1		17.1	1 1 7 4 1 4 676 2 6 6 1 1 6 974 1 7 12	19,781 , 0.076 20,195 , 0.195 , 1915	10.708 20.681 10.127 20.988 20.989	29, 757 23, 678 58, 194 29, 944 29, 971	1 3, 705 59 679 30, 145 29, 921 29, 976	29, 7 (2) 29, 052 39, 157 19, 853 19, 853 29, 853	10,704 10,683 50,155 29,870 20,500	1.0 7.4 1.0 7.4 20, 156 20, 876 20, 876 30, 011	20,711 10,711 10,117 10,856 10,015	19,715 13,716 56,156 20,841 55,022	* 701 * 115 * 117 2
\$11.700 \$14.700 \$15.000	100 mg 100 mg 100 mg 100 mg 100 mg	5555 5555 5555 6555	2 (2) 2 (4) 2 (4) 3 (7) (4) 3 (7) (2)	9.171 19.40 19.40	1.00.5 1.00.1 1.00.1 1.00.1 1.00.1	10, 100 a0, 310 a0, 446 00, 511 bot 428	50, 100 50, 513 50, 454 70, 757 55, 150	20, 109 30, 249 30, 462 10, 524 50, 489	no 118 34 028 00,4-5 4 00,521 50,700	00, 148 00, 009 00, 505 00, 512 80, 520	50, 137 30, 150 30, 526 30, 526 30, 526 30, 526	00, 140 10, 544 10, 544 10, 562 10, 741	00, 158 50, 342 50, 542 10, 400 50, 513	163 113 114 1152 1152
Modes :	19,639	79.50	13.04	721.1	1000	10.947	23 94 1	10.691	29,565	19,901	UN 961	23,000	29, 56,0	1273
											Daily			
1) ().	3 p. m	Ch. in	5 p. m	6 p. m	1, 11	<b>&gt;</b> p. m.	9 p. m.	10 p. m.	H p.m.	12 p. m.	means,	Max.	Min.	111 ,
1882. Apr. 1 Apr. 2 Apr. 3 Apr. 4 Apr. 5	8 p. m 8 163 130 - 32 1 9 8 1 1 2 9 6 54 2 5 10 8	30, 175 ± 0,854 ± 0,854 ± 0,848 ± 0,011	5 p. m 	6 p in 2 141 23 - 67 4 839 24.863 - 5.021	20,135 29,866 21,863 5,004	5 p. m. 50, 117 29, 865 19, 864 29, 864 50, 97	9 p. m. 90, 101 29, 842 29, 805 29, 860 00, 020	10 p. m. 50, 687 29, 845 29, 869 29, 869 50, 635	H p m. 30, 047 20, 827 20, 800 20, 847 30, 601	12 p. m. 0c, 037 19 824 29 832 29, 861 06, 008		Max. 50,240 50,020 20,834 20,869 50,037	Min. 30, 65.7 10, 824 20, 800 20, 804 29, 876	1n.,
1882. Apr. 1 Apr. 2 Apr. 3 Apr. 4	0.163 100 - 2 10.814 10.834	30, 175 20,854 20,854 50,848	), 11- 20, 857 -00, 810 -1, 8-1	e 111 21 -67 4 819 23.863	00,135 29,866 24,869 10,863	00, 117 29, 865 29, 864 20, 864	00, 101 29, 842 20, 805 29, 860	00, 087 20, 845 20, 869 29, 809	30, 047 20, 827 20, 800 20, 847	30, 037 19 824 19 832 29, 861	00, 173 20, 904 19, 817 29, 840	10,240 10,629 20,831 29,860	30, 65.7 10, 824 29, 806 29, 804	11 / 12 1 10 1
Apr. 6 Apr. 5 Apr. 5 Apr. 6 Apr. 7 Apr. 8 Apr. 8	0.160 102 1 0.814 2 0.804 2 0.908 20.546 10.546 10.546	06, 175 23,854 23,854 53,854 53,957 29,556 53,565 53,565	29 857 59 849 24 8 4 16 916 23,0 9 29 566 23, 178 29,546	# 141 23 -67 -3 809 23.863 -3.021 29.634 20.439 20.439 20.439	00, 135 29, 863 21, 863 2, 964 20, 972 29, 518 20, 155 29, 587	00, 117 29, 865 19, 866 29, 864 10, 967 10, 960 10, 474 19, 582	00, 101 29, 842 29, 865 29, 865 30, 029 29, 887 29, 130 29, 130 29, 130	00, 087 29, 845 29, 869 29, 869 00, 005 29, 877 29, 473 19, 442 19, 784	30, 047 20, 827 20, 800 20, 847 30, 604 29, 450 29, 440 21, 580	00, 007 19, 824 29, 861 30, 008 29, 869 20, 452 13, 424 20, 605	90, 173 20, 901 19, 817 29, 840 20, 967 20, 956 20, 663 29, 563	10, 240 03, 020 20, 831 20, 869 00, 037 50, 027 20, 774 20, 474 20, 664	30, 607 19, 824 29, 869 29, 869 29, 876 29, 466 21, 130	40 mm 1 mm 1 mm 1 mm 1 mm 1 mm 1 mm 1 mm
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Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

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[Barometer above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes ]

	[Baro	meter ab	ove sen, 1	7 feet. V	Yashingte	on mean t	ime. Co	rrection fo	r mean lo	cal time,	- 3 hours	17 minut	est [	
Date.	1 a. m.	2 a. m.	3 a. m.	4 n. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1882. May 1 May 2 May 3 May 1 May 4	30, 508 30, 613   29, 832 29, 790   10, 574	30, 598 29, 998 10, 829 29, 794 50, 821	30, 301 19, 079 29, 802 29, 800 20, 826	29, 974 29, 974 29, 817 29, 799 29, 829	50, 321 29, 053 29, 847 29, 810 10, 827	30, 202 29, 934 29, 848 29, 815 29, 825	00, 202 20, 919 29, 844 20, 820 23, 825	30, 923 10, 904 29, 853 20, 817 20, 820	29, 800   29, 848   29, 824   40, 825	00, 152 19, 896 19, 818 29, 823 19, 823	50, 141 29, 844 29, 829 29, 833 29, 833	00-003 29-872 29-807 29-831 29-810	50, 075 29, 862 29, 827 10, 829 29, 801	00, 653 29, 854 29, 824 29, 831 27, 831
M., 6 M., 7 M., 8 M., 8 M., 9	29, 821 29, 945 19, 030 19, 104 10, 104	20, 824 19, 917 19, 641 10, 169 10, 155	29, 828 29, 947 30, 044 50, 174 5, 9, 367	29, 881 29, 947 79, 942 39, 179 50, 57\$	29, 840 29, 970 20, 053 20, 191 10, 395	29, 851 29, 985 30, 061 30, 197 20, 398	29, 862 29, 980 50, 067 50, 206 30, 401	29, 864 29, 976 53, 974 50, 215 50, 101	29, 874   29, 957   10, 681   10, 217   10, 192	19,879 29,579 10,065 10,214 10,779	29, 889 10, 983 10, 690 10, 222 30, 555	29, 8% 19, 987 19, 991 19, 235 19, 373	29, 885 29, 987 39, 104 30, 250 30, 563	20, 895 19, 987 30, 117 30, 154 19, 144
Mar Mar.	10.15 10.115 20.72 13.76 13.76	00, 116 20, 112 00, 622 00, 147 00, 010	10, 173 30, 118 50, 030 50, 176 10, 503	00 167 00 103 00,007 00,169 00,010	50, 168 . 0, 115 .0, 944 .0, 184 .0, 299	30, 173 50, 107 30, 043 50, 185 50, 191	10 163 30 100 5.0,046 50,201 .0,290		19, 163 1,0 079 10, 076 12, 274 50, 250	1 0, 16 ( 1 0 6 (9 ) 1 0 6 (9 ) 1 0, 225 ( 1 0, 1 5 )	0.161	30, 119 50, 073 50, 073 50, 248 50, 261	58, 149 56, 040 30, 065 50, 258 56, 267	0 151 0 003 0 003 0 0 05 0 0 05 0 0 05
Mar. 5	f s. 195 19, 654 13, 188 10, 257 10, 210	10, 194 10, 134 10, 192 10, 107 10, 109	50, 185 30, 049 50, 192 10, 275 50, 203	00, 181 26, 054 1, 0, 196 36, 250 36, 204	30, 185 10, 071 30, 211 30, 297 50, 210	30, 174 50, 676 50, 916 30, 592 50, 197	00, 154 50, 079 10, 221 20, 294 50, 187	10,117 50 054 50,216 10,198 50,178	50 118 10 093   10 121   10 3 2   10 160	0. 112 1.0, (90 50, 217 100, 201 50, 153	00-194 00, 168 10, 128 20, 282 00, 152	30, 130 33 113 10, 220 50, 280 50, 132	30, 123 30, 1,2 50, 233 30, 180 10, 132	00 120 0 0 130 0 0 005 0 0 104 0 0 104
Market Ma	10, 197 10,236 20,124 10, 0,8 5,135	50, 094 10, 964 50, 917 50, 696 50, 608	10, 500 10,132 10,015 10,034 10,03	20, 124 1 0, 277 1 0, 209 1 0, 696 1 0, 601	0.143 50,360 30,304 50,490 50,490	20 146 50 310 3 50 299 50 688 50, 036	30, 165 19, 506 30, 294 30, 682 30, 031	10, 178 10, 378 10, 378 10, 185 100, 075 20, 641	50,625	9, 181 10 327 30 262 10, 072 10, 025	20, 101 50, 217 50, 258 50, 072 10, 025	50, 911 50, 545 50, 244 10, 671 50, 625	00, 268 00, 546 10, 264 10, 661 60, 623	10 214 10, 354 10, 221 10, 667 10, 633
Model and Model	11,110 19,963 19,811 19,842 29,714	50, 013 29, 9 d 29, 8 d 29, 8 H 29, 77 f	30, 012 20, 951 29, 880 29, 849 23, 777	1.0 012 1.0.954 29,884 20,839 20,775	.30, 010 19, 953 20, 891 29, 849 29, 795	30, 001 19, 049 29, 887 29, 838 29, 792	29, 998 29, 952 29, 886 29, 8-8 29, 793	19 093 1 1058 2 1,889 50,838 19,798	20, 91 1   55 957   55 883 10, 831 10, 703	19,000 59,945 20,881 29,824 20,703	29, 989 29, 959 29, 879 13, 814 19, 793	29, 980 29, 937 29, 879 29, 813 29, 798	**************************************	19, 970 19, 943 19, 870 19, 793 19, 501
210, 1	19.5 BF	10 0	29.817	20, 522	29,867	20, 810			29,843	20,811	19, 843	:3.813	19, 847	19.119
Means	80.063	56, 663	56,563	03,064	30,971	30, (69	(0), (0) s	20, 067	DR 065	03.162	\$0,001	1.0, 055	37.073	10, 057
Dates	3 р. п.	<b>i</b> ji. iii	5 p.m.	6 p. m.	7 p. m.	Sp.m.	9 p. m.	10 p. m.	11 p. m. '	12 p. m.	Daily means.	Max.	Min.	Range
1 -2, May 1 May 2 May 4 May 6	00, 009 29, 845 19, 823 19, 845 29, 865	00,020 29,850 29,821 29,847 10,813	00, 020 09, 860 29, 848 03, 856 29, 848	30, 008 29, 861 29, 847 29, 861 29, 818	30, 018 29, 853 29, 811 29, 863 29, 815	30, (c)8 29, 854 29, 866 29, 866 29, 861	00, 041 29, 854 20, 864 29, 865 29, 808	90, 651 20, 853 20, 709 19, 855 29, 807	30, 025   29, 838   29, 789   29, 829   29, 811	39, 015 29, 831 29, 786 19, 836 29, 838	00, 148 s 10, 893 20, 824 29, 831 20, 818	30, 308 30, 613 29, 853 29, 866 20, 834	50, 618 59, 811 59, 78 <b>6</b> 59, 794 29, 801	. 390 . 182 . 067 . 072 . 023
May 6 May 7 May 9 May 10	29, 9 of 29, 990 30, 130 30, 270 50, 340	29, 915 29, 992 30, 133 33, 274 30, 328	29, 907 29, 908 94, 199 96, 286 96, 32 <b>6</b>	29, 940 30, 604 39, 143 30, 309 50, 316	20, 008 30, 008 50, 152 30, 321 30, 305	29, 933 30, 004 30, 155 30, 334 30, 280	29, 933 30, 007 50, 162 30, 344 50, 258	29, 341 30, 007 30, 165 30, 313 30, 248	99, 925 39, 600 30, 150 30, 138 10, 205	19, 934 59, 911 50, 156 19, 149 50, 119	29, 889 29, 884 30, 102 30, 252 50,335	20, 941 30, 011 30, 165 30, 249	29, 824 29, 945 30, 031 30, 164 50, 199	.117 .060 .131 .1.5 .2.3
May 11 May 12 May 13 May 14 May 15	00, 154 00, 602 00, 670 00, 275 00, 255	30, 153 30, 640 30, 673 30, 285 30, 243	30, 156 30, 636 30, 676 30, 391 30, 216	30, 160 50, 633 30, 684 30, 300 30, 239	50, 156 30, 037 30, 096 30, 295 30, 243	30, 152 30, 037 30, 103 30, 300 30, 244	30, 150 30, 045 30, 111 30, 303 30, 241	50, 129 50, 645 50, 119 30, 193 30, 222	30, 131 30, 625 30, 116 30, 299 30, 207	30, 124 30, 019 30, 121 30, 297 10, 261	00, 158 00, 065 00, 068 00, 247 00, 265	8 30, 121 30, 303 30, 210	30, 124 50, 019 30, 022 30, 136 50, 201	.064 .099 .099 .107 .109
May 16 May 17 May 18 May 19 May 20	5.0, 118 30, 138 30, 245 50, 277 30, 118	30, 115 ( 30, 148 ) 30, 252 30, 276 . 30, 110	30, 120 ± 30, 166 50, 249 30, 282 30, 131 3	30, 119 ( 30, 178 30, 255 ( 30, 264 ) 30, 127	30, 111 30, 185 30, 260 30, 261 30, 115	30, 095 30, 186 30, 265 30, 257 30, 160	00, 089 00, 190 00, 267 00, 257 00, 103	30, 083 30, 198 30, 265 30, 250 30, 106	30, 654 30, 186 30, 214 50, 224 30, 054	50, C50 00, 163 30, 257 30, 2 5 30, 0 6	30, 132 30, 123 30, 132 30, 132 30, 146	30, 195 30, 198 30, 267 20, 302 30, 210	30, 030 30, 049 30, 188 30, 225 30, 084	.145 .149 .079 .677 .126
May 21 May 22 May 23 May 24 May 25	00, 224 00, 060 30, 208 30, 059 00, 042	30, 226 30, 367 30, 201 33, 659 30, 040	50, 229 30, 380 30, 194 30, 073 30, 047	30, 244 30, 370 30, 186 30, 070 30, 050	30, 251 30, 365 30, 176 30, 056 30, 040	30, 246 30, 359 30, 164 30, 051 30, 033	30, 249 30, 355 30, 150 30, 041 30, 026	30, 254 30, 353 30, 142 30, 044 30, 026	30, 238 30, 330 30, 125 30, 037 30, 019	50, 246 30, 310 70, 114 30, 029 30, 069	20, 192 30, 328 30, 233 30, 660 30, 032	30, 254 30, 380 30, 324 30, 698 30, 650	30, 094 30, 246 30, 114 30, 029 30, 009	. 160 . 134 . 210 . 669 . 011
May 26 May 27 May 28 May 29 May 30	29, 985   29, 942 29, 871 29, 798   29, 806	29, 985 29, 940 29, 869 29, 797 29, 807	29, 901 59, 904 29, 873 29, 796 29, 809	20, 983 29, 935 29, 871 29, 793 29, 800	29, 968 29, 927 29, 865 29, 783 29, 819	29, 971 29, 917 29, 863 29, 786 29, 821	29, 968 29, 912 29, 856 29, 783 20, 819	29, 961 29, 910 29, 856 29, 777 29, 817	29, 946 29, 902 29, 833 29, <b>755</b> 29, 800	20, 060 29, 898 20, 837 29, 761 29, 811	20, 987 20, 938 29, 873 29, 810 <b>29,799</b>	30, 013 29, 957 29, 804 29, 849 29, 821	29, 946 29, 898 29, 833 29,755 29,764	. 067 . 059 . 061 . 094 . 057
May 31	29, 842	29, 851	29, 850	29, 853	20, 842	29, 836	29, 842	29, 830	29, 838	29, 834	29, 839	29, 853	29, 809	. 041
Means	30. 058	30, 039	30.061	30. 065	30.062	30. 060	30, 059	30, 057	30.012	30, 043	35, 061	30. 114	29, 999	.115

Tables showing pressure of air at Uglaamic from October, 1881, to August, 1883-Continued.

(Earlier (c) above sea 17 feet. Washington mean time. Correction for mean local time. ~5 hours 47 minutes.)

	,													
Date.	12 m.	9 at 10	3 a. m.	‡a to	5 a. m.	6 s. m.	Tu. 10.	Na. m.	9 a. m. ;	10 a. m. <sub>]</sub>	Ham.,	12 m.	1 p. m.	2 p
18-1						29, ×50	29, 845	29, 845	29, 842	29 8.7	29, 845	29. a 13	19, 811	
Juna 1 Juna 2 June 3	19 8 7 29 738 29 6 9	19 6 7 11 29 6 7 1	29, 753 19, 619	29, 845 29, 549 29, 625 29, 734	29, 818 29, 759 29, 629 29, 751	29, 743 - 29, 627 20, 756	29, 731 29, 623 29, 757	29, 725 29, 640 20, 761	29, 723 29, 647 29, 725	19, 708	29, 639 29, 639 29, 751	29, 688 29, 647 23, 7, 8	10, 686 29, 666 29, 756	9.64
Jane 1 Jane 5	20170	217.0	29 7 - 3	29 570	.10, 8(6)	19, 913	29, 918	29, 924	29, 945	29, 941 +	29, 944	19, 350	19,545	
June 6 June 7 Jun Jun 2	19 5 7 19 5 7 19 591 30 695 30 f 1	9 613	29-948 29-907 30-101 33-683	20 1037 20 103 30 103 30 103	99, 944 30, 022 30, 117 30, 075	29, 947 30, 030 30, 128 30, 667	29, 947 + 30, 642   30, 123 + 30   066	20, 943 30, 037 30, 123 30, 039	29, 945 30, 041 30, 124 30, 057	29, 947 30, 943 30, 121 30, 018	29, 953 30, 053 30, 121 50, 048	29, 956 30, 053 50, 133 50, 057	29, 96, 9 00, 653 1,0, 120 30, 652	1 5 19 1 19 2 1 19
Just 10 June 11 June 1 June 11 :	20 8% 20 563 20 661 19,749 10,601	2.4 State 2.4 State 24.4 CH 24.4 CH 29.4 State	1.4 ± 36 0 559 0 059 19.7 ± 1 29.456	1   816   29   516   19   19   29   141   20   670	29, 808 29, 5 (2) 29, 71 (2) 29, 73 (2) 29, 631	29, 789 29, 550 49, 711 29, 772 29, 674	29, 765 29, 755 29, 742 29, 749 29, 659	20, 757 20, 550 20, 753 29, 752 20, 651	29, 751 29, 745 29, 735 29, 756 29, <b>64</b> 2	29, 740 29, 546 29, 734 29, 754 29, 637	20, 723 20, 545 20, 745 20, 754 20, 637	29, 712 29, 545 29, 747 29, 751 29, 638	29, 699 29,544 29,756 29,771 29,676	
June 15 June 16 June 17 June 18 June 13	19 ( c) 29, 707 29 (9 %) 50, 453 0, 055	19 416 9 747 19 676 58 1.8 10 6 3	1 614 29 7 % 19 955 20 196 00 614	70 1 08 19 7 19 10 07 1 10 141 70 056	19.665 29.744 29.993 0.154 0.059	29, 462 29, 754 10, 001 30, 135 30, 003	29, 665 29, 765 30, 612 30, 129 30, 057	1.3, 665 29, 767 30, 024 -0, 126 30, 051	29, 670 29, 775 30, 027 30, 122 30, 051	29, 674 29, 752 30, 041 30, 142 30, 053	29, 673 19, 765 30, 650 30, 697 30, 653	29, 679   29, 7, 41   30, 660   50, 695   50, 651	20, 684 19, 703 50, 869 30, 101 50, 650	11 19 11 1
June 21 June 21 June 23 June 23 June 23	10 042 20 042 20 041 20 04 314 9	(*1 (6.4 ×6) (4.4 h) (4.4 × 4) (4.4 × 4)	00 (00 00 (20) 00 (17) 00 (10) 0 (10)	1 , es6 ,1 001 + 15 e, 116 - d e+1	13 107 -0,000 20 168 -0,333 -1 2-1	30, 116 30, 098 30, 166 30, 133 30, 076	30, 107 30, 097 30, 150 30, 157 30, 197	20, 115 30, 096 30, 141 50, 143 30, 052	30, 113 30, 104 30, 131 30, 136 30, 042	30, 116 30, 111 30, 129 30, 149 30, 030	10, 116 50, 116 50, 121 50, 121 50, 020	30, 119 30, 134 30, 121 30, 118 30, 015	20, 100 30, 154 30, 135 30, 137 30, 006	
dune () June () June () June ()	29 663 29 663 29 663 39 676 24 628	20 6 7 20 6 7 20 6 7 20 6 7 20 6 3	9 64 29 64 29 64 27 647 27 647	9 1 01 2 1 6 5 21 6 6 21 670 1 672	19 (14 19 (08 19 (69 2), (46 2) (31	71 899 99 679 20,099 20,631 22,672	29, 641 29, 643 29, 649 29, 678	23, 866 29, 647 29, 640 29, 640 29, 680	23, 555 (29, 637 ) 29, 637 (29, 634 ) 29, 634	29, 842 29, 638 29, 618 29, 622 29, 704	29, 873 29, 833 29, 618 29, 619 29, 704	10. 818 29. 631 29. 633 49. 636 29. 717	29, 813 29, 659 29, 658 29, 616 29, 72)	7 (1) 79 (1) 7 (4) 7 (4) 27 (4)
June	29, 749		2. 0.3		. 1.775	1.,775	19, 778	29, 752	29, 787	29, 796	29, 863	29, 805	29 807	29, -13
Means	29,855	29.80	29.857	70.4	J. 800	29 800	29, 864	29, 863	29, 863	29, 862	29, 801	29, 403	29, 864	. 1
Date	3 р. т.	1 p. n.	aper	6 p. s	7 p m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 m.	Daily mans.	Max.	Min.	E. bar.
1882 June 1 June 2 June 3 June 4	29, 830 29, 670 29, 666 29, 761	29, 811 29, 660 29, 685 29, 768	29 845 29 654 29 668 29 775	19, 897 19, 656 29, 686 29, 781	19 405 19 654 19 700 24 751	29 750 29 648 29 715 29 795	29, 780 29, 646 19, 715 29, 800	29, 775 29, 643 29, 720 29, 795	29, 758 29, 620 29, 710 29, 805	29, 772 29, 631 29, 722 29, 820	20, 820 29, 694 29, 662 29, 765	20, 850 29, 758 29, 722 29, 829	29, 752 29, 620 29, 619 29, 730	1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 ×
June 5 June 6 June 7 June 8 June 9	29, 965 29, 967 30, 081 30, 131 30, 023	29 976 29 965 30, 080 50, 134 38, 014	29, 976 29, 966 9, 079 30, 136 29, 997	20 (170 20 (960 30 (684 36) (145 20 (88)	20, 966 29, 965 30, 6-7 40, 142 20, 97a	29, 95% 29, 979 30, 686 30, 171 29, 947	29, 555 29, 980 -0, 081 58, 114 29, 528	29, 955 19, 989 30, 085 70, 169 29, 926	29, 934 29, 969 30, 091 30, 090 20, 885	29, 973 29, 970 30, 987 30, 979 29, 866	29-96.0 29: 958- 30: 052- 30: 118- 30: 014	29, 976 29, 989 30, 091 30, 142 30, 080	29, 847 29, 947 29, 945 30, 659 29, 864	1.0 4.2 104 2.1
June 10 June 11 June 12. June 13 June 14	29, 674 29, 561 29, 764 29, 759 29, 632	29, 659 29, 565 29, 765 29, 757 29, 757	29, 6.9 29, 573 19, 762 29, 752 29, 639	29, 628 29, 585 29, 564 29, 751 29, 643	13 F 3 29 603 29 764 29 7 9 29 618	29, 668 29, 619 29, 747 29, 77, 9 29, 654	29, 606 23, 628 29, 753 29, 726 29, 653	29, 588 29, 630 29, 744 29, 717 29, 656	29, 571 29, 647 29, 735 29, 695 29, 644	29, 563 29, 441 29, 744 29, 769 29, 651	19,765 29,574 29,731 29,744 29,673	29, 852 29, 647 29, 768 19, 759 19, 691	29, 574 29, 544 29, 662 29, 695 29, 6-2	. 251 354 . 356 . 663 . 678
June 1' . June 16 . June 17 June 18 June 19	2% 0.06 29 856 20, 101 30, 096 50, 047	29, 699 29, 848 50, 110 30, 074 50, 653	29, 702 29, 860 30, 112 30, 074 30, 059	29, 763 29, 867 30, 117 10, 679 20, 619	29, 76 s 20, 891 20, 122 30, 674 00, 667	29, 760 29, 885 30, 127 30, 679 36, 679	29, 700 19, 889 30, 127 30, 076 32, 074	29, 714 20, 897 20, 126 30, 066 30, 074	29, 713 29, 965 50, 153 50, 065 50, 086	30, 149 - 30, 051	29, 683 29, 511 30, 058 30, 100 50, 060	29, 714 29, 929 30, 149 30, 141 30, 086	20. 67 29. 767 19. 978 30. 054 26. 017	.0.1 .20: .21:
June 20 June 24 June 12 June 23 June 14	30, 102 30, 165	30, 119 30, 192 70 101 30, 174 30, 015	30, 168	30, 134 30, 192 30, 107 30, 163 30, 002	30, 125 30, 200 30, 102 20, 155 29, 984	30, 121 30,201 30, 697 50, 148 29, 961	30, 169 30, 200 30, 096 50, 133 29, 956	30, 104 30, 197 30, 089 30, 137 29, 048	30, 661 30, 194 30, 084 30, 115 29, 946	30, 080 30, 182 30, 097 30, 125 29, 948	30, 108 30, 143 30, 126 30, 140 50, 023	30, 133 30,204 30, 191 50, 174 30, 696	50, 656 50, 652 30, 654 10, 097 29, 946	. 4.57 . 1.77 . 1.77
June 25 June 26 June 27 June 28 June 29.		29, 767 29, 667 29, 660 29, 609 29, 750	29, 755 29, 662 29, 654 29, 611 29, 749	29, 705 29, 677 29, 654 29, 608 29, 746	10,710 19,679 29,666 29,613 29,744	29, 688 29, 675 29, 668 29, 614 29, 743	29, 675 29, 675 29, 666 20, 616 29, 751	29 666 29, 675 29, 659 ,29, 620 29, 753	29, 644 29, 672 29, 666 29, 622 29, 749	29, 640 29, 662 29, 656 29, 696 29, 747	20, 802 29, 652 29, 636 29, 626 29, 707	29, 926 29, 679 29, 668 29, 656 29, 753	29, 640 29, 631 29, 599 29, 606 29, 624	0 11* 01* 059 120
		1	1		1		1							
June 30	29, 819	29, 823	29, 825	20, 822	29, 827	20, 825	29, 823	29, 814	29, 517	29. 521	29, 799	29, 827	29, 749	

## Tables showing pressure of air at Uglaumie from October, 1881, to August, 1883—Continued.

[Barometer above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes.]

**											-	
Date. , 1 ii. m.	2 a. m. 3 :	a. m. la. m.	3 a. m.	6 a. m.	7 a. m. †	% n. m. ,	9 a. m.	10 a. m.	## ata 106	12 m	i p. m.	2 p. m.
1882. July 1 29, 823 July 2 29, 819 July 3 29, 874 July 4 30, 927	29, 819   21	9, 831 29, 833 9, 817 29, 821 9, 893 29, 900 0, 042 20, 048	20, 833 29, 824 29, 861 20, 844	29, 832 29, 840 29, 901 30, 010	29, 825 29, 844 29, 905 30, 048	29, 819 29, 905 29, 905 20, 051	29, 819 29, 813 29, 913 30, 056	29, 816 29, 845 29, 915 30, 663	20, 843 20, 845 20, 927 20, 065	29, 843 29, 843 29, 941 30, 007	29, 807 29, 850 29, 947 50, 019	29, 806 29, 859 29, 946 36, 979
July 5 20,047 July 6 20,829 July 7 29,762 July 8 29,672 July 9 29,169	39,814 25 34,765 27 1 + 077	0, 058   00, 007 0, 810   29, 805 9, 719   29, 708 + 197   29, 574 9, 493   29, 493	199, 042 29, 801 19, 773 19, 534 29, 499	80, 032 20, 706 20, 767 20, 571 20, 500	30, 018 20, 701 29, 750 29, 556 29, 500	30, 000 20, 747 29, 736 29, 541 29, 510	29, 94 ( 29, 778 ) 29, 722 ) 29, 527 )	29, 958 29, 768 29, 721 29, 521 29, 522	20, 934 29, 763 29, 746 29, 549 20, 525	29, 916 29, 766 29, 714 29, 511 29, 530	29 828 29 766 29 616 29 766 28 534	20, 204 20, 762 29, 704 29, 494 29, 513
July 10. 29, 558 July 11. 29, 719 July 12. 29, 864 July 13. 29, 898 July 14. 29, 769	To the Country of the	9, 560   29, 551 9, 711   29, 712 9, 90   20, 977 9, 801   20, 870 9, 702   29, 689	29, 555 29, 775 29, 947 29, 886 29, 686	20, 576 29, 802 20, 980 20, 881 20, 681	29, 573 29, 827 29, 982 19, 852 29, 666	29, 878 20, 837 29, 967 29, 851 29, 645	29, 593 29, 651 29, 957 29, 954 29, 929	29, 509 29, 657 29, 952 29, 853 29, 631	29, 604 29, 867 29, 918 29, 860 29, 616	29, 617 29, 847 29, 934 29, 871 29, 600	29, 619 29, 607 29, 904 29, 878 29, 592	19, 624 29, 002 29, 905 20, 780 19, 159
#uly 15. 29, 581 July 16. 29, 595 July 17. 29, 403 July 18. 29, 572 July 19. 29, 756	20,594 12 20,410 2 24,740 2	9, 619   29, 627 9, 591   29, 576 9, 141   29, 120 9, 755   23, 631 3, 732   29, 733	20, 624 20, 581 20, 483 20, 633 20, 703	29, 634 29, 576 29, 426 19, 642 29, 799	20, 634   20, 564   20, 412   23, 464   23, 805	29, 642 29, 545 29, 439 29, 667 29, 801	29, 640 29, 534 29, 444 29, 671 29, 797	29, 636 29, 514 29, 412 29, 675 29, 796	20, 022 29, 515 29, 445 29, 681 29, 706	20, 644 20, 500 29, 445 29, 691 29, 799	29, 651 19, 496 29, 445 79, 701 29, 799	29, 654 29, 489 29, 452 29, 717 29, 709
July 20. 29, 829 July 21 29, 795 July 22 21, 905 July 24 29, 787 July 24 29, 787	19, 5, 3, 1, 29, 5, 8, 1, 20, 1, 20, 1, 20, 1, 20, 1, 20, 1, 20, 755; 1, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20	0.875   29,845 0.875   29,829 0.096   29,921 0.981   29,974 9,784   23,775	19, 874 29, 829 29, 931 29, 964 29, 783	29, 830 29, 831 29, 924 19, 967 29, 774	29, 853 29, 851 29, 916 29, 964 29, 759	20, 846 20, 828 29, 911 29, 965 29, 754	29, 845 29, 825 29, 906 29, 959 29, 759	29, 818 29, 834 29, 898 29, 962 29, 741	29, 873 29, 874 29, 965 29, 961 29, 736	29, 854 29, 814 29, 914 29, 944 29, 726	19, 817 29, 817 59, 620 19, 913 20, 726	29, 844 29, 850 19, 930 29, 925 29, 715
July 25. 29, 673 July 26. 29, 763 July 27. 29, 717 July 28. 29, 855 July 29. 30, 691	29, 773   25 29, 726   25 29, 863   25	9, 674 20, 670 9, 776 29, 777 0, 708 29, 731 9, 849 29, 895 0, 993 <b>30,098</b>	29, 684 29, 777 29, 741 29, 922 30, 695	29, 669 { 29, 774 } 29, 743 29, 922 30, 995 }	29, 660 29, 774 29, 738 29, 920 30, 991	29, 657 29, 767 29, 742 29, 952 30, 080	29, 645 29, 756 29, 746 29, 967 30, 071	29, 643 29, 755 29, 746 29, 950 30, 064	29, 647 29, 745 29, 748 30, 003 30, 003	20, 657 1 29, 743 1 29, 748 1 20, 768 10, 015 10, 000	29, 672 29, 739 29, 773 30, 053 30, 053	
July 30 29, 964 July 31 29, 817	29.944 2 29.846	9, 945   29, 949 9, 843   29, 837	20, 058 29, 847	20, 960 20, 51 <b>6</b>	29, 953 29, 813	29, 936 29, 837	20.041 20.500	29, 933 29, 819	29, 923 29, 815	29, 923 29, 403	29, 911 29, 803	19,903 29,795
Butter and and and							decreases of a small	The second of the second of			-	-
Means 29,782		9, 789 29, 789	29,795	29, 794	29 702	29, 753	29, 7×6	20, 781	29,761	29, 785	29, 7×6	29,785
	29, 784 29	9,789 29,789 p. m. <b>6</b> p. m.			29 792 9 p. m.			20, 781 12 m.	Daily means.	29, 785 Max,		29,785 Range,
Means 29,782	29, 784 29 1 p. m 5 p 29, 840 22 29, 865 27 29, 979 29								Daily	- 1	Min. 29, 808	Range.
Means 29, 782  Date 3 p. m.  1882 July 1 29, 850 July 2 29, 855 July 3 29, 955	29, 784 29  4 p. m. 5 p.  29, 810 22 29, 865 22 39, 979 22 30, 989 22 29, 787 22 29, 676 22 29, 485 22 29, 485 22	p. m. <b>6</b> p. m. 9, 816 - 29, 829 9, 861 - 29, 858 9, 970 - 29, 994	7 p. m. 29, 817 29, 856 29, 990	90, 816 29, 863 30, 001 30, 066 29, 860 29, 770 29, 638	9 p. m. 29, 814 . 29, 861 . 30, 001	29, 811 29, 865 29, 999	11 p. m. 29, 814 29, 866 30, 019	12 m. 20, 821 29, 876 30, 023	Daily means. 29, 818 29, 847 29, 948	Max. 29, 833 29, 876 30, 923	Min. 29, 806 29, 817 29, 874	Range
Date   29,782   1882   1882   19   1882   19   19   1882   19   19   1882   19   19   19   19   19   19   19   1	29, 784 22  1 p. m. 5 1  29, 810 2  29, 865 2  99, 970 2  30, 082 3  29, 876 2  29, 787 2  20, 676 2  20, 548 2  20, 548 2  20, 548 2  20, 646 2  20, 646 2  20, 646 2  20, 648 2  20, 648 2  20, 648 2  20, 648 2  20, 648 2  20, 648 2	p. m. 6 p. m. 9, 816 29, 820 9, 861 29, 838 9, 975 20, 991 0, 075 50, 072 9, 784 29, 658 1, 668 29, 681 29, 498 29, 688	7 p. m. 29, 817 29, 856 29, 909 90, 071 29, 885 29, 779 29, 659 29, 471	\$ p. m. 20, 816 20, 863 30, 001 30, 066 29, 869 29, 776 29, 638 29, 459	9 p. m. 29, 860 29, 860 30, 001 30, 062 29, 850 29, 777 29, 631 29, 462	29, 811 29, 865 29, 999 30, 057 29, 812 29, 769 29, 626 29, 457	29, 814 29, 866 30, 019 30, 050 29, 843 29, 767 29, 632 20, 478	12 m. 20, 821 29, 876 30, 623 30, 659 29, 824 29, 769 29, 621 29, 175	Daily means. 29,818 29,847 29,948 30,059 29,942 29,782 29,782 29,7519	20, 833   20, 876   30, 023   30, 082   30, 082   29, 822   29, 773   29, 612	Min. 29, 806 29, 817 29, 874 30, 027 29, 824 20, 760 20, 621 29, 457	Range. 027059149055234062151135
Date   3 p. m.   1882   July 1   29, 805   July 2   29, 805   July 3   30, 679   July 5   29, 906   July 6   29, 726   July 7   29, 676   July 7   29, 577   July 10   28, 619   July 10   29, 577   July 10   29, 577   July 10   29, 577   July 12   29, 577   July 14   29, 784 22  4 p. m. 5 1  29, 810 22  29, 865 22  29, 870 22  29, 870 22  29, 485 22  20, 651 22  20, 656 2  20, 586 2  20, 586 2  20, 656 3	9, 816 29, 820 9, 846 29, 838 9, 864 29, 838 9, 970 29, 970 9, 974 29, 848 9, 549 29, 548 9, 549 29, 548 9, 549 29, 547 9, 549 29, 548 9, 549 29, 548 9, 549 29, 548 9, 549 29, 547 9, 549 29, 548 9, 549 29, 548	7 p. m. 29, 517 29, 858 39, 900 30, 071 29, 885 29, 650 29, 471 20, 513 29, 689 29, 689 29, 885 29, 885 29, 885 29, 885	\$ p. m. 20, 816 23, 863 30, 001 30, 066 29, 860 29, 776 20, 632 29, 459 20, 542 29, 863 29, 942 29, 863 29, 863 29, 863	9 p. m. 20, 814 20, 863 30, 001 30, 002 20, 879 20, 631 20, 462 20, 663 20, 963 20, 963 20, 865 20, 865 20, 885	29, 811 29, 865 29, 996 30, 057 29, 769 29, 626 29, 457 29, 552 29, 29, 29, 29, 29, 29, 29, 29, 29, 29,	29, 814 29, 860 30, 619 30, 650 29, 843 29, 672 29, 478 29, 542 29, 542 29, 542 29, 542 29, 892 29, 892 29, 892	29, 821 29, 876 30, 623 30, 659 29, 824 29, 769 29, 821 29, 175 20, 519 29, 961 29, 963 29, 963 29, 577 29, 611 29, 437	Daily means. 29, 818 29, 847 29, 946 50,059 29, 942 29, 762 29, 519 29, 526 29, 960 29, 960 29, 960	Max, 20, 849 20, 876 30, 623 30, 682 20, 775 20, 612 20, 764 20, 869 20, 869 20, 869 20, 869 20, 869	Min. 29, 806 29, 817 29, 874 29, 874 29, 760 20, 621 29, 460 29, 551 29, 711 29, 883	Range. . 027 . 059 . 110 . 055 . 234 . 063 . 153 . 153 . 153 . 155 . 166 . 166 . 166	
Means   29,782	29, 784 22 29, 810 22 29, 865 22 29, 867 23 29, 868 22 29, 787 29, 676 22 29, 518 22 20,	9, 816 29, 829 9, 816 29, 838 9, 673 29, 944 10, 818 9, 673 29, 944 10, 874 29, 875 9, 814 29, 857 9, 818 29, 818 9, 418 29, 817 9, 618 29, 817 9, 618 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 818 10, 876 29, 876 10, 87	7 p. m. 29, 517 29, 856 29, 969 30, 071 29, 885 29, 779 29, 630 20, 545 29, 689 29, 689 29, 689 29, 689 29, 689 29, 689 29, 689 29, 685 29, 485 29, 485 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759 29, 472 29, 759	29, 816 23, 863 30, 601 30, 601 30, 601 29, 766 29, 638 29, 459 20, 542 29, 861 29, 861 29, 862 29, 572 29, 641 29, 488 29, 488 29, 488 29, 572 29, 572	9 p. m.  29, 814 29, 863 30, 602 29, 877 29, 633 29, 577 29, 634 29, 577 29, 634 29, 577 29, 634 29, 577 29, 634 29, 577 29, 634 29, 572 29, 844 29, 575 20, 844 29, 575 20, 848 29, 401 29, 762 29, 825	29, 811 29, 865 29, 999 39, 057 29, 842 29, 769 29, 626 29, 552 29, 552 29, 552 29, 574 29, 574 29, 574 29, 574 29, 576 29, 576 29, 576 29, 576 29, 576	29, 814 29, 866 30, 019 30, 050 20, 843 29, 767 29, 478 29, 543 29, 543 29, 543 29, 543 29, 543 29, 543 29, 543 29, 531 29, 531 29, 531	29, 821 29, 876 30, 623 30, 659 29, 824 29, 760 29, 621 29, 175 29, 175 29, 105 21, 106 21, 107 21, 10	Daily means. 29, 818 29, 818 29, 910 30,009 29, 920 29, 762 29, 762 29, 566 29, 662 29, 561 29, 561 29, 561 29, 662 29, 662 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663 29, 663	20, 833   22, 876   30, 023   30, 028   20, 822   20, 012   20, 704   20, 968   20, 769   20, 565   20, 567   20, 56	Min. 29, 806 29, 817 29, 874 30, 027 29, 824 29, 760 29, 457 29, 457 29, 763 29, 763 29, 763 29, 763 29, 763 29, 763 20, 437 20, 437 20, 437 20, 437	Range, . 027 . 059 . 110 . 055 . 062 . 159 . 135 . 135 . 166 . 195 . 177 . 177 . 178 . 118 . 118
Means   29, 782	29, 784 22 29, 810 22 29, 810 22 29, 865 22 29, 869 20 29, 869 20 29, 867 22 29, 576 22 20, 518 22	9, 814 29, 829 822 29, 824 19, 825 19, 826 19, 826 19, 826 19, 826 19, 826 19, 826 19, 826 19, 826 19, 826 19, 826 19, 827 19,	7 p. m. 29, 517 29, 856 29, 960 30, 971 20, 885 29, 792 29, 660 29, 673 29, 750 29, 155 29, 457 29, 759 29, 759 29, 855 29, 656 29, 746	20, 816 20, 801 20, 803 20, 606 29, 776 20, 608 20, 678 20, 682 20, 882 20, 489 20, 72 20, 842 20, 72 20, 826 20, 72 20, 826 20, 826 20, 72 20, 826 20, 826 20, 72 20, 826 20, 826 2	9 p. m. 20, 814 20, 863 30, 001 30, 002 29, 673 29, 673 29, 693 29, 993 29, 993 29, 993 29, 993 29, 993 29, 993 29, 844 29, 845 29, 844 29, 845 29, 844 29, 845 29, 844 29, 845 29, 845 20,	29, 811 29, 865 29, 990 30, 057 29, 769 29, 769 29, 769 29, 552 29, 55	29, 814 29, 869 29, 869 39, 669 29, 849 29, 767 29, 478 29, 513 29, 699 29, 791 29, 692 29, 791 29, 79	29, 821 29, 876 30, 623 30, 659 29, 824 29, 769 29, 621 29, 505 29, 519 29, 519 29, 519 29, 517 29, 517 29, 517 29, 517 29, 517 29, 517 29, 517 29, 517 29, 517 29, 519 29, 51	Daily means. 19, 818 29, 818 29, 919 29, 919 29, 782 29, 782 29, 782 29, 519 29, 566 29, 560 29, 862 29, 574 29, 580 29, 682 29, 682 29, 580 29, 802 29, 802 29, 803 29, 803 29, 803 29, 803 29, 803 29, 803 29, 803 29, 803	20, 848 (22, 876 ) 30, 003 (36, 822 ) 20, 822 (29, 822 ) 20, 012 (20, 828 ) 20, 567 (20, 838 ) 20, 567 (20, 838 ) 20, 567 (20, 838 ) 20, 567 (20, 838 ) 20, 567 (20, 838 ) 20, 567 (20, 838 ) 20, 824 (20, 834 ) 20, 834 (20,	Min. 29, 806 29, 817 29, 824 30, 027 29, 824 29, 760 29, 551 29, 460 29, 551 29, 762 29, 562 20, 584 20, 470 29, 775 29, 775 29, 802 29, 775 29, 802 29, 808 29, 808 29, 808	Range, . 027 . 038 . 110 . 055 . 055 . 153 . 153 . 255 . 168 . 153 . 168 . 177 . 075 . 188 . 189 . 089 . 169 . 177
Date   29, 782	29, 784 22 29, 810 22 29, 865 22 29, 867 22 29, 867 22 29, 867 22 29, 518 22 20, 518 22	p. m. 6 p. m.  0, 816	7 p. m. 29, 517 29, 856 29, 969 30, 671 29, 885 29, 759 29, 650 29, 759 29, 855 29, 855 29, 855 29, 855 20, 855 20, 855 20, 855 20, 660 20, 750 20, 845 20, 855 20, 660 20, 750 20, 855 20, 660 20, 746 20, 74	\$ p. m.  20, 816 23, 863 36, 001 30, 006 29, 756 29, 860 29, 654 29, 861 29, 863 29, 572 29, 572 29, 572 29, 572 20, 826 29, 576 29, 856 29, 576 29, 856 29, 576 29, 576 29, 576 29, 576 29, 576 29, 576 29, 576 29, 576 29, 576 29, 577 20, 813 30, 813 30, 813	9 p. m. 29, 814 29, 849 30, 001 29, 859 29, 737 10, 662 29, 859 20, 637 20, 683 20, 844 20, 575 20, 848 20, 762 20, 818 20, 818 20, 762 20, 818	29, 811 29, 803 29, 803 29, 803 29, 803 29, 873 29, 873 20, 87	29, 814 29, 866 30, 019 30, 050 20, 843 29, 662 29, 662 29, 662 29, 892 29, 791 29, 603 29, 603 29, 892 29, 791 29, 613 29, 613 29, 622 29, 817 29, 817 29, 817 29, 817 29, 817 29, 817 29, 818 29, 817 29, 818 29, 817 29, 818 29, 818 29, 818 29, 818 29, 818 20, 81	12 m.  20, 821 29, 876 30, 623 30, 623 30, 624 29, 769 29, 824 29, 769 29, 704 29, 961 29, 577 29, 577 29, 577 29, 578 29, 986 29, 986 29, 765 29, 765 29, 766 29, 823 29, 805 29, 765 29, 765 29, 765 29, 805 29, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765 20, 765	Daily means.  20, 818 29, 847 20, 916 20, 20, 20, 20, 20, 20, 20, 20, 20, 20,	Max. 20, 803   20, 876   30, 023   30, 023   30, 023   20, 872   20, 764   20, 966   20, 698   20, 769   20, 769   20, 769   20, 769   20, 769   20, 769   20, 878   2	Min. 29, 806 29, 817 29, 874 20, 874 20, 760 20, 760 20, 760 20, 751 20, 782 407 20, 751 20, 752 20, 752 20, 752 20, 752 20, 752 20, 755 20, 805 20, 805 20, 805 20, 717 20, 717 20, 717 20, 757	Range, . 027 . 059 . 110 . 059 . 151 . 153 . 153 . 153 . 155 . 106 . 155 . 177 . 075 . 188 . 181 . 181 . 181 . 181 . 181 . 182 . 116 . 059 . 052 . 067 . 055 . 067 . 055 . 068 . 059 . 052 . 067 . 055 . 056 . 057

0. 15s 0. 15s 0. 61° 1. 611 1. 72s

Range,

.05 .07 .05 .07 .01 .09 .01

1:

Tables showing pressure of air at Uylaamie from October, 1881, to August, 1883-Continued.

[Barometer above sea, 17 feet. Washington mean time. Correction for mean local time. - 5 hours 17 notantes.]

Date.	4 n. m.	9 0 10	3 a. m.	4 a. m.	Su. m.	6 n. m.	T a. m.	8 a. m.	9 a m.	10 n. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
APRILL.	# n. m.	2 11. 111.	09 (11, 111)		0		4				** ***		, p	, w p. 101.
1882. Aug. 1 Aug. 2 Aug. 3	20, 680 29, 684 29, 372	29, 676 29, 679 29, 377	29, 662 29, 684 29, 884	20, 644 29, 679 29, 424	29, 654 29, 676 29, 447	29, 666 29, 669 29, 466	29, 674 29, 639 29, 487	29, 669 29, 648 29, 563	29, 660 29, 605 29, 523	29, 676 28, 614 29, 540	29, 666 29, 661 79, 532	29, 581 29, 581 29, 578	29, 666 29, 657 29, 501	29 660 29 536 29 621
Aug. 4 Aug. 5 Aug. 6 Aug. 7 Aug. 8	290,040	29, 760 29, 996 29, 720 29, 544 29, 815	29, 762 29, 057 29, 697 29, 545 29, 814	29, 759 30, 005 29, 687 29, 545 20, 815	20, 761 30, 018 29, 684 29, 583 29, 820	29, 747 36, 024 29, 657 29, 627 29, 813	29, 739 40, 042 29, 652 29, 634 29, 601	29, 721 50, 043 29, 655 29, 655 29, 791	29, 709 20, 012 29, 051 29, 668 29, 774	29, 608 10, 055 29, 653 39, 082 29, 748	29, 694 30, 055 29, 649 29, 602 29, 734	29, 766 30, 039 29, 641 29, 713 29, 690		20, 754 50, 015 20, 626 20, 761 20, 621
Aug. 0 Aug. 10 Aug. 11 Aug. 12 Aug. 13	29, 320	29, 507 19, 662 19, 186 28, 193 19, 009	29, 102 10, 673 29, 390 20, 206 29, 722	29, 405 29, 681 29, 282 29, 213 29, 716	29, 410 29, 690 29, 572 29, 240 29, 776	29, 241	29, 409 29, 666 29, 259 29, 253 29, 864	29, 400 29, 651 29, 244 29, 267 29, 814	29, 399 29, 626 29, 235 29, 282 29, 817	29, 387 29, 601 28, 221 29, 223 29, 820	29, 576 29, 576 29, 205 28, 500 29, 570	29, 072 29, 554 29, 195 29, 525 29, 848	29, 366 29, 528 29, 190 29, 349 29, 845	29 364 29 506 29 204 29 364 29 86
Aug. 14 Aug. 15 Aug. 16 Aug. 17 Aug. 18	29, 900 20, 855 19, 790 29, 921 19, 863	20, 601 19, 863 29, 796 19, 901 19, 863	20, 905 29, 861 19, 862 29, 663 29, 866	20-010 20-955 29-966 29-966 29-958	29, 918 29, 801 29, 821 29, 955 29, 860	29, 825 29, 865 29, 850 29, 956 29, 869	20, 014 29, 855 29, 830 29, 955 29, 870	20, 015 20, 850 20, 874 20, 949 20, 801	20, 013 29, 845 29, 846 29, 852 29, 854	29, 907 99, 835 99, 846 99, 952 99, 853	29, 900 29, 863 29, 863 29, 943 29, 848	29, 896 29, 824 29, 861 29, 940 29, 848	29, 806 29, 826 29, 607 29, 934 29, 854	20, 804 20, 818 20, 879 20, 934 20, 935
Aug. 19 Aug. 20 Aug. 21 Aug. 22 Aug. 22	market and the same	29 808 19,778 29,805 29,847 19,811	00, 805 20, 770 26, 810 19, 861 19, 861	20 (02) 29, 772 20, 630 29 (63) 20 (64)	29, 801 29, 780 29, 831 20, 871 19, 803	20, 831 29, 770 29, 832 29, 871 29, 806	19, 831 19, 762 19, 836 19, 876 19, 824	29, 825 29, 760 29, 828 29, 873 29, 873	10, 820 19, 757 19, 830 19, 873 19, 840	09, 808 29, 750 29, 800 29, 872 29, 848	29, 835 29, 757 29, 833 29, 872 29, 835	29, 807 29, 757 29, 803 29, 880 29, 856	29, 837 29, 772 29, 834 29, 887 29, 861	20, a 1 20, 7 7 20, a27 20, a27 20, a71
Aug. 21 Aug. 25 Aug. 26 Aug. 27 Aug. 28	290, 605	29 89% 29 836 29 815 20 815 20 650 30 110	29, 906 29, 828 29, 827 20, 059 10, 131	20 pod 29 828 29 840 10 000 10, 174	29, 907 29, 834 99, 835 30, 667 30, 170	29, 906 29, 863 29, 863 10, 986 30, 139	29, 906 29, 837 29, 863 30, 079 30, 138	29, 900 29, 807 29, 873 30, 074 30, 136	29, 899 29, 795 29, 883 36, 073 36, 105	29, 892 29, 785 29, 898 30, 077 30, 133	29, 580 29, 780 29, 906 30, 077 30, 128	29 875 29, 789 29 568 30, 978 30, 128	29, 867 29, 780 29, 927 30, 029 30, 126	29, 861 29, 760 29, 906 30, 093 39, 123
Aug. 29 Aug. 30 Aug. 31	39, 023 29, 935 30, 171	20, 036 29, 146 30, 156	30, 041 29, 964 30, 204	00, 029 29, 963 30, 288	30, 033 29, 980 30, 228	20, 022 29, 990 30, <b>24</b> 3	30, 016 29, 996 30, 247	30, 009 50, 694 30, 257	90, 011 30, 017 30, 268	30, 010 30, 024 30, 252	29, 991 50, 024 30, 293	29, 988 30, 042 30, 566	29, 978 39, 041 30, 308	29, 978 1 20, 963 30, 514
Means.	29,775	29.775	29,783	20,755	29, 795	29, 797	29, 707	29, 795	29, 795	29, 791	20, 702	29, 792	29, 702	29, 795
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	۱ p. m.	9 p. m.	<b>10</b> p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Ran c.
1882 Aug. 1 Aug. 2	29, 669 29, 522 29, 638	29, 664 29, 562 29, 656	29, 667 29, 49,1 29, 674	29, 601 29, 463 29, 691	29, 671 29, 445 29, 711	29, 677 29, 432 24, 732	29, 678 29, 412 29, 739	29, 679 29, 390 29, 750	29, 680 29, 376 29, 752	29, 684 29, 359 29, 754	29, 670 29, 554 20, 583	29, 684 29, 684 29, 754	29, 644 29, 359 29, 372	. 040 . 325 . 382
Ang. 4 Ang. 5 Ang. 6 Ang. 7 Ang. 8	29, 629   29, 795	29, 793 29, 992 29, 415 29, 782 29, 564	29, 813 29, 964 29, 662 29, 779 29, 547	29, 843 29, 962 29, 594 29, 772 29, 524	29, 862 29, 914 29, 593 29, 776 29, 512	29, 890 29, 974 19, 592 29, 793 19, 499	29, 908 29, 842 29, 582 29, 813 29, 402	29, 920 29, 866 29, 575 29, 523 29, 484	29, 949 29, 769 29, 572 29, 821 29, 446	29, 957 29, 737 29, 559 29, 823 29, 432	29, 791 29, 970 29, 634 29, 765 29, 657	29, 957 50, 055 29, 720 29, 823 29, 820	29, 694 29, 737 29, 559 29, 535 29, 432	. 263 . 019 . 161 . 288 . 388
Aug. 9 Aug. 10 Aug. 11 Aug. 12! Aug. 13!	29, 355 19, 456 19, 196 29, 414 20, 873	29, 055 19, 465 19, 193 29, 439 29, 878	29, 387 29, 455 29, 198 29, 474 29, 879	25, 435 29, 440 29, 195 29, 497 29, 883	29, 481 19, 425 29, 193 29, 550 29, 861	29, 539 29, 407 29, 185 29, 577 29, 960	29, 584 29, 573 29, 188 29, 599 29, 890	29, 619 29, 363 29, 193 29, 621 29, 897	29, 627 29, 335 2 <b>9,184</b> 29, 651 29, 903	29, 646 29, 320 29, 188 29, 663 29, 895	29, 430 29, 535 29, 226 29, 363 29, 831	29, 646 29, 690 29, 320 29, 663 29, 963	29, 355 29, 320 <b>29,184</b> 29, 193 29, 684	. 291 . 370 . 129 . 470 . 219
Aug. 14 Aug. 15 Aug. 16 Aug. 17 Aug. 18	29, 891 29, 821 29, 882 29, 931 29, 858	29, 891 29, 800 29, 884 21, 41 20, 7, 1	29, 886 29, 794 29, 882 29, 921 29, 848	29, 584 29, 786 29, 884 29, 911 29, 844	29, 889 29, 791 29, 894 29, 896 29, 846	29, 849 29, 786 29, 900 29, 899 29, 842	29, 880 29, 801 29, 905 29, 888 29, 839	29, 867 29, 799 29, 965 29, 886 29, 887	29, 861 29, 779 29, 668 29, 873 29, 827	29, 852 29, 781 29, 911 29, 866 29, 820	29, 895 29, 824 29, 859 29, 959 29, 852	29, 927 29, 865 29, 911 29, 956 29, 870	29, 852 29, 779 29, 790 29, 866 29, 820	075 , 086 , 121 , 090 , 050
Ang. 19 Ang. 20 Ang. 21 Ang. 22 Ang. 22	29, 828 29, 759 29, 831 29, 875 29, 878	29: 836 29: 739 29: 836 19: 872 19: 887	29 821 19,759 29,848 19,872 29,889	29, 809 19, 763 29, 849 29, 874 29, 885	19, 812 19, 761 19, 839 19, 870 19, 40	29, 802 19, 766 19, 831 29, 867 29, 896	29, 802 29, 776 29, 829 29, 865 29, 896	29, 792 29, 779 29, 811 29, 856 10, 895	29, 788 19, 788 19, 836 19, 848 29, 902	29, 775 29, 787 29, 837 29, 845 23, 887	29 8 9 9 707 2 7 7 2 7 7 2 9 8 6	29, 837 29, 788 29, 813 29, 890 19, 962	29, 775 29, 753 29, 703 29, 845 19, 821	.062 050 050 045 078
Aug. 24 Aug. 25 Aug. 26 Aug. 27 Aug. 28	29, 867 29, 783 29, 944 30, 161 50, 111	29, 865 29, 776 29, 958 30, 104 30, 107	29, 862 29, 776 29, 968 30, 166 30, 106	29, 857 29, 774 29, 974 30, 108 30, 096	29, 833 29, 777 29, 975 30, 101 30, 088	29, 850 29, 783 29, 985 30, 102 36, 077	29, 819 29, 780 29, 994 30, 100 30, 066	29, 844 29, 783 29, 998 30, 106 30, 069	29, 8 at 29, 785 30, 018 30, 118 30, 001	29, 828 29, 794 30, 028 30, 115 30, 648	29, 870 29, 797 29, 914 30, 086 30, 110	29, 907 29, 837 30, 028 30, 118 30, 139	29, 828 29, 774 29, 105 30, 630 30, 648	. 079 . 061  . 082 . 094
Ang. 29 Ang. 30 Ang. 31	29, 964 50, 076 50, 327	29, 907 30, <b>089</b> 30, 311	29, 969 30, 107 30, 350	29, 952 30, 117 30, 355	29, 947 30, 119 30, 354	29, 941 30, 126 30, 347	29, 942 30, 133 30, 346	29, 940 30, 154 30, 320	29, 945 30, 172 00, 327	29, 943 30, 188 30, 332	29, 986 30, 053 <b>30, 255</b>	30, 041 30, 188 30,335	29, 940 29, 935 30, 171	. 101 . 254 . 184
$\mathbf{M}eans$	22, 796	29, 795	29, 796	29, 795	29, 797	29,803	29, 800	29 700	29, 798	29, 795	29, 703	29, 875	20,700	. 175
The second														

## EXPEDITION TO POINT BARROW, ALASKA.

## Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

	, Baro	meter ab	ny o sea, 17	feet. V	Vashingti	on mean t	lme, tion	rection fo	r mean b	seal time	5 hours	17 minut	HH. ]	
Date	ta. m.	2 a. m.	Sa. m.	§ n. m	å a. m.	6 a. m.	7 a. m.	۹ a. m.	9 n. m.	10 a. n.	11 a. m	12 m.	1 p. in.	2 p. m.
Nept.	30, 321 30, <b>1</b> ,0	30, 022 30, 128	30, 314 30, 426	30, 30% 30, \$29	30, 315 30, 410	30 315 30 331	30, 322 30, 410	30, 330	30 346	30 501 30, 424	30 412	00.009 00.004	30, 386	30, 40 <b>6</b> 30, 307
Sept 2 - Sept 3 Sept 4 Sept 6 Sept 6 Sept 7	20, 240 20, 040 20, 03 20, 649 29	30, .00 30, 048 29, 934 9, 647 29, 666	0, 1×3 20, 030 20, 024 20, 644 20, €09	20, 177 20, 051 29, 912 29, 627 29, 641	30, 179 30, 048 29, 910 29, 623 29, 634	30, 171 30, 644 29, 895 29, 611 29, 436	30, 102 30, 040 20, 887 24, 619 29, 612	30, 158 00, 031 29, 875 29, 609 29, 647	30: 147 30: 027 20: 859 20: 501 20: 656	00 448 00 027 09:826 09:586 09:674	50, 149 50, 650 29, 850 59, 587 29, 663	80 140 30 024 29, 848 29, 584 29, 672	00, 127 30, 025 29, 804 29, 803 29, 677	30 123 30 025 29, 789 29, 564 39 679
Sept. 8 Sept. 9 Sept. 10 Sept. 11 Sept. 12	29 - 3 29 - 3 29 - 45 15 - 345 19,796	29, 703 29, 868 20, 807 29, 546 29, 611	29 807 29 862 29 794 29 541 29 612	19, 818 29, 898 29, 787 29, 552 29, 621	29, 800 29, 901 29, 752 29, 548 29, 616	29, 845 29, 967 29, 772 29, 546 29, 644	29, 837 29, 943 29, 760 29, 543 29, 641	29, 845 29, 918 29, 749 29, 541 29, 619	20, 842 20, 913 20, 729 20, 545 20, 664	29, 846 29, 915 29, 717 20, 549 20, 667	29, 854 29, 967 29, 765 29, 553 29, 674	29, 861 29, 965 29, 687 29, 549 29, 681	20, 840 27, 897 29, 668 29, 543 29, 661	29, 860 29, 860 29, 652 29, 543 29, 684
Sept 11 Sept 11 Sept 10 Sept 10 Sept 10	29 (29) 29 (20) 20 (812) 10 (20) 20 (1)	29, 694 29, 707 23, 817 29, 895 29, 314	29, 698 29, 707 20, 830 29, 670 29, 189	29, 702 20, 703 29, 834 29, 836 29, 174	29, 712 29, 714 29, 817 29, 641 29, 151	29, 714 29, 714 29, 829 29, 631 29, 139	19,719 29,716 20,829 20,686 29,125	20, 722 29, 718 29, 827 29, 881 29, 681	29, 721 29, 725 29, 846 29, 566 29, 086	29, 729 19, 723 19, 827 29, 543 29, 072	29, 722 29, 710 19, 815 29, 521 29, 665	10,725 29,701 29,631 29,631 29,191 29,048	29 718 29 738 29 817 29 478 29,030	23, 714 29, 741 29, 823 29, 385 29, 086
Sept 19 Sept 19 Sept 11 Sept 11 Sept 11	29, 1 (1) 41 (3) (2) 40 (3), 52 (4) (1) 42 (4) (1)	19 160 29 161 20 468 50 613 29 914	2 (, 150 29 (320 29, 5 () 10 (006 10 (920	29, 159 29, 54 29, 869 30, 036 23, 92,	29, 185 29, 352 29, 940 30, 035 99, 929	29, 195 29, 380 29, 940 30, 019 29, 979	20, 205 20, 500 20, 955 30, 011 20, 930	29, 210 19, \$14 29, 980 30, 004 29, 939	29, 297 29, \$44 29, 996 29, 662 29, 640	29, 456 39, 456 30, 642 29, 991 29, 952	9 250 19,464 30,050 10,962 29,948	29, 241 29, 486 30, 052 29, 980 29, 956	29 241 29 506 30, 066 29, 957 29 952	29, 248 29, 518 30, 081 29, 945 29, 952
Sept - Se	9 6 4 9 6 4 9 6 4 9 5 4	290, 300 200, 607 200, 607 200, 907 200, 903	29 (445) 29 (631) 29 (656) 29 (456) 29 (41)	29, 945 29, 666 29, 761 29, 95 23, 94	2 ( 0 ) 4 20 ( 500 59 ( 744 20 (953 2 3 966	29, 930 29, 576 29, 773 29, 950 29, 965	29 915 29 563 29 793 29 937 29 948	29, 901 29, 543 29, 820 29, 923 29, 948	29, 800 29, 541 29, 836 29, 642 29, 975	29 880 19, 528 19, 858 19, 897 29, 918	29, 860 29, 521 29, 868 29, 868 29, 914	29, 862 19, 514 29, 864 26, 847 29, 901	29, 805 29, 494 29, 900 29, 821 29, 880	29, 843 29, 489 29, 907 29, 809 29, 876
Sept 21 Sept 21 Sept 21	24 757 20 833 50 067	19 773 19 740 50 666	29 767 - 19 915 - 20 Co7	29 767 29 939 10 067	29, 775 29, 970 53, 052	29 782 20 892 30 652	29, 783 29, 985 30, 607	29, 777 29, 988 29, 984	19,789 99,988 59,972	29, 798 29, 993 29, 946	29 801 30 000 29 918	29-820 30, 000 29, 895	20 829 20 598 20 864	29, 841 30, 000 29, 830
Media	, 4-795	.9 80°	,4 sel	29,810	29,810	29,810	,!), »(I»	29, 505	29, 805	29 802	29 799	20,70%	29, 791	29, 786
Dec	ар ∞	1 p. 0 s.	<b>5</b> p. n.	6 p. ta	₹ p. t.i.	Sp. m.	9 p. m.	10 p 36	Ир. в.	12 p. m	Daily lacans.	Max.	Min.	Range.
Sept 1 Sept 1	10 41 1 37 3 37	10 420 50 844	70 420 10 334	.0, 430 .00 .019	30 138 30, 298	30, 419 39, 272	30,452 30,259	30, 450 30, 241	30, 113 30, 221	30 148 50, 210	30,384 30,364	30,452 30,416	30, 313 30, 210	. 139 . 230
Sept 1 . Sept 5 . Sept 6 . Sept 6 . Sept 6 .	10, 110 10,026 10,70 20,54 19,00	50-110 50-656 59,761 59,763 59-702	50, 110 50, 024 29, 755 59, 574 29, 714	30 104 50,017 19,749 19,774 29,721	00, 100 00, 006 29, 728 29, 571 29, 704	30, 692 29, 996 19, 716 19, 571 29, 752	30, 690 29, 973 29, 688 29, 582 29, 757	30, 082 29, 961 29, 683 29, 5*2 29, 763	29, 955 29, 666 29, 582 29, 770	29, 592	30, 134 30, 018 29, 806 29, 594 29, 681	30, 200 30, 051 29, 034 29, 649 29, 784	30, 070 29, 945 29, 650 29, 563 29, 575	130 - 108 - 284 - 081 - 200
7 6 m - 9 8 pa - 10 8 pp - 11 8 pp - 11 8 pp - 11	99, 873 29, 888 29, 644 19, 714 29, 650	29, 876 29, 885 29, 626 29, 549 29, 607	29, 881 29, 619 29, 564 29, 762	29, 863 29, 640 29, 567 29, 762	29, 882 29, 855 29, 600 29, 577 29, 697	29, 830 29, 849 29, 586 29, 584 29, 695	29, 889 29, 849 29, 572 29, 584 29, 710	29, 879 1 29, 834 29, 564 29, 598 29, 699	29, 890 29, 826 19, 555 29, 600 29, 704	29, 827 29, 549 29, 608	29, 853 29, 882 29, 681 29, 559 29, 669	29, 892 29, 915 29, 848 29, 668 29, 710	29, 785 29, 826 29, 549 29, 541 29, 596	. 10 . 08 . 26 . 06 . 11
Sept. 11 Sept. 14 Sept. 15 Sept. 16 Sept. 17	29, 749 29, 748 29, 815 29, 972 29, 955	29, 721 29, 765 29, 81 ( 29, 577 29, 64 (	29 7 9 29,782 29,805 29 101 29,053	29, 729 29, 749 19, 798 19, 574 19, 670	29, 729 • 29, 792 29, 793 29, 952 19, 678	29, 724 29, 788 29, 777 20, 319 19, 076	29, 710 29, 800 29, 770 29, 292 29, 078	29, 712 20, 791 29, 747 29, 280 29, 689	29, 711 29, 866 29, 767 29, 255 19, 698	29, 799 29, 729 29, 245	29, 746	29, 729 1 29, 800 29, 837 29, 699 29, 214	29 694 29, 703 29, 720 29, 245 <b>29, 030</b>	. 03 . 09 . 11 . 45 . 18
Sept. 18 Sept. 19 Sept. 20 Sept. 21 Sept. 22	29 276 29, 557 30 088 59 934 29, 9 6	09 979 19,581 50 105 29 950 29 971	29-271 29-469 30-110 29-927 29-958	29 275 29, 644 50, 110 29, 921 29, 7-1	29, 271 29, 659 50, 100 29, 921 29, 959	29, 268 29, 681 50, 605 29, 929 19, 956	29, 264 29, 765 30, 682 27, 927 13, 957	29, 266 29, 730 30, 086 29, 916 29, 956	29, 911	29, 964	30, 010 29, 972	29, 291 29, 766 30, 110 30, 064 19, 959	29, 123 29, 360 29, 792 29, 964 29, 913	. 15 . 16 . 31 . 16
Sept. 24 Sept. 24 Sept. 25 Sept. 26 Sept. 27	29, 804 29, 477 29, 917 29, 779 29, 868	29, 791 29, 477 29, 963 29, 768 29, 862	29, 771 29, 490 19, 947 29, 769 29, 841	29, 755 29, 566 29, 647 29, 777 29, 841	29, 749 19, 546 29, 950 29, 805 29, 824	29, 72 ) 29, 528 29, 954 29, 838 29, 814	29, 700 29, 550 29, 959 29, 861 29, 866	29, 690 29, 558 29, 959 29, 886 29, 793	29, 588	29, 621 29, 961 29, 918	29, 548 29, 856 29, 876	29, 949 29, 637 29, 963 29, 957 29, 966	29, 665 29, 477 29, 624 29, 768 29, 775	. 16 . 33 . 18
Sept. 15 Sept. 29 Sept. 50	29, 841 50, 015 20, 786	29 × 14 30, 028 29, 764	29, 816 30, 619 29, 745	19 807 30,066 29,731	29, 793 50, 668 29, 697	29, 793 30, 064 29, 699	30, 065	29, 809 30, 071 29, 607	50, 031	50, 067	30, 004	29, 843 39, 085 39, 666	29, 767 29, 851 29, 594	. 07 23 17
Means	29-755	29 786	29, 789	29.757	29, 781	29 742	29, 779	29,776	29.776	29 777	29, 793	19.880	29, 6a6	19

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## EXPEDITION TO POINT BARROW, 'ALASKA.

Tables showing pressure of air at Uglaumie from October, 1881, to August, 1883—Continued.

 $[Batometer\ above\ sea,\ 17\ feet,\quad \textbf{Washington}\ mean\ time,\quad \textbf{Correction}\ for\ mean\ local\ time,\ -5\ hours\ 17\ minutes,\ and\ an all of the properties of the proper$ 

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Dat	e.	1 a. m.	2 a. m.	3 a. m.	£ al. 105	5 a. m.	6 a. m.	7 a. m.	Sa. m.	9 a. m.	10 a. m.	Ha m.	12 m.	£p. m.	2 p. m.
-															
Oct. 1 Oct. 1	1	29, 621 29, 671	29, 596 29, 670	29, 581 29, 693	29, 576 29, 691	29, 583 29, 716	29, 574 29, 729	29,564 29,746	29, 568 29, 734	29, 57a 29, 734	29, 584 29, 744	28 598 29,748	29, 593 29, 754	29, 606 29, 762	29, 624 29, 174
Oct. 3 Oct. 4 Oct. 6 Oct. 7		29, 964 30, 012 29, 882 29, 649 29, 907	29, 007 30, 006 29, 675 29, 663 29, 923	29 949 30, 097 29, 880 29 676 19, 920	2 ( 9%) 50, 006 29, 871 29, 676 29 577	29, 973 50, 016 29, 858 29, 693 29, 959	20, 980 30, 005 29, 843 29, 698 29, 970	29, 994 29, 995 29, 829 29, 704 20, 970	20, 904 29, 804 29, 710 29, 967	20, 005 29, 957 29, 780 29, 715 29, 971	30, 014 29, 984 29, 762 29, 726 20, 970	00, 0.11 20, 986 29, 743 29, 743 29, 974	20, 980 29, 724 29, 748 29, 978	10, 009 29, 975 29, 709 29, 749 29, 749	10, 6 1 29, 6, 2 29, 69 - 29, 760 29, 91
Oct. 5 Oct. 16 Oct. 16 Oct. 11	) )	29, 960 29, 983 29, 963 30, 001 30, 131	29, 969 29, 963 29, 963 36, 011 30, 136	20, 960 29, 985 29, 966 30, 966 30, 111	29, 971 29, 990 29, 966 30, 919 30, 159	29, 980 29, 997 29, 978 30, 028 30, 172	29, 981 29, 996 29, 985 30, 025 30, 177	29, 978 29, 994 29, 985 30, 933 30, 186	29, 968 29, 983 29, 985 20, 633 50, 187	29, 970 29, 975 29, 982 30, 036 30, 196	29, 967 29, 971 29, 985 30, 938 30, 205	29, 974 29, 975 29, 985 30, 036 30, 217	29, 970 29, 972 29, 979 30, 934 30, 213	23, 973 29, 971 29, 974 30, 933 50, 212	29, 97 s 29, 96 s 29, 98 s 30, 0 3 30, 21 ;
Oct. 1: Oct. 1: Oct. 1: Oct. 1: Oct. 1:	l 5 3	30, 152 29, 830 29, 743 29, 944 29, 947	20, 145 29, 846 29, 794 20, 973 29, 954	30, 147 29, 826 29, 804 29, 972 29, 944	30, 123 29, 811 29, 804 29, 979 28, 932	30, 127   20, 816   29, 804   29, 993   20, 939	30, 117 29, 813 29, 809 30, 001 29, 901	30, 103   29, 809   29, 825   30, 000   29, 918	29, 800 29, 828 30, 006	30, 678 29, 798 29, 839 30, 669 29, 897	30, 065 29, 794 29, 811 30, 069 29, 882	30, 048 29, 791 29, 845 30, 047 49, 869	00, 001 29, 777 29, 855 30, 014 29, 865	30, 018 29, 779 29, 865 30, 019 29, 858	20, 604 29, 515 29, 81, 35, 604 29, 84
Oct. 18 Oct. 19 Oct. 20 Oct. 21 Oct. 22	) )	29, 739 29, 736 29, 734 25, 715 29, 733	29, 744 29, 773 29, 736 29, 735 29, 741	29, 749 29, 769 29, 742 29, 767 29, 766	29, 749 29, 774 29, 723 29, 739 29, 741	29, 742 29, 781 29, 721 29, 769 29, 755	29, 742 29, 783 29, 724 29, 773 29, 715	29, 737 29, 784 29, 724 29, 778 29, 778	29, 736 29, 781 29, 719 29, 778 29, 733	29, 742 29, 786 29, 720 29, 775 29, 737	29, 745 29, 781 29, 716 29, 775 29, 732	29, 745 29, 790 29, 716 29, 776 29, 703	29, 745 29, 781 29, 711 29, 767 29, 756	29, 742 29, 776 29, 712 29, 761 29, 760	290, 71 s 290, 71 s 290, 71 s 290, 73 s 290, 73 s 291, 73 s
Oct. 23 Oct. 23 Oct. 25 Oct. 26 Oct. 27		29, 677 29, 708 29, 767 29, 849 29, 846	29, 680 24, 707 29, 784 29, 842 29, 832	29, 674 29, 769 29, 784 29, 849 29, 852	29, 674 29, 729 29, 788 29, 867 29, 859 29, 859	29, 689 29, 729 29, 799 29, 879 29, 865	29, 686 29, 729 29, 895 29, 880 29, 862	29, 677 29, 729 29, 798 29, 883 29, 883	29, 669 20, 734 29, 808 19, 684 20, 853	29, 667 29, 741 29, 805 29, 893 29, 856	29, 668 29, 748 29, 805 29, 895 29, 856	29, 667 29, 754 29, 810 29, 895 29, 851	29, 667 29, 754 29, 814 29, 893 20, 852	29, 669 27, 757 29, 812 29, 897 29, 853	25 677 29 50 5 29 811 29 804 29 850
Oct. 28 Oct. 29 Oct. 30 Oct. 31	) }	29, 861 30, 628 30, 677 29, 824	29, 871 30, 035 30, 106 29, 826	29, 881 30, 028 30, 092 29, 821	29, 883 03, 030 00, 092 29, 656	29, 894 30, 048 30, 105 29, 827	29, 899 30, 056 39, 096 29, 811	29, 904 30, 958 30, 992 29, 794	29, 914 30, 071 30, 073 29, 773	29, 925 30, 073 30, 035 29, 757	29, 926 30, 086 30, 028 29, 753	29 9.33 30, 086 29, 994 29, 744	29, 947 30, 695 29, 955 29, 735	29, 541 00, 097 29, 898 29, 732	29, 94 ( 30, 698 29, 862 29, 728
	118 .	29, 862	29 867	23, 867	29, 869	29,878	29,878	29, 877	29, 874	29, 874	29, 872	29, 873 4	29, 869	29, 867	29, % 5
Men		40. 004	2.0	_ (*,11)	20,000	237, 76 7	2171717	20.011	211, 51 4	m15. 17.6 B	20.012	-0.010	20,000	= 1,1111	
Date		3 p. m.	4 p. m.							H p. m.		Daily meates.	Max.	Mir.	Range.
	e. 1									II p. m. :		Daily			
Date 1882 Oct. 1 Oct. 2 Oct. 3	e. 1	3 p. m. 29, 631	4 p. m. 29, 651	5 p. m 29, 660 .	6 p. m	7 p. m 29, 661	<b>S</b> p. m.	9 p. m. 29, 677	20, 672 20, 672 20, 874 30, 620 20, 923 20, 641	11 p. m. : 29,668	12 p. m. 29, 668 29, 904 36, 620 29, 904 29, 652 26, 913	Daily means.	Max. 29, 677	Mir. 29,561	Range.
Date 1	e. 1	29, 631 29, 791 30, 645 29, 973 29, 781	4 p. m. 29, 651 29, 806 00, 046 29, 974 29, 677 29, 796	5 p. m 29, 660 . 29, 823 30, 647 : 29, 977 . 29, 652 ! 29, 809	6 p. m. 29, 672 29, 672 29, 828 30, 967 29, 969 29, 652 29, 814	7 p. m. 29, 661 29, 847 30, 937 29, 931 29, 639 20, 839	S p. m. 29, 661 29, 850 30, 028 29, 939 29, 629 20, 841	9 p. m. 29, 677 29, 864 30, 029 29, 931 29, 645 29, 840	29, 672 29, 672 29, 874 30, 620 29, 923 29, 811 29, 876	29, 668 29, 889 30, 620 29, 909 29, 645 20, 884	12 p. m. 29, 668 29, 904 36, 620 29, 904 29, 652 26, 913	Daily nouses. 29,620 29,776 30,004 29,974 29,764	Max. 29, 677 29, 991 59, 047 39, 016 29, 882 29, 918	Mir. 29,564 29,670 29,904 29,904 29,629 20,619	Range,
Date    1882		3 p. m. 29, 631 29, 791 30, 645 29, 973 29, 781 29, 781 29, 983 29, 966 20, 988	29, 651 29, 866 30, 046 29, 974 29, 677 29, 776 29, 975 29, 965 29, 965 30, 059 29, 967	5 p. m	6 p. m. 29, 672 29, 828 30, 007 29, 969 29, 652 29, 979 20, 988 29, 958 29, 968 30, 069 30, 06	7 p. m. 29, 661 29, 847 30, 037 29, 639 20, 839 20, 988 20, 955 29, 985 30, 071	\$ p. m. 29, 661 29, 850 50, 028 29, 939 29, 629 29, 963 29, 962 29, 962 29, 962 29, 963 30, 080	9 p. m. 29, 677 29, 864 30, 029 29, 931 29, 645 29, 970 20, 982 20, 959 30, 000 30, 000	20, 672 29, 874 30, 620 29, 923 29, 641 29, 969 29, 982 29, 959 30, 0ct	29, 668 29, 889 30, 020 29, 900 29, 904 29, 894 29, 973 29, 994 29, 971 30, 011 30, 113	29, 668 29, 904 30, 620 29, 904 29, 652 29, 913 29, 972 29, 971 30, 013 30, 126	Daily means. 29,620 29,776 00,004 29,974 29,764 29,963 20,978 29,974 29,974 29,986 30,049	Max. 29, 677 29, 994 30, 047 30, 048 29, 943 20, 980 29, 997 30, 013 30, 126	Mir.  29,564 29,670 29,904 29,0620 29,6620 29,565 29,565 29,063 20,000	Range,
Date 18-2 Oct. 1 Oct. 2 Oct. 3 Oct. 4 Oct. 6 Oct. 6 Oct. 9 Oct. 10 Oct. 11 Oct. 12 Oct. 13 Oct. 15 Oct. 15 Oct. 15	2	3 p. m. 29, 631 29, 791 30, 045 29, 791 29, 682 29, 784 29, 983 20, 900 20, 988 30, 043 20, 988 30, 043 20, 988 30, 043 20, 988 30, 043 30,	4 p. m. 29, 651 29, 806 00, 046 29, 974 29, 776 29, 975 20, 985 50, 997 70, 000 10, 216 29, 760 20, 276 20, 30, 216	29, 660 29, 823 30, 647 29, 977 29, 977 29, 589 29, 589 29, 589 29, 589 30, 666 30, 212 29, 588 29, 747 29, 888 30, 668	6 p. m. 29, 672 29, 828 30, 007 29, 969 29, 814 29, 658 29, 658 29, 658 29, 658 29, 747 29, 997 29, 917 29, 917 20, 91	7 p. m. 29, 661 29, 847 30, 037 29, 931 20, 839 20, 980 20, 988 20, 955 30, 071 30, 071 20, 228 20, 747 20, 228 20, 747 20, 929 20, 747 20, 929 20, 928 20, 92	\$ p. m. 29, 661 29, 850 50, 028 29, 629 29, 963 29, 963 29, 963 20, 980 60, 195 20, 962 20, 906 20, 751 20, 923 20, 92	9 p. m. 29, 677 29, 861 30, 029 20, 951 29, 860 29, 982 29, 982 29, 988 30, 089 30, 089 30, 089 30, 745 29, 988	20, 672 29, 874 30, 626 29, 923 29, 644 29, 876 29, 982 29, 950 30, 107 30, 177 20, 775 20, 975 29, 940 29, 940 20, 94	H p. m. 29, 668 29, 889 20, 999 32, 999 32, 971 29, 971 20, 115 20, 178 29, 766 29, 766 29, 974 29, 974 29, 975 29, 976 29, 976 29, 976 29, 977 29, 977	29, 668 29, 904 30, 920 29, 904 29, 965 29, 913 20, 972 29, 999 29, 971 30, 126 50, 179 29, 857 29, 968 29, 968 29, 968	Daily 100-316s. 29, 620 20, 776 20, 774 20, 774 20, 774 20, 774 20, 974 20, 974 20, 974 20, 974 20, 978 20, 97	Max. 29, 677 29, 904 50, 047 30, 016 29, 882 29, 980 29, 997 30, 013 30, 126 30, 217 30, 152 60, 20, 968 50, 021	Mir., 29,564 29,670 29,904 29,904 29,640 29,555 29,660 29,555 29,661 29,755 29,755 29,759 29,961	Range,
Date    1882   Oct. 1   Oct. 2   Oct. 3   Oct. 4   Oct. 5   Oct. 6   Oct. 7   Oct. 8   Oct. 10   Oct. 11   Oct. 12   Oct. 12   Oct. 13   Oct. 15   Oct. 6   Oct. 15   Oct. 6   Oct. 17   Oct. 18   Oct. 19   Oct. 19   Oct. 19   Oct. 10   O		29, 631 29, 791 30, 045 29, 791 30, 045 29, 682 29, 781 29, 980 30, 043 30, 04	29, 651 29, 866 30, 046 29, 974 29, 677 29, 975 20, 982 30, 216 20, 971 20, 97	5 p. m	29, 672 20, 828 30, 949 20, 809 20, 652 20, 970 20, 984 20, 970 30, 207 30, 207 30, 207 30, 207 30, 207 207 30, 207 207 30, 207 30, 207 207 30, 207 30	7 p. m., 29, 661 29, 847 30, 031 29, 669 29, 859 29, 985 29, 985 29, 987 30, 271 29, 929 29, 891 29, 804 29, 750 29, 752 29, 7752	\$ p. m. 29, 661 20, 850 50, 028 29, 629 29, 962 29, 962 29, 962 20, 976 20, 977 20, 978 20, 977 20, 751 20, 923 20, 978 20, 751 20, 752 20, 752 20, 752 20, 752	9 p. m.  29, 677 29, 861 30, 029 29, 931 29, 645 29, 970 29, 982 30, 030 30, 089 30, 188 29, 903 20, 773 29, 774 29, 774 29, 774 29, 774 29, 774 29, 774	29, 672 29, 874 30, 622 29, 923 29, 641 29, 969 29, 982 29, 983 30, 0c1 30, 107 30, 107 29, 772 29, 776 29, 776 29, 777 29, 776 29, 777 29, 776 29, 778 29, 77	29, 668 29, 889 30, 029, 999 29, 643 29, 994 29, 973 29, 994 29, 974 30, 011 30, 115 30, 115 30, 178 29, 876 29, 776 29, 768 29, 776	29, 668 29, 904 30, 652 29, 904 29, 652 29, 903 20, 972 29, 903 30, 126 50, 177 29, 765 29, 968 29, 760 29, 776 29, 754 29, 754 29, 754	Daily means. 29, 620 cm. 10, 620 cm. 10, 620 cm. 10, 604 cm. 10, 704 cm. 10, 7	Max. 29, 677 29, 904 50, 047 30, 046 29, 892 20, 913 30, 126 30, 126 30, 127 20, 953 40, 175 20, 953 40, 770 20, 770 20, 774 20, 774	Mir. 29,564 29,670 29,504 29,904 29,904 29,907 29,619 29,907 29,669 29,575 29,963 0,001 30,131 29,856 29,758 29,759 29,774 29,776 29,774 29,77	Range,
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Date 18-22 Oct. 2 Oct. 20 Oct.		29, 631 29, 791 30, 052 30, 053 30, 053 30, 053 30, 053 30, 054 30, 05	20, 651 22, 806 30, 046 22, 877 30, 877 20, 975 20, 975 20, 975 20, 975 20, 976 20, 976 20, 976 20, 976 20, 802 20, 776 20, 802 20, 776 20, 77	20, 660 20, 820 20, 820 20, 820 20, 820 20, 820 20, 820 20, 820 20, 820 20, 747 20, 985 20, 747 20, 820 20, 747 20, 820 20, 747 20, 820 20, 748 20, 749 20, 820 20, 83	29, 672 20, 828 30, 007 20, 828 30, 007 20, 682 20, 673 20, 673 20, 673 20, 683 20, 691 20, 747 20, 747 20, 747 20, 747 20, 742 20, 742 20, 742 20, 743 20, 743 20, 743 20, 744 20, 74	7 p. m. 20, 661 120, 847 29, 663 120, 983 120, 983 120, 983 120, 983 120, 985 120, 985 120, 747 120, 747 120, 756 120, 757 120, 756 120, 757 120, 857 1200, 857 1200, 857 1200, 857 1200, 857 12000, 857 12000000000000000000000000000000000000	\$ p. m.  29, 661 20, 850 50, 028 20, 980 20, 981 20, 981 20, 982 20, 982 20, 982 20, 982 20, 981 20, 751 20, 752 20, 752 20, 753 20, 754 20, 756 20, 757 20, 756 20, 757 20, 756 20, 757 20, 756 20, 757 20, 756 20, 757 20, 756 20, 757 20, 756 20, 757 20, 766 20, 771 20, 836 20, 857 20, 766 20, 771 20, 766 20, 771 20, 766 20, 772 20, 766 20, 773 20, 766 20, 774 20, 766 20, 777 20, 766 20, 777 20, 766 20, 776 20, 766 20, 777 20, 766 20, 776 20, 776 20, 766 20, 777 20, 766 20, 776 20, 766 20, 777 20, 766 20, 776 20, 766 20, 777 20, 766 20, 776 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 766 20, 777 20, 776 20, 776 20, 776 20, 776 20, 776 20, 777 20, 776 20, 777 20, 776 20, 777 20, 776 20, 777 20, 776 20, 777 20, 777 20, 777 20, 777 20, 777 20, 777 20, 777 20, 7	9 p. m. 29, 677 29, 861 30, 029 20, 961 30, 029 20, 970 20, 982 20, 959 30, 000 30, 089 20, 751 20, 751 20, 751 20, 771 20, 771 20, 779 20, 836 20, 788 20, 982 20, 771 20, 771 20, 771 20, 788 20, 886 20, 886 20, 886 20, 886	29, 672 29, 874 30, 626 29, 987 30, 626 29, 982 30, 661 29, 982 30, 107 30, 177 29, 756 20, 974 20, 974 20, 771 29, 756 20, 974 20, 771 29, 756 20, 771 29, 756 20, 974 20, 97	29, 668 29, 889 20, 000 20, 020 20, 040 20, 973 20, 904 20, 973 20, 118 30, 101 30, 118 30, 115 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 117 30, 118 30, 11	29, 668 29, 904 30, 620 29, 904 30, 620 29, 917 20, 907 20, 907 20, 907 30, 013 30, 124 30, 177 29, 765 29, 765 29, 774 40, 774 29, 774 29, 774 29, 774 29, 874	Daily mestics.  29,620 20,776 20,004 20,774 20,764 20,963 20,978 20,988 20,978 20,988 20,978 20,988 20,978 20,988 20,978 20,788 20,884 20,884	Max. 29, 677, 70, 616, 617, 617, 617, 617, 618, 618, 617, 617, 618, 618, 618, 618, 618, 618, 618, 618	Min. 29,561 29,670 20,984 20,984 20,984 20,985 20,986 20,986 20,986 20,986 20,745 20,986 20,745 20,766 20,775 20,777 20,777 20,777 20,840 20,840 20,984 20,784 20,784 20,784 20,784 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,784 20,884 20,9	Range,

Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

 $\{ Barometer\ above\ sea,\ 47\ fret.\ \ \textbf{Washington}\ mean\ time.\ \ Correction\ for\ mean\ local\ time,\ --5\ hours\ 47\ m'suites. \}$ 

	11010	meter ab												
Date.	1 n. m.	2 a. m.	3 a. m	la. m.	3 a. m.	<b>6</b> a. m.	7 a. m.	Sa. m.	9 a. m.	10 a. m.	H a.m.	12 m.	Lp. m.	2 p. m.
1882. Nov. 1	20.724	29 704	20.676	29, 654	29, 634	29, 597	29, 565	20, 525	29,111	29 (57	_ < 479	29, 157	29, 410	29, 431
Nov. 2 Nov. 4 Nov. 4 Nov. 6	20, 476 24, 981 36, 113 26, 956 27, 964	29, 450 59, 610 50, 113 29, 944 20, 300	29, 492 50, 041 53, 419 29, 951 29, 942	29,510 10,004 10,115 29,974 19,910	20, 497 30, 083 50, 127 29, 949 29, 924	29, 595 80, 696 90, 132 29, 941 28, 931	29, 500 39, 048 30, 122 29, 941 29, 947	29, 492 30, 098 50, 104 19, 928 29, 948	29, 497 39, 106 30, 020 29, 952 29, 957	29, <b>189</b> 30, 112 30, 000 29, 927 29, 963	19 491 30, 168 30, 684 29 925 20, 976	29, 531 30, 103 30, 071 29, 929 29, 591	29, 571 30, 096 30, 071 29, 926 30, 600	29, 611 30, 093 30, 063 20, 921 30, 008
Nov. 7 : Nov. 5 : Nov. 9 : Nov. 11 :	20, 767 20, 767 20, 760 20, 294 20, 414	20, 116 . 29, 744 29, 775 19, 205 29, 129	00, 121 20, 7.3 20, 7.5 20, 7.5 29, 204 20, 4.6	00, 117 29, 743 29, 749 29, 864 29, 447	30, 118 29, 714 29, 734 29, 346 29, 428	29, 704 29, 766 29, 324 29, 324	30, 124 29, 698 29, 695 29, 344 29, 429	29, 683 29, 666 29, 666 29, 354 29, 432	20, 607 29, 661 29, 611 19, 974 29, 400	29 680 29 624 29 406 29 411	25,674 20,680 20,580 20,431 20,431	10, 059 10, 696 10, 562 20, 47 20, 47	00, 644 29, 700 29, 542 29, 479 29, 456	00, 025 29, 710 29, 519 29, 506 29, 47 1
Nov 12 . Nov 14 . Nov 14 Nov 15 Nov 16	29, 662 29, 781 59, 601 29, 879 29, 606	29, 683 29, 781 19, 843 29, 880 29, 607	29, 706 19, 797 29, 842 29, 876 29, 591	29, 7.39 29, 787 29, 847 29, 875 29, 601	29, 757 29, 865 29, 863 29, 8c1 29, 548	29, 761 29, 80 1 29, 855 29, 854 29, 581	29, 777 29, 806 29, 861 29, 837 29, 574	29, 784 29, 806 29, 861 19, 820 29, 569	29, 788 29, 866 29, 864 29, 811 29, 564	20, 799 29, 807 29, 862 29, 795 29, 567	29, 793 29, 812 29, 866 29, 777 29, 554	29, 795 29, 814 29, 873 29, 770 26, 559	29, 797 29, 829 26, 872 29, 763 29, 562	29, 798 29, 825 29, 866 29, 738 29, 551
Nov. 17 Nov. 18 Nov. 19 Nov. 20 Nov. 21	29, 554 29, 562 29, 569 29, 769 29, 674	29, 179 29, 195 29, 521 29, 713 29, 666	29 554 19, 692 29, 519 29, 721 29 654	29, 541 29, 384 29, 543 19, 729 29, 673	29, 546 29, 584 29, 554 29, 747 29, 628	19 543 29 393 29, 564 29, 745 29, 616	29, 534 29, 405 29, 578 29, 751 29, 594	29, 514 29, 400 29, 509 29, 762 29, 584	29, 192 29, 398 49, 601 29, 764 29, 555	20, 493 29, 397 29, 609 29, 771 29, 544	29, 481 29, 408 29, 610 29, 758 29, 521	29, 481 29, 420 19, 639 29, 764 29, 103	29, 469 29, 424 29, 634 29, 766 29, 489	29, 407 09, 426 29, 652 29, 779 29, 458
Nov. 221. Nov. 122 Nov. 24 Nov. 27 Nov. 26	29 018 29, 698 00, 101 20, 791 30, 440	2.0, 0009 29, 714 30, 105 30, 5.6 30, 440	29, 515 29, 739 59, 429 59, 358 59, 442	29, 102 29, 763 30, 118 30, 394 30, 428	29, 322 29, 781 50, 162 30, 172 30, 472	29, 532 29, 796 30, 174 30, 445 50, 400	29, 340 29, 818 50, 186 30, 451 50, 377	29, 950 29, 845 30, 194 50, 481 50, 574	29, 864	29, 378 29, 875 30, 269 30, 493 30, 346	29, 094 29, 892 30, 218 30, 498 30, 503	29, 411 29, 912 30, 228 30, 498 30, 193	29, 430 29, 925 30, 229 50, 502 50, 260	29, 454 29, 939 30, 236 30, 500 20, 238
Nov. 27 Nov. 18 Nov. 19 Nov. 39	30, 043 29, 774 20, 074 30, 170	29, 790 10, 000 50, 111	29, 795 50, 106 50, 149	00, 017 29, 799 00, 150 00, 124	30, 999 29, 804 30, 188 30, 104	29, 975 29, 811 30, 204 30, 087	29, 958 29, 816 20, 212 30, 062	29, 949 29, 815 30, 219 30, 043	29, 911 29, 818 30, 224 30, 024	29, 895 29, 828 30, 200 30, 018	29, 863 29, 847 50, 224 29, 996	29, 856 29, 872 30, 223 29, 979	29, 849 29, 886 30, 220 29, 969	29, 838 29, 894 30, 224 29, 964
Means.	29,799	29, 805	29, 808	29, 814	29,816	29, 814	29, 812	29, 810	1 29, 806	29.807	29, 803	29, 806	29, 800	29, 806
Date.	3 р. ш.	4 p. m.	<b>5</b> թ. ա.	6 p. m.	7 p. m.	5 p. m.	9 p. m.				Daily means.	Max.	Mm.	Range,
Date. 1882 Nov. 1	·	4 p. m. 29, 443	5 p. m. 29, 133	<b>6</b> p. m.	7 p. m. 29, 436	9 p. m. 20, 405	9 p. m. 29, 155					Max 20,721	Mm. 29, 430	Range,
1*82	29, 430 29, 642 30, 109 30, 043 29, 913			29, 458 29, 773 50, 109 30, 607	!	29, 435 29, 835 30, 104	1	10 p. m.	11 p. m.	12 p. m.	means.	•		
Nov. 2 Nov. 2 Nov. 3 Nov. 4 Nov. 5	29, 430 29, 642 30, 109 30, 043 29, 913 30, 021 30, 005 20, 719 29, 484	29, 443 29, 690 30, 111 30, 622 29, 909	29, 133 29, 722 30, 114 30, 014 29, 909	29, 458 29, 773 50, 109 30, 607 29, 903	29, 496 29, 809 30, 104 29, 802 29, 896	29, 405 29, 805 30, 104 29, 979 29, 806 30, 089 29, 801	29, 455 29, 876 30, 105 29, 981 29, 897	10 p. m. 29, 675 29, 903 30, 105 1 29, 977 29, 800	29, 492 29, 945 30, 112 29, 972 29, 908	29, 497 29, 497 29, 982 30, 128 29, 968 29, 908 30, 118 29, 791 29, 792	29, 517 29, 639 30, 691 30, 657 29, 923	29, 724 19, 987 30, 128 30, 132 29, 956	29, 430 29, 436 29, 981 29, 962 29, 896	. 294 . 506 . 147 . 170 . 060
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Range.

. 040 . 052 . 044 . 073 . 073 . 089 . 089 . 055

.115

Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

[Barometer above sea, 17 feet - Washington mean time. - Correction for mean local time, - 5 hours 17 minutes.]

Date.	1 n. m.	2 a. m.	. 3 n. m.	4 a. m	5 n. m.	6 a. m.	7 n. m.	8 n. m.	9 n. m.	10 a. m.	Нали.	12 m.	1 p. m.	
1882 Dec. 1	9.850	29, 847	29-850	29, 853	29,850	29 854	29, 852	29, 845	29 852	29, 863	,44 FM)	.79 F-58	29, 889	29 964
Dec 2 Dec 3 Dec 4 Dec 5 Dec 5	29 968 30, 01 5 30 736 29 7 5	29, 969 30, 031 30, 117 30, 238	20 968 30,047 16,127 39 240 29 948	29, 985 1 00, 010 10, 147 10, 228 10, 924	29, 988 30, 036 30, 152 30, 231 39, 923	30, 167	1 29, 986 -0, 028 1 30, 169 1 30, 211 29 905	30, 198	30, 189	29, 979 30, 022 30, 182 30, 169 29, 874	20 968 30, 027 30 196 30 161 )	29, 995 30, 030 30, 202 30, 154 79, 867	30 005 50 034 30 334 30 145 20 857	20 001 0 030 20 150 20 150
Det 5 Det 8 Det 19 19	20, 601 30, 203 30, 221 30, 672 30, 877	29 909 30, 275 30, 239 30, 68 1 30, 880	29, 914 20, 299 30, 258 30, 703 50, 880	29, 927 1 30, 987 30, 975 1 30, 714 30, 894	29, 950 20, 298 1 20, 306 1 20, 723 30, 905	29, 975 30, 306 30, 325 30, 747 30, 908	29 985 30 300 30 347 1 30 759 30 919	36, 294	30, 007 30, 290 30, 385 30, 771 30, 935	30, 0 11 30, 291 30, 404 30, 780 30, 944	30 035 -0.276 30 419 30 590 -0 914	30, 934 30, 433 30, 794 30, 949	30, 070 -0 763 -0 465 -30, 808 -30, 945	50 (80) 00 (58) 00 4 50 (81) 0 (8)
Det 17 Dec 13 Det 14 Det 15 Det 16	30, 686 10, 215 30, 722 13, 99	30, 920 30, 659 30, 198 30, 212 29, 998	20, 917 20, 647 30, 478 30, 192 29, 978	30, 934 30, 624 30, 177 30, 175 29, 973	30, 917 30, 609 30, 182 30, 167 20, 961	30, 887 30, 602 30, 185 30, 151 29, 929	30, 882 30, 573 30, 195 30, 133 29, 918	30, 891 30, 550 30, 203 30, 129 29, 901	30, 882 30, 542 30, 211 30, 110 20, 871	30, 836 30, 517 30, 222 30, 117 29, 860	30, 860 30, 489 50, 230 50, 105 29, 87	00 854 0 462 0 233 0 097 0 829		20 st. 31 41 c 30 234 30 0s4 30 sep
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Des Des Des Des	\$4.567 54.763 39.911 0.03 3.38	29 604 0 703 29 903 188 2 14	29 614 20 70 7 20 908 20 017 20 701	29, 599 29, 818 29, 914 20, 014 22, 686	1.9 612 29, 827 9 923 30, 030 19, 679	29, 621 29, 848 20, 943 30, 921 19, 659	29, 624 29, 834 29, 931 30, 012 29, 642	29, 626   29, 86 c   29, 60 f   29, 628	29, 632 29, 880 29, 980 19, 990 19, 911	29, 631 ( 29, 881 59, 921 29, 983 19, 591	19 4 5 19 904 19 904 19 900 19 900 9 589	19 466 1 18 68 1 18 68 1 18 68 18 18 18 18	29 6 46 29 6 5 29 936 29 937 1 89	24 10 7 29 946 29 924
Dec S Dec S Dec 9 Dec 9	0.60 B 20.000 0.804 0.600	23 40 3 30 484 29 946 30, 833 50 653	19 694 50 212 29 812 50 813 50 666	19 713 09 744 09 94 - 30, 830 30 1 3	11.741 (1.273 29.949 (0.839 (0.68	20,719 30,097 30,027 50,826 50,631	29, 792 .00 .00 20 149 30 808 .00 639	29, 819 30, 305 30, 247 30, 810 70, 629	19, 839   30, 280 30, 41   30, 808   30, 666	29 858 ( 80, 283 50, 420 ( 50, 791 50 604	0.271	9,950 0.236 0.536 0.53 0.536	9, 911 a0, 220 i0, 769 a0, 7a5 a0, 7	or to all the state of the stat
M. o.	30,078	.0.039	10. 051	10.18	tien	- 1 - (ppr)	50-095	30 (97)	on 1999 i	381 1500	, a cm j	100	30-10-5	. in 10\$
Date	** ** *	Lp m	5 · .u.	ti p n	i p m.	<b>%</b> p− m.	9 p. m	10 p. m. '	# p m. 1	12 p. m	D, dy no dis	Max.	Min.	$R \leq \epsilon_{\rm s}$
15.	41 - 1	, a. p	41 1	22.8 %	150,040	20.945	29, 351	29.164	29 1006 -	29, 962	19 896	, 9-966	29, 845	121
15	2 4 4	70 ces e, 060 e 47 7 30 c	0 00 i 0 104 00,245 0 003 29 8 6	30, 01 1 00, 00 1 10, 0 14 30 00 1 20 305	10, 018 30, 060 -0, 234 -0, 034 13, 873	00, 018 00, 652 00, 246 00, 025 10, 869	20, 01 s 50, 082 50, 241 50, 017 29, 862	00 015 ( 00, 093 ) 50, 250 ) 30 012 ) 29, 871 [	30, 695 ± 20, 251 29, 995		20 997 30 084 10 199 10 135 20 889	30, 038 3 30, 098 30, 251 3 0, 240 19, 955	29 968 30, 015 30, 114 29, 986 29 851	. 050 . 083 157 . 251 . 104
Dec State St	70 0 4 0 5 7 1 5 7	10 2 30 2 30 3 30 3 30 3 30	30, 217 -0, 350 - 5 6 -3 -964	0 1.7 30, 181 40 50 1 81 30,965	0, 189 0, 176 06 576 0 840 30,965	30, 704 50, 169 70, 598 70, 842 50, 958	20, 228 30, 172 20, 621 38, 85 ( 30, 946	30, 24,3 30, 178 30, 6, 1 50, 6, 1 50, 940		20, 243 20, 213 20, 61 30, 89, 30, 948	30 07 7 30 247 30 430 30 792 30,934	0.257 .0.300 .0.673 .0.895 30,965	29, 902 30, 176 0, 221 30, 672 30, 877	. H . a . 1 . 3 . 4a . 20 4 . 20 4 . 088
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Dec 28 Dec 28 Dec 24 Dec 1 Dec 1				6 0 <sub>0</sub> j	0 073 0 80 5 7 1 480	30 4 34 20 70 1 3 4 1 1 3 4 4 1	at 01 : 30 0 :1 30 ;8 :9 50; 707 30 463	30, 033 30, 045 30, 822 30, 706 50, 454	0 408 1 29, 998 30 8, 6 30 498 36 1-9	30 1 1 29, 975 30 8 7 30 6 4 30, 425	14.881 0.17 0.14 0.161 0.161 0.05	0 5 6 0 5 6 0 843 0 666	3 656 30 978 31 942 20 694 10 125	36.4 2 149 141
Mexica	100	, it for	\$0,110		0.02	0.00	30-100	30-101	08-10	30 101	. 0.097	.0 201	29-981	

## Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

[Barmometer above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes.]

	[ Barn	ometer a	bove sen,		warangi							71		F. 00 APR
Date.	<b>1</b> a. m.	2 a. m.	3 a. ni.	1 a. m.	5 n m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	$2~\mathrm{p.}~m_\star$
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Jan. 6 Jan. 7 Jan. 5 Jan. 9 Jan. 10	29, 030 29, 208 29, 317 29, 480 59, 9,2	29, 632 29, 246 29, 352 29, 507 29, 915	29, 008 29, 213 29, 354 29, 542 29, 951	29, 655 29, 234 29, 357 29, 365 29, 913	29, 058 29, 245 29, 371 29, 576 29, 957	29, 073 29, 253 29, 372 29, 588 20, 972	29, 085 29, 268 29, 362 29, 604 29, 977	29, 698 29, 25 5 29, 3 7 29, 623 29, 972	29, 100 29, 264 29, 360 29, 637 19, 977	29, 094 29, 270 29, 356 29, 662 29, 582	29, 098 29, 278 29, 319 29, 681 19, 975	29, 11 : 29, 284 29, 348 29, 706 29, 976	29, 143 29, 297 29, 374 29, 731 29, 975	29 125 29, 366 20 563 20 7 4 20 975
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Tables showing pressure of air at Uglaumie from October, 1881, to August, 1883—Continued.

 $(Barometer\ above\ sea,\ 17\ feet.\ \ Washington\ mean\ (inco.\ \ Correction\ for\ mean\ local\ time,\ {$\implies$}\ homs,\ 47\ minutes.\}$ 

Date.	1 a.m.	2 a. m.	3 a. m.	<b>\$</b> p. m.	5 .t. 111.	6 a. m.	7 a. m.	ч а. ш.	9 a. m.	10 a. m.	. 111.	12 m.	1 p. m.	2 p. ai
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Feb. 5 Feb. 6 Feb. 7 Feb. 8 Feb. 9	30, 283 29, 788 10, 256 29, 985 29, 901	00.283 20.707 30.041 20.850	20, 796 50, 194 50, 104 50, 104 29, 767	00, 200 29, 812 30, 106 20, 164 20, 704	10, 106 29, 841 20, 098 30, 214 29, 651	50, 201 20, 865 20, 913 30, 944 29, 600	50, 284 29, 865 29, 995 50, 199 29, 551	50, 258 29, 925 29, 926 30, 355 29, 192	30, 25a 29, 976 29, 863 39, 360 29, 431	30, 229 30, 028 29, 790 30, 381 29, 37,1	30, 183 30, 073 39, 759 30, 410 29, 308	30, 111 30, 224 29, 724 30, 416 29, 203	30, 110 30, 178 29, 695 30, 169 29, 180	30, 231 20, 231 20, 650 30, 407 20, 115
Feb. 10 Feb. 11 Feb. 12 Feb. 13 Feb. 14	29, 1 (5) 30, 126 30, 618 29, 746 29, 895	29 758 0 752 00 569 29 761 29 897	50, 100 500, 776 500, 548 290, 799 291, 90 6	9 550 30, 504 30, 500 20, 815 29, 920	29, 677 50, 887 30, 458 29, 840 29, 956	29, 777 30, 859 30, 399 29, 868 29, 974	29, 875 30, 861 30, 950 29, 872 29, 965	29, 942 90, 873 90, 297 29, 879 29, 970	30, 038 30, 879 30, 233 29, 873 29, 970	30, 110 30, 875 30, 177 29, 880 29, 979	30, 184 30, 885 30, 128 29, 800 29, 998	50 211 30, 890 30, <b>077</b> 29, 896 29, 995	30, 309 30,901 30, 022 29, 898 30, 614	20, 899 29, 964 29, 894 21, 894 21, 892
Feb. 15 Feb. 16 Feb. 17 Feb. 18 Feb. 19	30, 145 30, 425 30, 200 30, 400 10, 600	30, 160 : 50, 427 30, 204 : 30, 407 :	00, 175 00, 130 00, 207 00, 004 00, 000	30, 194 30, 428 30, 428 30, 374 30, 992	00, 210 00, 409 00, 218 00, 578 09, 683	30, 240 30, 446 30, 231 30, 364 30, 678	30, 255 30, 135 30, 251 30, 326 30, 057	30, 270 30, 495 30, 210 30, 306 30, 045	30, 295 30, 133 30, 262 30, 292 30, 023	30, 307 30, 413 30, 276 30, 275 30, 622	30, 328 . 30, 408 . 30, 203 30, 265 30, 025	30, 934 30, 985 30, 266 50, 237 50, 014	00, 045 00, 086 80, 022 00, 226 00, 007	90; 30, 363 50 345 40, 214 30 opt
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Feb. 25 Feb. 26 Feb. 27 Feb. 28	70, 488 30, 449 30, 232 30, 674	50, 491 50, 402 50, 241 50, 676	30, 455 30, 122 30, 239 30, 674	. 3, 487 30, 427 30, 216 30, 079	30, 501 30, 428 30, 219 30, 086	30, 425 30, 425 30, 205 30, 087	30, 477 30, 419 30, 204 30, 987	50, 468 30, 425 50, 197 50, 078	30, 444 30, 414 30, 195 30, 078	30, 450 30, 417 30, 482 30, 076	30, 437 30, 413 30, 175 30, 073	30, 434 30, 408 30, 172 30, 672	30, 442 30, 424 30, 164 30, 079	30, 42 1 30, 42 1 30, 141 30, 080
Means	30.181	30, 187	30, 195	20, 201	30, 215	30,221	30.221	30, 219	30, 218	00, 216	30, 216	30, 209	30, 200	30 5 65
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m. ,	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Range,
Date,  1883. Feb. 1 Feb. 2 Feb. 3. Feb. 4	3 p. m. 1 19: 423 13: 444 23: 796 70 780	4 p. m. 30, 168 20, 422 29, 768 30, 976	5 p. m. 50, 480 50, 419 29, 749 50, 568	8 p. to. 30, 530 56, 409 19, 709 50, 967	5 p. m. , 30, 547 30, 402 1, 697 211, 5	8 p. m. 50 550 30, 684 29, 671 50, 646	30, 564	10 p. m. 50, 579 50, 345 20, 623 50, 543		30, 590 30, 302 29, 710 30, 289	Daily means. 30, 380 30, 465 29, 925 30, 253	30, 590 30, 577 30, 271 30, 401	Min. 30, 191 30, 592 29, 623 29, 774	Range, .500 .275 .648 .627
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Tables showing pressure of air at Uglaumie from October, 1881, to August, 1883—Continued.

Barometer above sea, 17 feet. Washington mean time. Correction for mean local time, -5 hours 17 minutes.]

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Biste.	<b>1</b> n. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	% n. m.	9 a. m. ]	10 a. m.	11 a. m. 🤄	12 m.	1 p. m.	2 р. ш.
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Means	30, 005	30, 006	30, 009	30, 003	30,019	30, 018	30.019	30, 616	30, 013	30, 012 ;	30, 009	30, 004	20, 001	50. Cog
Pate.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	4 p. m.	9 p. ni.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Range.
Pate.	3 p. m	4 p. m.	5 p. m. 20, 703	6 p. m. ]	7 p. m. 30, 725	% p. m. 30, 738	9 p. m	<b>10</b> p. m. 30, 782	11 p. m.	12 p. m.		Max.	Min. 30, 262	Range.
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Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883—Continued.

(Barometer above sea, 47 feet. Washington mean time. Correction for mean local time, -5 hours 47 minutes.]

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Date.   1	la.m.	2 n. m.	3 a. m.	<b>\$</b> a. 10-	5 a. m.	6 a. m.	7 n. m.	8 a. m.	9 a. m.	10 a. m.	Ha.m.	12 m.	1 p. m.	2 p. m.
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Apr. 7   Apr. 8   Apr. 9	29, 549 29, 650 20, 699 20, 577 20, 577	19, 8-8 19, 682 20, 600 20, 782 29,382	20, 848 29, 670 20, 706 20, 542 20, 005	29, 846 29, 676 29, 697 29, 579 29, 332	29, 839 29, 673 29, 699 29, 594 29, 313	29, 636 29, 675 29, 694 29, 576 29, 912	29, 823 29, 677 29, 632 29, 574 29, 316	29, 807 29, 684 29, 685 29, 564 29, 357	29, 796 29, 680 29, 678 29, 549 29, 562	29, 787 29, 670 29, 665 29, 543 29, 369	29, 769 29, 688 29, 649 29, 531 29, 576	29, 763 29, 681 29, 653 29, 522 29, 580	29, 761 29, 686 29, 654 29, 508 29, 586	29 752 29 686 12 634 12 435 29 435
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Means 2	9,996	29, 566	50, 661	30, 002	00,000	20,000	(0, 010	30, 009	20,0 8	30,058	30, 139	20, 003	20, 0.9	20.913
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Apr. 7; 2 Apr. 8 2 Apr. 9 2	9 745 9 689 9 652 9 476 9 119	20, 694 20, 694 20, 477 20, 419	19 727 19,695 20,617 19,415 20,106	29, 720 29, 704 29, 503 29, 503 23, 427 29, 442	29, 711 29, 702 29, 591 23, 419 29, 450	29, 703 29, 702 29, 502 29, 502 29, 163	29, 694 29, 696 29, 591 29, 385 29, 475	29, 691 29, 702 29, 586 29, 374 29, 479	29, 689 29, 701 29, 587 29, 564 29, 505	29, 679 29, 716 29, 585 29, 646 29, 520	19,768 29,688 29,646 29,495 29,401	29, ×63 29, 716 29, 766 29, 776 29, 529	19,67 ( 19,670 29,585 19,346 29,332	181 - 121 - 2 n - 183
Apr. 12 2 Apr. 13	9, 760 9, 863 9, 013 0, 114 9, 096	29, 714 29, 864 59, 018 51, 1 8 59, 099	19,711 22,860 30,016 1106 22,100	20, 731 29, 862 30, 025 30, 135 50, 694	29, 745 29, 862 30, 031 30, 135 30, 039	29, 755 29, 865 50, 045 50, 122 50, 087	29, 765 29, 881 50, 060 30, 112 50, 089	29, 775 29, 883 30, 070 50, 113 50, 692	29, 783 29, 889 30, 083 30, 112 30, 095	29, 794 29, 894 30, 694 30, 106 30, 102	29, 679 29, 848 29, 983 30, 427 33, 699	29, 791 29, 894 50, 694 50, 115 59, 120	20, 529 29, 785 29, 893 50, 695 30, 687	. 267 . 100 . 203 . 945 . 033
Apr. 17	9, 162 9, 144 9, 955 9, 653 (3, 665	00, 163 00, 138 23, 94 ( 29, 672 29, 614	10, 167 13, 126 23, 921 23, 654 23, 622	30, 162 30, 126 29 501 20, 647 20, 626	00, 162 : 00, 115 ; 20, 892 ; 20, 607 29, 627	30, 160 30, 115 29, 861 29, 630 29, 619	00, 161 30, 110 29, 855 29, 665 29, 661	00, 161 30, 104 29, 540 29, 628 29, 676	00, 163 30, 693 29, 823 29, 628 29, 604	00, 165 00, 090 29, 813 29, 625 20, 760	00, 146 00, 142 29, 970 29, 695 29, 620	30, 165 39, 174 39, 677 29, 799 29, 769	50, 692 50, 690 29, 813 19, 625 29, 586	.07: -134 -104 -107
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Means . 30	.013	30,013	30,010	20,607	30, 007	30.006	30, 008	30, 0 %	30, 009	30, 609	30. 007	50.082	29, 936	, 156

Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883--Continued.

Barometer above sea, 47 feet. Washington mean time. Correction for mean local time = 5 hours 17 minutes.

	Bar	ometer ab	ove.ea.	17 feet.	Washingt	on mean	time. Co	rrection f	or mean b	acal time	-5 hours	17 minut	inst.	
Date	1 a. m.	2 a. m.	3 a. w.	ta.m.	5 a. m.	<b>6</b> a. m.	7 a. m.	Sacin.	9 a. m.	10 a. m.	11 n.m	12 66	Lp. m.	2 p. m.
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M - 6	23, 673 94, 703 96, 661 99, 820 93, 648	29, 690 29, 591 29, 649 29, 806 20, 672	29, 691 29, 764 29, 661 19, 866 19, 666	20 (08 20 % × 20 % × 21 (03 10 787 21 (00)	29, 7, 67 29, 751 19, 767 29, 174 29, 676	.9 718 .9 1 8 29 721 24 754 20 671	29, 7,00 29, 749 29, 740 20, 741 20, 600	23-748 29-766 5-773 90-747 13-676	+ 711 + 1,611 + 717 211 - 1	74 7 (5 20 6 4 20 7 ( 1,701 27 1 (4	19.685 19.665	29, 7×3 3, 6, 3 29, 413 29, 653 1, 1, 631	7 51 <b>5</b> 7 515 7 619 7 0195	20, 814 14 1 (3 19 8 8 29 614 29, 7 9
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1 1 1 1 1 1 1 1 1	11.65 2.067 30, 160 20, 035 50, 873	50, Co., 30, Co., 30, 161, 20, 017, 20, 890	00.1.1 20.015 20.015 20.805	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	70.076 100.076 100.168 100.000 20.020	0.054 0.054 00.460 0.057 24.926	30 022 30,030 50 170 39 969 5 0 073	201 028 30, 097 30, 161 29 568 23, 629	20, 01) 20, 139 29, 946 29, 940	000 00150 00151 90944 90942	50 (4), 30, 1, 7 10, 1, 1 20, 921 20, 93 ;	10.107 10.119 10.149 10.161 10.145	00, 42 00, 1, 9 30, 151 1, 0, 805 2, 0, 344	10 % G 100 103 0 150 0 800 21 947
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	2 р. п.	4 р. т.	5 p. m.	6 p. m.	7 p. m.	Sp. m.		10 p. m.	11 p. m.	12 p. m.	Dady neans.	Max.	Min.	Range.
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Ma. 7 Ma. 7 Ma. 5 May 9	19, 825 29, 614 29, 845 19, 614 19, 746	29, 805 29, 637 29, 855 29, 623 29, 756	23, 820 29, 626 29, 853 29, 602 19, 763	20, 817 29, 621 29, 853 29, 635 29, 701	29, 815 29, 621 29, 848 29, 664 29, 812	29, 813 29, 652 29, 844 29, 602 29, 823	29, 847 29, 636 29, 850 29, 645 29, 833	29, 816 29, 638 29, 811 29, 612 29, 845	29, 798 29, 649 29, 838 29, 630 29, 850	29, 757 29, 654 29, 827 29, 642 29, 853	29, 770 29, 680 29, 785 29, 683 29, 731	29, 855 99, 793 99, 855 29, 820 19, 853	29, 673 29, 621 29, 661 29, 602 29, 648	. 162 . 172 . 194 . 218 . 205
Ma. 11	29, 589	29, 916 29, 999 29, 940 29, 582 29, 291	19, 967 23, 996 29, 927 29, 573 29, 273	29, 907 29, 982 29, 911 29, 574 29, 235	29, 969 29, 989 29, 897 29, 564 29, 233	20, 597 29, 987 29, 890 29, 514 29, 234	29, 900 29, 904 29, 879 29, 546 29, 225	29, 893 29, 989 29, 867 29, 540 29, 213	29, 885 36, 661 29, 858 29, 548 29, 137	29, 8, 7 79, 999 29, 847 29, 5, 3 29, 193	29, 942 29, 953 29, 944 29, 639 29, 356	29, 946 30, 601 30, 601 23, 785 23, 522	19, 865 20, 872 29, 847 29, 513 29, 193	. 081 - 119 - 154 - 262 - 329
May 17 May 17 May 18 May 19 May 19	29, 133 29, 472 29, 791 29, 912 30, 615	29, 142 29, 492 29, 798 29, 914 00, 044	29, 146 29, 505 20, 803 29, 914 39, 036	29, 151 29, 521 29, 803 29, 923 35, 036	29, 160 29, 528 29, 818 29, 928 50, 056	29, 176 20, 549 29, 823 29, 934 30, 634	29, 188 29, 568 29, 828 29, 937 36, 042	29, 200 29, 585 29, 832 29, 937 30, 041	29, 269 29, 563 20, 840 29, 944 30, 047	29, 606	29,160 29,424 29,750 29,896 50,012	29, 221 29, 606 29, 843 29, 948 30, 047	29,130 29, 234 29, 610 29, 833 29, 952	. 091 . 972 . 233 . 115 . 095
May 21 May 23 May 23 May 23 May 23	00, 042 29, 880 29, 772 29, 797 29, 958	30, 429 29, 875 29, 774 29, 841 29, 963	30, 618 29, 561 29, 767 29, 826 19, 973	30, 015 29, 852 29, 765 29, 837 29, 978	20, 007 29, 847 29, 759 29, 843 29, 579	20, 002 20, 538 29, 759 29, 850 29, 977	29, 930 29, 831 29, 762 29, 852 29, 996	29, 980 29, 824 29, 762 29, 853 29, 997	29, 971 29, 819 29, 759 29, 856 29, 905	29, 759 29, 866	30, 626 29, 888 29, 779 29, 790 29, 937	30, 054 29, 960 29, 814 29, 866 30, 000	29, 737	. 095 . 153 . 055 . 129 . 145
May 26 May 27 May 28 May 3 May 30	30, 063 30, 147 30, 149 29, 897 29, 952	30, 068 30, 151 30, 148 29, 891 29, 947	30, 063 30, 153 30, 137 29, 888 29, 945	30, 960 30, 156 30, 133 29, 885 29, 941	30, 060 30, 153 30, 124 29, 885 20, 925	30, 065 30, 164 30, 699 29, 883 29, 924	90, 067 90, 165 90, 095 29, 882 29, 910	29, 066 30, 171 30, 085 29, 886 29, 898	30, 070 30, 176 30, 081 29, 885 29, 888	30, 170 30, 658 29, 883	30, 044 30, 119 30, 139 29, 934 29, 922	30, 674 30, 176 30, 172 30, 035 20, 952	29, 996 30, 058 30, 058 29, 882	. 078 . 118 . 114 . 153 . 080
May 51	29, 783	29, 778	:9, 774	99, 739	29, 759	29, 756	29, 757	29, 700	29, 760	29, 761	29, 796	29, 864	20, 756	. 108
Мен	29, 864	29, 865	29, 860	29, 818	29, 855	29, 853	29, 856	29, 854	29, 853	29,850	29, 861	29, 911	29, 776	, 165
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## Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

(Barometer above sea, 17 feet, Washington mean time. Correction for mean local time, -5 hours, 17 minutes.)

Pater	Late to a	2 a. m.	3 a. m.	4 n. m.	5 a. m.	6 a. m.	7 a. ni.	Sa. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	f p. m	2 10 10
June 1 June 2 June 3 June 4	20, 768 29, 743 29, 759 29, 011	29 775 29,754 29,758 29,758 29,858	29, 779 99, 774 99, 758 29, 966	29, 778 29, 764 29, 774 29, 774	29, 785 19, 765 29, 786 29, 975	29, 789 29, 770 29, 791 29, 991	29, 792 29, 775 29, 806 29, 993	29, 779	29, 793 29, 776 29, 818 30, 004	29, 798 29, 786 29, 826 39, 066	29, 860 29, 794 29, 809 ( 00, 623	29, 799 + 29, 794 + 20, 855 20, 927	19, 708 29, 864 29, 865 30, 656	1 .
June 5 June 6 June 8 June 9.	30, 108 30, 013 10, 088	30, 587 30, 137 30, 123 30, 622 23 (c.)	20, 089 20, 140 30, 121 30, 020 20, 990		30, 009 30, 147 30, 133 30, 026 20, 095	30, 100 30, 147 30, 137 30, 019 20, 091	30, 110 30, 146 30, 135 30, 019 30, 002	30, 103 30, 133 30, 134 30, 024 30, 006	30, 112 30, 134 30, 132 30, 010 30, 000	30, 104 30, 124 30, 122 30, 009 30, 00d	30, 105   30, 114   30, 121   30, 003	30, 105 30, 108 30, 124 30, 017 30, 018	1.0, 108 100, 101 100, 121 100, 013 100, 002	11.
June 10 June 11 June 12 June 13 June 14	29, 758	00, 15 00, 142 09, 7 73 29, 575 29, 584	36, 173 30, 650 29, 780 19, 567 29, 791	30, 173 30, 026 29, 782 29, 576 29, 586	30, 191 30, 0, 5 29, 777 29, 564 29, 663	30, 197 50, 021 29, 754 29, 556 29, 666	30, 205 50, 013 19, 751 29, 557 29, 600	30, 205 20, 995 29, 740 29, 554 29, 604	30, 260 29, 984 29, 715 29,543 29, 612	30, 200 29, 970 29, 719 29, 547 29, 614	30, 200 20, 960 20, 718 20, 551 29, 617	30, 194 29, 939 29, 768 29, 565 29, 615	20, 18 29, 677 29, 571 29, 571	1.5 2.5 1.75
June 15 June 16 June 17 June 18 June 19	30, 063 30, 124 30, 135	19 755 30, 003 30, 129 30, 134 30, 134	29, 860 20, 008 30, 157 50, 146 50, 200	29, 818 30, 018 30, 143 30, 136 30, 202		29, 849 30, 043 30, 155 30, 161 39, 259	20, 852 30, 043 30, 160 30, 161 30,214	29, 868 50, 044 30, 100 80, 178 80, 210	10,879 30,047 30,157 30,161 70,210	1.0 886 1.0 038 1.00 107 1.00 162 1.0 230	29, 890 30, 650 30, 165 30, 166 50, 209	29, 951 30, 058 30, 166 30, 160 30, 197	29, 9 a 30, 667 39, 163 50, 165 50, 155	
June 21 : June 21 : June 21 : June 23 : June 24 :	20,026	29, 505 29, 505 29, 749	10.001 10.001 10.600 20.812 15.730	50, 111 50, 021 29, 875 20, 863 20, 776	00, 148 00, 60 1 20, 805 20, 809 20, 70 5	0,074 0,0,026 20,802 29,804 29,706	30, 174 30, 603 20, 883 29, 800 20, 760	30, 154 50, 022 29, 883 29, 763 10, 763	10, 143 30, 014 29, 876 29, 764 29, 764	0, 133 20, 008 29, 876 29, 703 29, 767	33, 127 30, 009 29, 869 29, 786 29, 709	00, 127 30, 000 29, 867 29, 780 1	50 1.7 19.994 19.8 3 19.7 3 19.703	
June 25 June 26. June 27. June 28. June 29	29, 940 29, 955 29, 637	29, 945 29, 945 29, 957 29, 422 29, 479	10.547 19.955 29.961 29.667 29.467	29, 855 29, 975 29, 955 29, 602 29, 683	19, 871 29, 965 19, 964 19, 599 29, 607	29, 882 29, 168 20, 568 20, 586 20, 690	20, 885 20, 970 29, 969 29, 582 29, 691	20, 808 29, 975 29, 956 29, 584 29, 689	10,903 19,970 19,948 29,570 19,697	29, 905 29, 908 19, 901 29, 579 29, 767	19, 902 29, 979 29, 972 29, 566 29, 722	29, 9, 2 19, 972 29, 899 29, 559 [ 23, 754	20.000 20.000 20.000 20.000 20.700 20.700	
Pare	7.18	19,740	29.7 10	19,759	18,754	29, 775	196711	20.747	29, 740	29,744	29, 745	19,715 .	29 7 3	
Means	29,509	10.102	29, 915	29, 917	20, 024	29 926	29, 947	29, 326	29, 924	29, 925	20.014	20,924	29 521	
Date.	3 p. m.	Fp. m	5 p. m.	6 p m	7 p. m.	Sp. ne	9 p. m.	<b>(θ p</b> −i	11 p. m.	12 p. m.	Daily means.	Max.	Min.	14
Date.  1882. June 1 June 2 June 4 June 1	29, 801 29, 795 29, 880	Ep. to 29, 195 29, 186 29, 885 56, 648	5 p. m. 29, 702 29, 794 29, 893 50, 061	29, 784	29, 775 29, 780 29, 909 30, 003	\$ p. to 29, 762 29, 777 28, 908 30, 665	9 p. no. 29, 757 29, 773 29, 916 30, 069	29, 758	29, 751 29, 751 29, 767 29, 932 30, 677	29, 747 29, 763	29, 782 29, 777	Max. 29, 802 29, 801 29, 940 30, 078	M(9), 29,747 29,743 29,776 20,941	10 J
June 1 June 2 June 3	29, set 29, 795 29, 880 29, 644 39, 114 39, 104	29, 195 29, 196 29, 885	29, 702 29, 794 29, 893	29, 784 29, 790 29, 893	29, 775 29, 780 29, 900	29, 762 29, 777 28, 908	29, 757 29, 773 29, 916	29, 758 29, 769 29, 923	29, 751 29, 767 29, 902	29, 747 29, 763 29, 910	29, 782 29, 777 29, 777 29, 750 50, 023	29, 802 29, 801 29, 940	29, 747 29, 741 29, 776	
June 1 June 2 June 4 June 4 June 4 June 5 June 5 June 8 June 8	29, 891 29, 795 29, 886 50, 614 39, 114 30, 104 30, 104 10, 155 10, 956 10, 956 10, 956 10, 956 10, 956	29, 195 29, 196 20, 885 30, 143 30, 143 30, 108 34, 115 30, 108	29, 702 29, 794 29, 893 50, 061 5, 115 5, 067 5, 0 07	29, 784 29, 790 29, 893 30, 661 50, 152 60, 157 50, 000	29, 775 29, 780 29, 909 30, 063 30, 174 30, 172 20, 076 20, 020	20, 742 29, 777 28, 908 30, 605 50, 119 50, 011 70, 019	29, 757 29, 773 29, 916 30, 069 30, 126 0, 126 0, 13 31, 67 4	29, 768 29, 769 20, 929 20, 974 an, 074 no, 115 at 07	29, 754 29, 767 29, 932 30, 677 24, 11, 11, 11, 11, 11, 11, 11, 11, 11, 1	29, 747 29, 763 29, 910 0, 07% 0, 135 40, 148 40, 024 29, 901	90, 782 29, 787 29, 777 29, 850 30, 023 20, 112 30, 127 50, 103 3, 0, 015	29, 802 29, 804 29, 940 39, 078 30, 135 30, 147 30, 157 30, 29	29, 747 29, 743 29, 776 29, 776 29, 941 00, 084 00, 024 29, 991	39
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Tables showing pressure of air at Uglaamic from October, 1881, to August, 1883—Continued.

[Barometer above sea, 17 feet. Washington mean time. Correction for mean local time — 5 hours 17 minutes.]

Date. | 1 a.m. | 2 n.m. | 3 n.m. | 4 a.m. | 5 a.m. | 6 a.m. | 7 a.m. | 8 a.m. | 9 a.m. | 10 a.m. | 11 a.m. | 12 m. | 1 p.m. | 2 p.m. 29, 755 29, 583 29, 614 20, 696 29, 914 29, 753 29, 642 29, 634 29, 584 29, 945 29, 758 29, 644 29, 653 29, 594 20, 928 29, 760 29, 631 29, 651 29, 508 29, 923 29, 762 29, 669 29, 632 29, 758 29, 591 29, 619 29, 669 29, 911 29, 741 29, 661 19, 641 29, 582 19, 883 29, 741 29, 651 29, 625 29, 576 29, 564 29, 744 29, 654 29, 629 20, 576 29, **9**08 29, 763 29, 619 29, 636 29, 615 29, 923 29, 753 29, 583 29, 609 29, 722 20, 912 29, 760 29, 582 29, 611 29, 742 20, 909 29, 042 29, 923 29, 855 29, 788 29, 783 29, 844 29, 891 29, 854 19, 788 29, 860 29, 846 29, 880 20, 838 29, 801 29, 821 29, 863 29, 905 29, 845 29, 807 29, 823 29, 867 29, 968 29, 854 29, 788 29, 864 29, 845 29, 895 29, 085 30, 101 30, 015 29, 717 29, 605 29, 991 30, 112 30, 015 29, 714 29, 604 30, 005 30, 113 30, 016 29, 686 29, 599 30, 007 30, 119 30, 011 29, 681 29, 613 30, 012 30, 124 29, 995 29, 670 29, 610 30, 028 30, 117 29, 968 29, 648 29, 972 30, 698 30, 627 29, 718 29, 590 30, 019 30, 121 29, 980 29, 671 29, 606 30, 029 30, 114 29, 954 29, 638 29, 605 30, 054 30, 101 29, 015 29, 611 20, 508 July 15 July 16 July 17 July 18 July 19 30, 039 30, 113 29, 930 29, 621 29, 664 30, 109 20, 942 20, 624 20, 600 29, 542 29, 681 29, 858 30, 021 30, 185 29, 543 29, 725 29, 965 30, 953 30, 228 29, 534 29, 664 29, 867 30, 606 30, 160 29, 541 29, 670 29, 879 30, 917 30, 169 29, 544 29, 761 29, 801 30, 639 30, 265 29, 546 29, 704 29, 803 30, 043 30, 210 29, 566 29, 775 29, 942 30, 095 30, 244 July 20 July 21 July 22 July 23 July 24 30, 258 30, 203 30, 017 30, 254 30, 192 30, 017 29, 838 29, 786 30, 256 30, 104 30, 017 20, 831 20, 801 30.269 30, 102 30, 019 20, 838 29, 818 30, 263 30, 181 30, 013 29, 833 29, 831 30, 264 30, 177 30, 001 29, 811 29, 846 80, 264 30, 170 29, 999 29, 803 29, 856 30, 265 30, 167 29, 994 29, 791 29, 861 30, 261 30, 156 29, 980 29, 785 29, 880 30, 260 30, 146 29, 969 29, 773 29, 836 30, 161 29, 986 29, 789 29, 871  $\frac{20,830}{29,770}$ 30, 073 30, 003 30, 035 30, 019 30, 031 30, 011 30, 050 30, 016 30, 061 30, 015 30, 066 30, 069 30, 081 29, 975 30, 606 30, 035 29,552 20, 857 | 29, 858 29, 867 | 29, 866 29, 865 | 29, 865 29, 862 | 20, 862 Means .. 3 p. m. 4 p. m. 5 p. m. 6 p. m. 7 p. m. 8 p. m. 9 p. m. 10 p. m. 11 p. m. 12 p. m. Daily means. May. Mip. Range. 29, 738 29, 747 29, 813 29, 725 29, 730 29, 771 29, 826 29, 734 29, 716 29, 789 29, 831 29, 739 29, 709 29, 803 29, 825 29, 734 29, 701 29, 810 29, 807 29, 746 29, 695 19, 804 29, 801 29, 736 29, 748 29, 596 29, 620 29, 828 29, 921 29, 744 29, 604 29, 624 29, 841 29, 899 29, 739 29, 607 29, 619 29, 851 29, 896 29, 731 29, 611 29, 619 29, 863 29, 895 29, 721 29, 618 29, 609 29, 871 29, 800 29, 714 29, 636 29, 609 29, 890 29, 889 29, 699 20, 642 29, 603 29, 894 29, 885 29, 687 29, 637 29, 596 29, 897 29, 882 29, 682 29, 647 29, 503 29, 896 29, 876 29, 740 29, 616 29, 621 29, 741 29, 906 29, 763 29, 661 29, 653 29, 897 29, 928 29, 794 29, 820 29, 851 29, 870 19, 956 29, 790 29, 808 29, 851 29, 883 29, 960 29, 785 29, 808 29, 848 29, 888 29, 965 29, 792 29, 808 29, 848 29, 891 29, 972 29, 791 29, 805 29, 848 29, 885 29, 959 29, 799 29, 813 29, 850 29, 899 20, 979 29, 862 29, 823 29, 858 19, 902 29, 979 30, 087 30, 107 29, 876 29, 600 29, 603 30, 693 30, 698 29, 855 29, 605 29, 594 30, 688 30, 688 29, 828 29, 504 29, 581 30, 086 30, 075 29, 811 29, 592 29, 566 30, 095 30, 071 29, 800 29, 595 29, 566 30.104 30, 107 30, 047 29, 764 29, 594 29, 559 30, 111 30, 040 29, 745 29, 593 29, 546 30, 051 30, 097 29, 907 20, 632 29, 592 30, 111 30, 124 30, 027 29, 718 29, 613 30, 063 29, 779 29, 596 29, 559 29, 603 29, 815 29, 975 30, 115 30, 263 29.571 29.754 29.934 30.079 30.230 29, 583 29, 794 29, 959 30, 113 30, 259 29, 592 29, 801 29, 967 30, 120 30, 259 29, 592 29, 803 29, 970 30, 115 30, 262 29, 604 29, 818 29, 977 30, 118 30, 260 29, 618 29, 817 29, 988 30, 130 30, 257 29, 628 29, 823 30, 062 30, 133 30, 256 29, 638 29, 827 30, 010 30, 142 30, 257 29, 647 29, 840 30, 006 30, 153 30, 257 29, 647 29, 840 30, 010 30, 153 30, 263 . 126 . 193 . 155 . 155 . 156 July 25 July 26 July 27 July 28 July 29 30, 250 30, 114 29, 939 29, 756 29, 950 30, 252 30, 107 29, 925 29, 739 29, 961 30, 247 30, 098 29, 923 29, 739 29, 967 30, 240 30, 082 29, 918 29, 738 29, 972 30, 232 30, 070 29, 900 29, 738 29, 982 30, 231 30, 067 29, 894 29, 750 20, 991 30, 224 30, 061 29, 894 29, 755 29, 999 30, 222 30, 056 29, 877 29, 759 30, 005 30, 214 30, 649 29, 868 29, 766 30, 614 30,269 30,203 30,023 29,848 30,014 30, 233 30, 126 29, 953 29, 779 29, 944 30, 214 30, 049 29, 868 29, 738 29, 760

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Tables showing pressure of air at Uglaamie from October, 1881, to August, 1883-Continued.

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Aug. 0 Aug. 10 Aug. 11 Aug. 12 Aug. 13	29, 008 29, 790 29, 698 29, 765 29, 712	29, 900 29, 790 19, 667 19, 560 29, 512	59, 903 29, 787 29, 694 29, 550 29, 515	29, 979 29, 779 29, 694 29, 551 29, 526	29, 773	29, 970 29, 749 29, 696 29, 549 29, 534	20 601	29, 947 29 734 29 679 29, 524 29, 544	29, 938 29, 723 29, 679 29, 516 29, 551	29, 901 29, 716 29, 671 29, 514 29, 552	29, 922 29, 705 29, 666 29, 566 7, 561	( 29, 908 19, 700 29, 668 29, 505 29, 560	29 890 20, 694 29, 652 39, 503 29, 571	29, 65 29, 65 29, 65 29, 56 29, 57
Aug 11 Aug 15 Aug 16 Aug 17 Aug 14	29, 622 29, 763 29, 631 29, 372 29, 314	29, 609 29, 773 20, 629 20, 637 20, 320	19, 634 20, 787 99, 615 29, 339 20, 313	29, 636 29, 787 29, 611 29, 325 29, 319	29, 784 29, 616 29, 319	29, 656 29, 802 29, 612 29, 507 29, 335	20, 797 29 606 20, 303	29, 661 29, 793 29, 596 29, 297 29, 358	29, 650 29, 786 29, 586 29, 305 29, 375	29, 650 29, 786 29, 578 20, 313 29, 303	29, 609 29, 768 29, 576 19, 328 29, 405	29, 664 29, 762 29, 560 20, 329 20, 422	29, 672 29, 750 29, 548 29, 548 20, 437	29. 68 29. 74 29. 74 29. 54 29. 40
Aug. 19 Aug. 20 Aug. 21. Aug. 22 Aug. 23	29, 642 29, 913 29, 611 30, 059 30, 022	29, 660 29, 885 29, 537 39, 668 39, 666	29, 675 29, 872 29, 545 30, 684 29, 983	29, 691 29, 840 29, 571 30, 696 29, 970	29, 810 29, 790 30, 109	29, 713 29, 705 29, 611 30, 111 29, 934	. 29, 755	29, 741 29, 713 29, 658 30, 120 29, 666	29, 751 29, 681 29, 680 30, 118 29, 896	29, 760 29, 655 29, 701 30, 115 29, 882	29, 772 29, 623 29, 726 30,122 29, 878	29 808 29, 592 29, 753 30, 121 29 872	29, 821 29, 568 1 29, 780 30 120 29 861	29 80 29 31 20 80 30 11 20 80
Aug. 24 Aug. 25 Aug. 26 Aug. 275.	29, 722 29, 995 29, 645 1 29, 677	29, 704 30, 914 29, 625 29, 912	: 29, 6×5 30, 622 : 29, 590 20, 933	29, 667 30, 050 29, 565 29, 946	29, 627 30, 065 29, 540 29, 945	29, 608 30, 665 29, 523 29, 939	29, 518	29, 542 30, 062 29, 496 29, 896	29, 505 1 30, 052 29 487 29, 913	29, 400 30, 650 29, 512 29, 905	29 483 30 025 29,530 10,913	29, 482 30, 013 29, 561 19, 962	29 494 30, 003 29 570 29, 883	29 5 59 5 23 60 29 40
Mema	19. "(d)	29,767	29, 760	29 74.8	29, 765	29,764	29, 761	29.755	29 752	29,752	29,751	29,751	29,751	29.75
Date	<b>3</b> p. m.	1 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Range,
183. Aug. 1 Aug. 2 Aug. 3	29, 869 29, 815 29, 857	29, 866 29, 823 29, 859	29, 865 29, 825 29, 850	29, 860 29, 826 29, 853	29, 858 29, 826 29, 857	29, 850 29, 833 29, 855	29, 845 29, 830 20, 858	29, 840 29, 831 29, 850	29, 839 29, 829 29, 859	29, 846 29, 826 29, 850	29, 879 19, 822 23, 846	29-970 29-833 29-858	29, 849 29, 804 29, 822	. 08
Aug. 4 Aug. 5 Aug. 6 Aug. 7 Aug. 8	29, 857 29, 834 29, 928 29, 970 30, 021	29, 846 29, 837 29, 937 29, 968 30, 928	19, 844 29, 841 29, 948 29, 977 30, 001	29, 85 <b>0</b> 29, 844 29, 943 29, 975 36, 031	29, 848 29, 845 29, 946 29, 981 30, 927	29, 841 29, 849 20, 949 29, 980 30, 027	29, 843 20, 1 29, 952 29, 978 30, 920	20, 844 29, 857 29, 954 29, 977 30, 013	29, 839 29, 853 29, 955 29, 978 30, 008	29, 829 29, 850 29, 952 29, 971 30, 090	29, 854 29, 832 29, 941 29, 972 30, 007	29, 866 59, 857 29, 955 29, 981 56, 031	29, 829 29, 817 29, 855 29, 956 29, 976	. 0 4 . 0 4 . 0 2 . 0 7 7
Aug. 9 Aug. 19 Aug. 11 Aug. 12 Aug. 13	29, 879 29, 693 29, 642 29, 500 29, 577	29, 867 29, 683 29, 642 29, 491 20, 591	29, 867 29, 681 29, 692 29, 491 19, 589	29, 852 29, 689 29, 625 29, 496 29, 594	29, 835 29, 686 29, 609 99, 498 29, 594	29, 829 29, 686 29, 698 29, 497 29, 594	29, 823 20, 691 19, 592 29, 593 29, 603	29, 813 29, 692 29, 691 29, 499 29, 609	20, 804 20, 698 29, 574 29, 502 29, 616	19, 798 20, 698 29, 569 29, 508 29, 617	29, 963 29, 720 29, 650 29, 517 29, 565	20-56- 29, 790- 29, 698- 19-565- 29, 617	29, 798 29, 681 29, 569 29, 491 29, 512	,50 , 100 , 103 , 107 , 100
Aug. 11 Aug. 15 Aug. 16 Aug. 17 Aug. 13	29, 692 29, 721 29, 532 29, 552 29, 552	29, 709 29, 714 19, 622 29, 353 29, 313	29, 719 29, 703 29, 502 29, 555 29, 555	29, 721 29, 699 29, 485 29, 360 29, 550	29 729 29 692 29 470 29 352 29 572	29, 735 29, 678 29, 450 29, 340 29, 586	29, 737 29, 675 29, 432 29, 337 29, 596	29, 734 29, 662 29, 414 29, 323 29, 606	29, 749 29, 649 29, 404 29, 314 20, 620	29, 637 29, 637 29, 391 29, 306 29, 636	29, 685 29, 738 29, 537 <b>29,383</b> 29, 452	29, 754 29, 802 29, 671 29, 572 29, 696	29, 622 29, 637 29, 391 <b>29,306</b> 29, 313	. 137 . 163 . 240 . 066 . 22
Aug 19 Aug 20 Aug 21 Aug 22 Aug 23	29, 868 29, 527 29, 843 39, 118 29, 850	29, 898 29, 568 29, 870 36, 113 29, 838	29, 900 29, 494 29, 899 59, 107 19, 849	29, 917 29, 479 29, 913 36, 099 29, 840	29, 933 29, 470 29, 935 30, 094 29, 817	29, 918 29, 469 29, 960 30, 978 29, 804	29, 933 29, 476 29, 985 30, 667 29, 785	29, 955 29, 482 30, 004 39, 053 29, 769	10, 923 29, 489 30, 017 10, 044 29, 750	29, 923 29, 492 30, 045 30, 030 29, 735	29, 811 29, 630 29, 773 3 <b>0,095</b> 29, 874	29 985 20, 915 30, 045 30,122 30, 022	29, 642 29, 469 29, 511 30, 030 29, 735	. 440 . 5.1 . 090 . 281
Aug. 24 Aug. 25 Aug. 26 Aug. 27	29, 560 29, 956 29, 637 29, 632	29, 614 29, 933 29, 664 29, 829	29, 683 29, 898 29, 692 25, 893	29, 73 <b>0</b> 29, 859 29, 733 29, 792	29 782 29 840 29 761 29 791	29, 823 29, 868 29, 787 29, 769	29, 875 20, 770 29, 811 29, 751	29, 918 29, 702 20, 831 29, 727	29, 943 29, 704 29, 853 29, 711	29, 973 29, 665 29, 866 †29, 695	29, 668 29, 940 29, 642 29, 854	29, 973 30, 065 19, 866 29, 946	29, 182 29, 665 29, 487 29, 695	. 4 d . 46i .37!
Meana	29.758	29, 760	29, 762	29, 761	29. 765	29, 763	29, 764	29, 761	20,760	29, 758	29, 760	29, 554	29, 664	. 1*
51	ation ab	andoned	August 2	7, 1881.	Atmo	spherie	pressure,	correcte	ed.	†.	Approxir	nated.		
Month.	Ме	an. Hax	Min. 1	lange.	Mont	1. 1	Mean. M:	x. Min.	Range	Mon	th.	Mean. M	lαπ. Min.	Range.
1881. Vovember Vecember Whata per	iod. 29.	894 90, 70 853,30, 19 876 90, 70		1. 162			30, 680 30, 29, 880 30, 29, 804 30, 29, 811 30, 29, 812 30, 29, 898 30, 29, 828 30, 30, 118 30,	222 29, 558 116,19, 443	0,673	January Pebruar March April May June		30, 218 30 30, 028 39 30, 027 30	. 962 29, 62 . 962 29, 62 . 626 28, 99 . 849,29, 50 . 572 29, 33 . 606 19, 14 . 233 29, 56 . 289 29, 58	2 1.93 3 1.74 0, 1.22 6 1.46
anuary		684 30, 50		2. 282					1, 208	July				8 0 75

Table showing the temperature of the air at Uglaumie from October, 1881, to August, 1883.

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Dife	1 6.10	, 2 a ta	3 a. m.	4 a.m.	å n. m.	6 a. m.	7 n. m.	, N. D. Die	0 a.m.	10 n. m.	H a. m.	13 m.	1 p. m.	2 p. m.
[84] () 1 [9] () 8 [14] () () 1 [1] () 1 [2]	74. 1 19. 1 .41. 3 .75. 0 11. 6	50 d 58 2 51, 9 25 5 21, 0	19 9 37, 3 30, 7 24 3 10 3	30. 4 30. 4 30. 8 25. 1 19. 9	31.5 35.8 31.0 25.0 19.5	33.3 36.0 30.3 25.0 15.8	33, 3 36, 2 30, 2 26, 4 17, 6	30. 8 36. 2 29. 4 27. 5 17. 1	34. 6 56 0 29. 4 29. 9 17. 4	35. 7 34. 7 29. 2 28. 0 16. 1	35. 0 33. 8 28. 2 28. 3 10. 1	35. 0 34. 0 28. 2 28. 0 14. 5	37 5 34 4 27 4 27 9 13.5	38 5 33 7 26 6 27 4 16, 2
Oct 25 Oct 25 Oct 25 Oct 25	1 2 7 1 3 2 1 3 7 1 2 0	19 6 14 5 12 0 10 0 13 7	19 1 15 6 10 2 10, 7 12, 0	17. 1 15. 2 9. 1 10. 8 11. 0	15. 4 14. 1 8. 8 10. 7 11. 3	19 1 12 9 8 8 10 8 11 4	19. 6 12. 3 9. 4 11. 5 10. 6	19. 7 13. 7 9. 4 11. 7 10. 1	19 6 1 14 9 1 8, 6 12 7 10, 7	1 19.4 17.8 8.5 12.9 10.8	10. 1 17. 4 8. 3 12. 6 10. 7	18. 9 19. 1 8. 1 11. 1 0. 9	18. 6 17. 0 7. 9 11. 2 0. 6	18.7 16.8 7.6 12.6 9.1
(1) ( ) (1) ( ) (1) ( ) (2) ( )	15 4 15 6 15 6	15 2 15 7 93 5 17, 0	14. 6 15. 5 20. 5 15. 6	$\begin{array}{c} 15 & 1 \\ 15 & 7 \\ 23,  9 \\ 15,  2 \end{array}$	15, 2 16, 4 21, 7 15, 5	15.7 16.2 10.3 15.8	17. 2 17. 0 15. 8 16. 4	17. 3 17. 2 13. 7 14. 3	47. 9 16. 8 9. 9 18. 2	17. 0 17. 4 7. 0 15. 3	16. 8 17. 5 6. 2 15. 8	17. 8 17. 5 8. 8 15. 3	18. 6 17. 7 8. 2 15. 6	19. 8 17. 8 9. 5 17. 4
Mitte	20.59	e 51	19, 95	19, 64	10.78	19, 64	19, . 1	19.36	11.10	19, 31	19, 05	19, 06	19. 08	19. 37
· D	3 p. 91	I p. m.	5 p. m.	6 p. m.	; p. m.	Sp. m	9 p. m	10 p. m	H p. m	12 p. m	Daily means.	Max.	Min.	Diff.
( ) (2) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	38 9 33 2 46 n 26 2 13 -	39 4 024 8 15, 9 15, 1	39 <b>1</b> 32 3 36, 4 16, 2 18 6	97. 7 32 8 27. 1 25 9 19 1	08. 3 31. 8 26. 6 25. 1 19. 1	38, 5 32, 1 26, 4 24, 1 18, 9	38, 4 30, 5 25, 8 24, 1 18, 6	38. 1 30. 7 25. 7 14. 1 17. 7	75 1 39, 8 25 3 22, 9 17, 6	38 2 51.3 25.5 22.5 18.6	25, 70 54, 13 28, 22 25, 80 48, 17	38, 1 11, 6 28, 1 31, 9 29, 9	28.3 29.9 23.4 21.9 14.4	9 8 11, 7 13 7 19, 0 15, 5
(* ) *p. (* * ) (* * * ) (* * * )	18, 1 16, 6 5, 5 12, 1 5, 2	18 4 10 6 7 7 12 8 9, 9	18 1 14.8 7 8 12.0 10.3	17. 4 14. 7 7. 7 12. 8 9. 9	17. 4 14. 7 7 5 12. 7 12. 0	17 1 14 6 7 3 13 1 10 5	17. 1 14. 6 - 8. 0 12. 9 - 6. 8	15. 6 14. 1 7. 5 13. 0 6. 8	15.7 13.2 5.5 11.2 6.6	16 1 13, 7 9, 0 13 6 13 2	$\begin{array}{c} 18,26 \\ 15,20 \\ 8,74 \\ 11,97 \\ 10,52 \end{array},$	21, 0 25, 0 12, 3 16, 5 14, 0	11.5 0.4 6.0 7.4 2.5	6. 5 14. 6 6. 3 9. 1 10. 5
0 1 5 1 0 1 3 1 0 1 1 1 1	19. 9 16. 8 12. 9 17. 6	10 d 19 d 17. 9 17. 1	20. 6 10. 5 18. 6 17. 6	19 3 10 9 18 7 16 6	19 1 20 7 15, 5 16, 2	19.5 20.6 9.4 19.0	19. 3 20. 6 8. 9 16. 1	18.5 24.3 13.0 16.0	15.6 24.1 18.8 16.3	17 1 24.4 14.9 16.0	17 50 18 68 15, 16 15, 99	20, 0 24, 0 24, 2 17, 0	10. 4 14. 0 4. 3 71. 5	9 6 10 0 19 9 5 5
Merri	( ) 67	20, 26	20, 21	20.05	(9, 79	19 16	15 69	18 85	19, 09	19, 58	19, 56	25. 19	14.118	10.91
					-									

29.734 Range

Range

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued, (Beight of the thermometer above the surface of the carrie, 4 feet. Washington mean time. Correction to reduce to mean local time. About

1	1111-1111		marry (III			1	7 minutes	1						INSIETA
Date.	f a. m.	3 n. m.	3 a. m.	4 a. m.	5 a.m.	6 a m.	. 3 a. m.	4 n. m.	9 a. m.	10 a. m.	H a. m.	12 m.	] <b>1</b> p. m.	2 p. m.
1881. Nov. 1	10.0	15. 8	16.0	15. 9	15, 2	14.9	14.7	10.7	12.5	11.8	9. 0	11. 0	10. 8	10 9
Nov. 2 Nov. 3 Nov. 4 Nov. 5 Nov. 0	12. 0 6. 8 3. 3	11. 0 11. 6 6, 0 4. 4	11. 0 10. 7 5. 3 4. 8 - 4. 7	10.8 10.2 5.0 4.6 5.8	11. 0 0. 8 4. 8 4. 4 - 3. 8	10, 6 9, 9 4, 2 3, 3 - 7, 5	11. 1 9. 9 3. 9 3. 4 7. 9	10. 6 10. 4 4. 2 2. 8 — 0. 5	10. 8 0. 8 4. 2 1. 0 0. 3	10, 9 8, 4 4, 5 0, 2 9, 3	10.7 8.0 3.1 0.1	10, 6 7, 8 5, 4 	10. M 7. 2 0. 0 1. 0 1. 2	12.7 6.1 7.1 - 0.7
Nov. 7 Nov. 8 Vov. 0 Nov. 10 Nov. 11	= 3.7 = 2.7 = 0.1	$\begin{vmatrix} -3.2 \\ -4.9 \\ -2.1 \\ -1.3 \\ -3.0 \end{vmatrix}$	$\begin{array}{c} -3.0 \\ -5.3 \\ -3.1 \\ -2.1 \\ -3.7 \end{array}$	$\begin{array}{c} -1.9 \\ -5.0 \\ +3.0 \\ -3.0 \\ -5.1 \end{array}$	- 2.3 - 4.9 - 2.3 - 3.0 - 5.3	$\begin{array}{c} -5.0 \\ -4.9 \\ -1.7 \\ -3.4 \\ -5.4 \end{array}$	$\begin{array}{c} -5.7 \\ -4.6 \\ -0.1 \\ -3.8 \\ -4.5 \end{array}$	7.5 - 4.3 - 6.4 - 4.8 - 5.6	- 7.0 - 3.8 - 0.7 - 5.3 - 8.3	$\begin{array}{c} -0.1 \\ -4.0 \\ -0.1 \\ -5.4 \\ -7.5 \end{array}$	- 0.7 - 4.8 - 1.2 - 4.4 -11.0	- 7. 0 - 4. 4 - 1. 0 - 3. 2 - 11. 0	-11.0 - 3.9 - 1.0 - 2.5 -11.9	
Nov. 12 Nov. 13 Nov. 14 Nov. 15 Nov. 10	-14.5 -19.2 -14.1 -20.8 -26.3	-14.5 -19.2 -11.9 -20.7 -24.0	$\begin{array}{c} -15.4 \\ -19.4 \\ -10.1 \\ -10.1 \\ 20.6 \\ 23.7 \end{array}$	-15.4 -19.4 -11.8 -22.4 -20.9	-15.6 -20.3 -7.5 22.7 19.8	-15. 2 -20. 4 - 3. 6 23. 5 18. 6	$\begin{array}{c} -16.0 \\ -21.0 \\ -0.6 \\ 21.0 \\ 15.7 \end{array}$	$\begin{bmatrix} -\frac{16.4}{21.6} \\ -\frac{1.0}{24.5} \\ 8.5 \end{bmatrix}$	$\begin{bmatrix} -16.3 \\ -21.0 \\ -1.0 \\ 21.4 \\ 6.0 \end{bmatrix}$	-75.0 $-21.8$ $-6.7$ $-24.5$ $-4.6$	$ \begin{array}{c} -15.6 \\ -21.0 \\ -0.5 \\ 24.5 \\ 3.7 \end{array} $	-17.5 $-21.1$ $-9.6$ $21.5$ $3.0$	-17.6 -20.7 - 9.1 -21.8 - 0.8	-16 6 -20,1 -7.7 -7.7
Nov. 17 Nov. 18 Nov. 19 Nov. 20 Nov. 21	-13. 2 - 4. 0 - 1. 0 - 0. 2 8. 8	-12. 6 - 4. 8 - 0. 9 6. 4 6. 0	13. 0 5. 3 - 0. 5 3. 8 4. 7	-14.0 -4.9 -0.4 2.7 4.4	$ \begin{array}{c c} -14.7 \\ -6.3 \\ -0.2 \\ 1.4 \\ 4.2 \end{array} $	-14.6 - 0.5 1.3 4.4 3.8	-15, 5 -6, 7 2, 1 3, 4 3, 2	$\begin{bmatrix} -14.3 \\ -6.2 \\ 2.3 \\ 1.5 \\ 2.1 \end{bmatrix}$	$\begin{array}{c} -12.5 \\ -3.6 \\ 2.6 \\ 1.4 \\ 1.5 \end{array}$	-16.6 - 5.8 3.0 - 3.2 - 0.5	-16. 6 - 5. 2 - 2. 1 - 2. 3 - 0. 8	-17. 5 -4. 4 3. 0 2. 7 3. 6	16, 1 4, 2 4, 4 4, 2 2, 8	-15 4 - 4.2 - 2 4
Nov. 22 Nov. 23 Nov. 24 Nov. 25 Nov. 26	- 4. 9 -10. 8 -12. 1 -10. 5 5. 4	-5.8 -19.0 -11.7 -9.7 5.3	$\begin{array}{c} -5.8 \\ -19.7 \\ -13.0 \\ -9.0 \\ 5.1 \end{array}$	$\begin{bmatrix} -6.0 \\ -20.2 \\ -11.0 \\ -7.7 \\ 2.5 \end{bmatrix}$	$\begin{array}{c} -6.7 \\ -21.3 \\ -11.2 \\ -6.1 \\ 3.0 \end{array}$	- 7. 5 -23. 1 -11. 4 - 3. 7 3. 4	$\begin{array}{c} -8.0 \\ -28.9 \\ -11.1 \\ -3.6 \\ 3.5 \end{array}$	$\begin{array}{c} -8.2 \\ -22.6 \\ -11.0 \\ -3.0 \\ 2.1 \end{array}$	$ \begin{array}{c} -0.3 \\ -21.5 \\ -11.1 \\ -3.2 \\ 1.2 \end{array} $	$\begin{array}{c c} -12.3 \\ -21.5 \\ -10.6 \\ -2.0 \\ 0.9 \end{array}$	-13.0 -19.7 -10.5 -1.8 -0.4	$\begin{array}{c} -15.7 \\ -17.3 \\ -9.7 \\ -1.9 \\ 0.6 \end{array}$	-15.3 -15.4 - 9.9 - 0.7 - 0.3	15. 4 12. 2 0, 6 0, 6
Nov. 27 Nov. 28 Nov. 29 Nov. 39	4. 6 22. 9 19, 0 3, 3	5, 0 21, 9 19, 4 2, 2	5. 5 19. 8 19. 6 0. 4	$\begin{bmatrix} 5.7 \\ 15.6 \\ 19.4 \\ -1.2 \end{bmatrix}$	5, 1 14, 1 20, 0 — 3, 2	5. 6 12. 3 20. 7 - 4. 2	5, 0 11, 6 23, 5 - 5, 6	4. 9 11. 6 23. 5 — 5. 4	5, 3 9, 8 23, 5 5, 6	6. 4 9. 6 22. 0 — 6. 3	7. 2 8. 5 21. 5 6. 1	8, 8 8, 2 15, 4 — 6, 0	9.8 9.7 11.8 5.0	1d, n 12, u 8, a 3, 1
Means	1. 15	1.67	0, 60	0, 15	0.04	0, 05	0, 12	- 0.70	- 0.92	- 1.55	2.03	1.84	- 1.80	- 1.50
Date.	1. 15 - 3 p. m.	1.67 4 p. m.	0, 60 5 p. m.	0, 15 <b>6</b> p. m.	7 p. m.	0, 05 % p. m.	0.12 9 p. ni.	1	- 0.92		- 2.03 Daily means.	1.84 Max.	- 1.80 Min.	— 1.50 Din
								1			Daily		1	
Date.	3 p. m.	4 p. m.	5 p. m.	<b>6</b> p. m.	, 7 p. m.	% p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Đin
1881. Nov. 1 Nov. 2 Nov. 3 Nov. 4 Nov. 5 Nov. 6 Nov. 7	3 p. m. 12. 0 13. 9 7 4 8. 2 1. 6 - 6. 0 - 9. 8 - 5. 1 - 0. 3 - 1. 4	4 p. m. 12. 1 13. 9 7. 9 9. 2 1. 3	5 p. m. 11. 8 14. 5 8. 2 8. 6 — 1. 9	# p. m.  11 0  14.5  8.6  7.0  2.9	7 p. m.  10. 8  14. 5  8. 5  6. 8  - 3. 0	% p. m.  11. 4  13. 1  8 1  6. 3	9 p. m. 11, 5 13, 5 8, 2 4, 4 - 3, 7	10 p. m.  11 3 13.3 8.0 2.8	11 p. m.  11. 8  12. 7  7. 0  0. 4  - 3. 2	12 p. m.  12.6  13.1  1.9  2.2	Daily means.  12. 69 12. 16 8. 80 5. 18 0. 07	Max.  16.1  13.2 12.8 8.0 1.0	Min.  8-9  9.5  4.4  -1.4  -6.6	Din 7 2 2 7 7 8 4 9 4 10 6
Date.   1881.   Nov. 1   .   Nov. 2   .   Nov. 3   .   Nov. 5   .   Nov. 6   .   Nov. 7   .   Nov. 5   .   Nov. 10   .   Nov. 10   .	3 p. m. 12. 0 13. 9 7 4 8. 2 1. 6 - 6. 0 - 9. 8 - 5. 1 - 0. 3 - 1. 4	12. 1 13. 9 7. 9 9. 2 1. 3 - 7. 5 - 8. 0 - 0. 1	5 p. m. 11. 8 14. 5 8. 2 - 7. 0 - 8. 2 - 7. 5 - 2. 1	6 p. m.  11 0  14.5  8.6  7.0  -0.2  -7.6  -4.9  -2.8	10.8 14.5 8.5 6.8 1.5 8.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	11. 4 13. 4 8. 1 6. 1 6. 3. 2 4. 2 	9 p. m.  11. 5  13. 5  8. 2  4 4  - 3. 7  - 4. 4  5. 3  - 4. 9  1. 3  - 4. 0	10 p. m.  11 3 13.3 8.0 2.8 14.1 - 5.4 - 5.8 0.3 - 3.4	11 p. m. 11 p. m. 12.7 7.0 0.4 - 3.2 - 4.0 - 5.1 - 3.5 - 1.4 - 3.0	12 p. m.  12.6  13.1  6.2  - 1.9  - 2.2  - 6.9  - 4.9  - 3.5  0.4  - 4.0	Daily means.  12. 69 12. 16 8. 80 5. 18 0.07 - 6. 51 - 6. 01 - 4. 65 - 0. 82 - 3. 14	Max.  16.1  13.2 12.8  1.0  -3.0  -2.8  -5.5  -0.1  1.0	Min.  8 9 9.5 4.4 - 1.4 - 6.6 -12.5 -14.1 - 7.6 - 7.5	7 2 77 8 4 9 4 10 0 9.3 1 2 1 7.0 0 6 5
Date, 1881, Nov. 1 Nov. 2 Nov. 3 Nov. 4 Nov. 5 Nov. 5 Nov. 5 Nov. 10 Nov. 11 Nov. 12 Nov. 12 Nov. 13 Nov. 14 Nov. 14 Nov. 15 Nov. 15	3 p. m.  12. 0  13. 9  7 4  8. 2  1. 0  9 8  5 1  1. 4  -10. 1  -14. 5  -2. 8  28. 9	4 p. m.  12. 1  13. 9  7. 9  9. 2  1. 7. 5  8. 0  5. 6  1. 1. 8  -11. 7  -0. 6  -17. 7  -0. 6  -27. 7	5 p. m. 11. 8 14. 5 8. 2 8. 6 - 1. 9 - 7. 5 - 2. 1 - 11. 8 - 15. 8 - 2. 1 - 15. 8 - 2. 5 - 2. 5	6 p. m.  11 0  14.5  8.6  7.0  - 2.6  - 7.6  - 4.9  - 9.8  - 15.2  - 1.6.0  - 16.2  23.0	10. 8 14. 5 8. 5 14. 5 8. 5 1 - 3. 8 - 7. 4 - 5. 4 0. 4 3. 6 - 13. 8 - 16. 2 - 15. 8 - 26. 5	11. 4 13. 4 13. 4 14. 6.3 15. 3. 2 16. 7 16. 4 17. 8 17. 8 17. 8 18. 1 18. 1 19. 10. 1 10. 10. 1 10. 10. 1	9 p. m.  11. 5 13. 5 8. 2 4 4 4 -3. 7 -4. 9 1. 34. 013. 9 -18. 217. 5 1. 20. 3	10 p. m.  11 3 18.3 8.0 2.8 -4.4 -5.4 -3.8 -3.4 -14.6 -18.1 -17.4 13.5 25.4	11, 8 12, 7 7, 0 0, 4 -3, 2 -4, 0 -5, 1 -3, 5 -14, 0 -18, 1 -17, 2 27, 3	12 p. m. 12. 6 13. 1 6. 2 - 1. 0 - 2. 2 - 6. 0 - 4. 0 - 3. 5 0. 4 - 4. 0 - 14. 7 - 19. 1 - 16. 0 16. 8 20. 9	Daily means.  12. 69 12. 16 8. 89 5. 18 9. 6. 51 - 6. 61 - 4. 65 - 9. 52 - 3. 14 - 9. 61 - 18. 90 - 0. 95 24. 82	Max.  16. 1  13. 2  12. 8  8. 0  - 3. 0  - 2. 8  - 5. 5  - 1. 0  - 18. 5  - 15. 4  - 28. 0  30. 1	Min.  8 9 9, 5 4, 4 -1, 4 -6, 6 -12, 3 -14, 1 -7, 6 -7, 5 -18, 6 -23, 5 -20, 2 -21, 0 14, 4	7 2 7 8 4 9 4 10 6 9 3 1 1 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Date.  1881. Nov. 1 Nov. 2 Nov. 3 Nov. 3 Nov. 4 Nov. 5 Nov. 6 Nov. 6 Nov. 6 Nov. 1 Nov. 1 Nov. 1 Nov. 1 Nov. 1 Nov. 1 Nov. 1 Nov. 11 Nov. 12 Nov. 13 Nov. 14 Nov. 15 Nov. 15 Nov. 15 Nov. 15 Nov. 15 Nov. 16 Nov. 17 Nov. 18 Nov. 20 Nov. 20 Nov. 21 Nov. 22 Nov. 22 Nov. 22 Nov. 22 Nov. 22	3 p. m.  12, 0  13, 9  7, 4  8, 2  1, 6  9, 8  5, 1  1, 4  10, 1  14, 5  17, 9  28, 9  0, 5  14, 2  28, 9  21, 2  21, 1  15, 1	12, 1 13, 9 7, 9 9, 2 1, 3 - 8, 0 - 8, 0 - 1, 8 - 11, 8 - 11, 4 - 15, 7 - 0, 0 - 0, 1 - 0	5 p. m.  11. 8  14. 5  8. 6  -1. 9  -7. 5  6. 0  -1. 5  -1. 5  -1. 5  -1. 5  -1. 5  -1. 7  -1	6 p. m.  11 0  14.5  8.6  7.0  9.2,9  -6.2  -4.9  0.0  -2.8  -15.2  -16.2  -1.0  -0.2  -1.0  -0.2  -1.0  -0.2  -1.0  -0.2  -1.0  -0.2	7 p. m.  10. 8  14. 5  8. 8  - 3. 0  - 5. 4  - 3. 6  - 15. 8  - 15. 8  - 2. 6  - 15. 8  - 15. 8  - 7. 7  - 15.	\$ p. m.  11. 4  13. 4  8 1  6. 3  1 - 3. 2  - 4. 2  - 4. 4  0. 9  - 13. 8  - 14. 8  - 15. 8  - 15. 8  - 16. 4  - 1. 2  - 8. 6  - 1. 2  - 8. 7  - 1. 2  - 1. 2  - 1. 3  - 1. 3  - 1. 3  - 1. 4  - 1. 2  - 1. 4  - 1. 2  - 1. 3	9 p. m.  11. 5  13. 5  8 2  4 4 4  - 3. 7  - 4. 4  - 3. 9  - 18. 2  - 17. 5  - 2. 1  - 2. 1  - 6. 2  - 15. 4	10 p. m.  11 3 13.3 8.0 8.1 9.8 9.4 1 9.3 14.6 13.5 25.8 14.6 13.5 25.8 16.5 17.6 18.1 17.6 18.1 17.7 18.1 18.1 18.1 18.1 18.5 18.1 18.5 18.1 18.5 18.5	11 p. m.  11. 8  12. 7  7. 0  0. 4  - 3. 2  - 4. 0  - 3. 5  - 1. 4  - 3. 5  - 14. 0  - 18. 1  - 17. 2  - 27. 3  - 11. 2  - 6. 0  - 1. 3  - 3. 9  - 12. 5	12 p. m.  12.6  13.1  6.2  -1.9  -2.2  -6.0  -3.5  -11.7  -19.1  -10.0  -11.9  -1.2  -7.0  10.8	Daily means.  12, 69 12, 16 8, 89 5, 18 6, 07 -6, 61 -4, 65 -0, 82 -3, 14 -9, 51 -16, 30 -0, 95 24, 82 -6, 00 -12, 89 -1, 13 -3, 64 -9, 47	Max.  16. 1  13. 2  12. 8  1. 0  1. 0  2. 0  1. 0  - 3. 0  - 1. 5. 5  - 0. 3  - 1. 5  - 1. 5  - 1. 5  - 1. 5  - 1. 5  - 1. 6  - 18. 5  - 15. 4  - 20. 0  - 30. 1  - 6. 0  - 9. 0  28. 0	Min.  8 9 9, 5 4 4 - 1, 4 6, 5 12, 5 12, 6 13, 6 14, 1 17, 6 18, 6 19, 6 11, 4 11, 4 11, 4 11, 6	7 2 7 7 8 4 4 10 6 9 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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<sup>\*</sup> Standard read higher than maximum.

Table showing the temperature of the air at Uglaamic from October, 1881, to August, 1883—Continued. Hoght of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time. —5 bours 17 minutes.]

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Date.	# a. m.	2 a. m.	3 n. m.	diam.	5 a.m.	6 n. m.	T (0. 10).	8 a. m.	<b>9</b> n. m.	10 a. m.	11 a.m.	12 m.	# p. no.	2 p. 10
per l	- 6. 2	··· 4. ()	8.5	- P. 7	H. G	1	2.1	- 3.7	- 2.3	J. O	0.4	3. 5	1.9	0.7
316 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.8 	$\begin{array}{c} 10.0 \\ -10.5 \\ -7.3 \\ -10.5 \end{array}$	$\begin{array}{c} 0.1 \\ 1.2 \\ -15.2 \\ -6.0 \\ -16.4 \end{array}$	7. 8 0. 4 -13. 3 - 0. 0 -10. 8	7. 0 - 0. 6 -14. 5 - 7. 0 -16. 6	$\begin{array}{c c} -5.1 \\ -0.7 \\ -14.0 \\ -7.1 \\ -10.4 \end{array}$	$\begin{array}{c} -1.0 \\ -15.6 \\ -7.5 \\ -11.9 \end{array}$	- 2.5 -16.8 -7.3 -14.7	- 0.1 - 2.5 - 17.5 - 7.7 - 11.1	$\begin{array}{c} -0.0 \\ -3.4 \\ -16.4 \\ -7.6 \\ -12.6 \end{array}$	- 1.5 - 4.4 - 16.1 - 8.0 - 11.3	1. 5 5. 1 15. 5 11. 0	7.1 -7.1 -11.5 -11.2 -10.1	1. 0 6. 7 13. F 0. 3 - 0. 6
1164 7 1164 7 1164 11 1164 11	- 7 9 - 8 1 -10 2 1 0 9 0	$\begin{array}{c} \cdot & 16.1 \\ -7.0 \\ -17.0 \\ -17.0 \\ 2.3 \\ -6.4 \end{array}$	7. 1 -7. 1 -18. 3 -7. 0	- 5, 4 - 8, 8 - 20, 3 - 7, 0	- 6.4 -10.5 -21.4 -21.2 - 8.5	- N. 6 - 0. 5 - 20. 2 - 4. 4 - 0. 0	- 9, 7 0, 4 22, 6 0, 0 10, 0	-10. 3 - 0. 0 -23. 0 -11. 8	- 9.9 80.7 24.8 11.7	- 8, 1 - 11, 8 - 25, 7 - 0, 0 11, 0	- 8. 0 -12. 1 -20. 0 -0. 4 -12. 3	8, 0 13, 2 27, 1 -0, 2 11, 0	$\begin{bmatrix} -13.2 \\ -24.9 \\ 0.0 \\ -11.3 \end{bmatrix}$	-13.9 -12.1 -11.1
Dic 12 Dic 14 Bit 14 Dic 15	2.4 15.1 19.9 21.4 22.5	1.3 15.2 18.1 21.0 21.0	-15.4 -15.1 -16.2 -22.6 -21.7		-7.6 -11.7 -16.2 -22.7 -10.2	-10, 1 -13, 8 -15, 8 -22, 6 -19, 4	-11 0 -13.3 -15.6 -21.4 -10.9	-12.3 -15.3 -14.0 -21.2 -10.4	-11.2 -17.4 -14.9 -21.2 -10.6	-14.2 -16.3 -14.7 -22.0 -18.0	-14.0 -16.8 -15.1 -23.1 -17.6	$\begin{array}{c} -15.6 \\ -16.0 \\ -15.3 \\ -23.4 \\ -17.0 \end{array}$	-15.6 -16.3 -15.4 -25.3 -16.6	-14.0 -10.4 -14.9 -5.5 -16.8
Dec 17 Dec 18 Dec 19 Dec 19 Dec 21	- 18.4 - 38.3 - 12.5 - 46.1 - 57.7	-18.0 -37.1 -43.5 -45.0 -35.0	-19, 3 37, 3 13, 8 15, 0 32, 6	-10.2 -38.11 -43.9 -44.1 -32.1	-10.5 -39.6 -44.2 -43.5 -32.6	- 19. 9 - 10. 0 - 46. 3 - 37. 7 - 32. 4	-19. 1 -40. 9 -17. 1 -35. 5 -32. 5	-20. -12.3 -18.8 -38.0 -32.4	- 23, 1 - 42, 5 - 46, 8 - 33, 5 - 73, 0	-21 1 -41.8 -46.9 -36.2 -32.8	-93.9 -41.4 -19.0 -32.6 -33.8	24, 2 12, 4 50, 1 35, 5 35, 1	-25.1 -42.3 -50.4 -30.4 -30.5	27. 1 - 11. 8 - 50. 0
Diet. 24	01.7 20.2 20.6 28.3 22.0		-91.0 -20.0 -20.6 -27.8 -21.4	-31, 5 -20, 0 -20, 0 -27, 6 -21, 0	=30, 9 =31, 7 = 21, 0 = 27, 1 = 20, 5	-21.0 -21.0 -21.0 -21.0	-20.0 -21.0 -25.0 -21.6	39, 9 -29, 3 -22, 6 -20, 6 -21, 6	-31.5 -27.3 -24.4 -27.1 -21.2	$\begin{array}{c} -32.6 \\ -25.7 \\ -25.4 \\ -27.1 \\ -20.0 \end{array}$	-31.7 -20.4 -20.0 -28.0 -20.2	-72. 0 -24. 7 -28. 0 -27. 0 -18. 9	-31.8 -24.7 -25.7 -35.7 -18.3	41. 7 21. 1 21. 9 21. 9 17. 4
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Means	18.01		-17.61	-17.90			references comments or	15,50	}8.63	18, 42	-1r. 41		-18.28	pi, 19
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Dec. 2 Dec. 3 Dec. 4 Dec. 5	6. 0 - 0. 7 - 6. 0 -11. 4 - 12. 1 - 12. 1 - 8. 3 - 7. 1 - 14. 7 - 10. 6 - 14. 3 - 10. 6 - 14. 3 - 26. 7	4.7 - 2.2 - 9.5 -11.2 -11.0 - 8.3 - 6.9 -14.8 - 10.1 - 0.9	$ \begin{vmatrix} 3.6 \\ -1.1 \\ -10.8 \\ -12.1 \\ -13.1 \\ -8.2 \end{vmatrix} $ $ \begin{vmatrix} -0.4 \\ -14.2 \\ -14.2 \\ -0.3 \end{vmatrix} $	3. 7   -0.5 -11.8 -11.9 -14.2 -7.9 -6.5 -14.3 -12.3 -12.3 -12.3 -12.6	4. 2 -2. 1 -12. 1 -11. 4 -16. 6 -8. 8 -5. 2 -15. 4 -10. 7 -2. 3	4. 1 - 0. 7 -13. 1 -10. 4 -14. 2 - 8. 8 - 6. 0 -14. 3 - 8. 7 - 3. 2	5. 6 - 0. 8 - 13. 8 - 9. 3 - 14. 2 - 7. 1 - 15. 2 1 - 5. 2 1 - 1. 4	0. 9 1. 4 -11. 0 2. 9 -14. 6 - 0. 9 -7. 2 -14. 6 - 3. 1 - 7. 2	8, 0 - 0, 2 - 13, 8 - 7, 1 - 10, 6 - 5, 3 - 13, 3 - 1, 8 - 7, 8	8. 0 - 1. 2 - 14. 2 - 7. 9 - 15. 6 - 6. 0 - 14. 7 - 1. 4 - 0. 5	0, 13 1, 45 - 6, 21 - 10, 55 - 10, 34 - 11, 96 - 7, 55 - 12, 03 - 16, 94 - 0, 17	7. 0 14.5 1. 2 -10. 2 - 7. 0 - 7. 0 - 7. 0 - 9. 5 - 3. 5 5. 0	-11.4 4.7 17.0 -21.4 -20, 21.6 13.6 -13.2 3.1	1- 1 1- 8 16.5 11.2 11.4 14.4 14.4 15.1 17.0 17.0 17.0 17.0 17.0
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Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.

[Height of the thermometeratore the sattace of the earth. I feet. Washington mean time. Correction to reduce to mean local time. -5 hours

						17	minutes.	1						
Dite.	1 a. m.	2 a. m	3 a in.	La. u.	ã a na	6 a. m.	7 a. m.	8 a.m.	9 a. m.	10 a. m.	11 a. m.	12 <b>W</b> .	1 p. m.	2 p. m.
1887. Jan 1 Jan 2 Jan 3 Jan 4 Jan 5	1 2 -15 6 - 18 6 -19.0 - 27 1	5 6 16 6 	-15 7 -15 7 -17 7 -21 9 -20 4	-19 4 -19 4 -11 7 -20 8	2 3 10, 4 17, 5 12, 1 21, 1	1, 2 18 2 17 1 21 1 20 1	0, 5 17, 8 16, 6 23, 6 28, 0	2, 3 18, 2 16, 2 24, 5 29, 0	$\begin{array}{c} -6.2 \\ -19.0 \\ -16.2 \\ -25.9 \\ -29.1 \end{array}$	7, 7 -49 6 16, 7 -26, 1 -29, 9	- 6, 2 - 20, 1 - 17, 3 - 26, 1 - 29, 7	-7.7 $-19.7$ $-17.6$ $-27.6$ $-29.1$	$\begin{array}{c} -9.7 \\ -20.7 \\ -17.4 \\ -27.5 \\ -28.0 \end{array}$	1 1
Jan 6 Jan 7 Jan 8 Jan 9 Jan 10	-26 1 -24 8 -25 2 -26 2 -27, 6	+ 26 1 - 24 2 - 16 6 - 17 8	25.7 25.7 25.9 26.7 -27.8	-26 7 -26 5 -26 9 -25 5 -28 0	-27, 1 -25, 3 -27, 3 -26, 9 -28, 3	-28.6 $-25.7$ $-27.6$ $-27.4$ $-29.0$	28, 2 25, 9 28, 4 27, 6 28, 8	-28, 7 -26, 2 -19, 4 -27, 8 -29, 0	-28.9 $-27.1$ $-29.1$ $-28.8$ $-28.6$	-29.1 $-27.2$ $-20.0$ $-28.2$ $-29.0$	29.1 27.3 31.9 30.3 28.1	-29.5 $-27.3$ $-30.9$ $-29.7$ $-28.3$	29, 1 27, 4 30, 7 50, 3 27, 8	1 1
Jan. 11 Jan. 12 Jan. 13 Jan. 14 Jan. 15	-21 2 - 3 5 - 4.2 -12 6 -18 4	- 21. 1 - 2 1 - 1 2 -13 0 -17 7	-21.4 -1.1 -5.5 -13.6 -18.7	-21 6 - 0 7 - 6 3 -13.8 -18.8	-23. 1 0. 4 7. 7 -14. 0 -19. 4	$\begin{array}{c} -22.6 \\ -1.2 \\ -8.4 \\ -15.4 \\ -21.1 \end{array}$	-22.3 $-3.9$ $-10.6$ $-15.2$ $-21.5$	-22.1 $-4.0$ $-11.2$ $-15.6$ $-22.4$	$-\frac{93}{4}, \frac{9}{7}$ $-12.8$ $-16.7$ $-22.9$	$\begin{array}{c} -22.6 \\ 6.4 \\ -14.6 \\ -17.7 \\ -23.1 \end{array}$	-22.3 7.5 -11.5 -18.5 -22.4	$\begin{array}{c} -22.5 \\ 10.3 \\ -13.5 \\ -17.8 \\ \cdot 22.1 \end{array}$	-20.3 $-12.4$ $-18.6$ $-21.2$	-17.5 6.7 - 11.4 - 10.5 - 21.9
Jan. 16 Jan. 17 Jan. 18 Jan 19 Jan 20	-91.9 -11.6 6.9 5.5 0.7	= 21, 2 =11, 4 = 6, 4 = 5, 7 = 2	-21.5 -11.5 7.1 4.9 0.0	$\begin{array}{c} -22 & 1 \\ -12 & 3 \\ -7 & 5 \\ -4 & 6 \\ -0 & 5 \end{array}$	-21 5 -12 6 - 2 2 - 4 6 - 0 9	-21.0 -12.6 - 8.8 - 4.6 - 1.9	-21.0 $-11.7$ $-9.3$ $-4.5$ $-1.7$	$ \begin{array}{r}     20.5 \\     -10.6 \\     -9.3 \\     -4.8 \\     -1.6 \end{array} $	$-20  ext{ 1} \\ -12.6 \\ -9.1 \\ -4.4 \\ -1.0$	19 9 12 1 8 8 4 4 1 9	- 19 4 9.8 8.8 1.5 2.0	-19.4 $-6.2$ $-8.8$ $-1.4$ $-1.9$	$\begin{array}{c} -17.7 \\ -5.5 \\ -9.1 \\ -4.3 \\ -2.0 \end{array}$	187 - 31 - 10
dan 21 dan 22 dan 24 dan 24 dan 23	0.9 20.2 1.9 8.4 9.7	20.3 1 2 - 8.9 - 8.7	1 9 20, 0 t -10 0 7, 5	2. 1 20-1 0. 1 -10. 9 8-6	$\begin{array}{c} 2.4 \\ 19.8 \\ -0.7 \\ 11.4 \\ -0.5 \end{array}$	2.3 19.4 - 2.4 12.1 8.9	$\begin{array}{c} 2.5 \\ 19.1 \\ -2.4 \\ -12.8 \\ -8.9 \end{array}$	$ \begin{array}{r} 2.3 \\ 19.2 \\ -2.9 \\ -14.1 \\ -8.6 \end{array} $	$\begin{array}{c} 2.7 \\ 19.1 \\ -4.6 \\ -13.9 \\ -8.2 \end{array}$	$ \begin{array}{r} 3 & 2 \\ 18 & 8 \\ - & 6.7 \\ - & 13.8 \\ - & 8.4 \end{array} $	3. 4 18. 5 - 7. 9 -14. 5 - 8. 6	$\begin{array}{c} 1.6 \\ 13.0 \\ -9.1 \\ -11.0 \\ -8.3 \end{array}$	$\begin{array}{c} 6.4 \\ 15.2 \\ -9.8 \\ -14.0 \\ -7.1 \end{array}$	15 1 15 7 1 6
Jan 26 Jan 17 Jan 18 Jan 19	4. 1 11. 1 -21. 2 -29. 5 -31. 9	4 4 - 11 7 -20.2 -31.1 -32 8	4 0 14.7 -21.7 -31.7 -33.1	3 4 15 6 21, 9 -31 7 -33 6	3 4 16 1 -21.2 -31 7 -31.4	$\begin{array}{c} 0.1 \\ -16.1 \\ -21.4 \\ -31.7 \\ -31.8 \end{array}$	$ \begin{array}{r} -0.8 \\ -16.1 \\ -21.5 \\ -31.9 \\ -34.4 \end{array} $	$\begin{array}{c} -3.4 \\ -16.5 \\ -21.4 \\ -31.0 \\ -34.8 \end{array}$	- 7. 2 -17. 3 -20. 5 -32. 6 -35. 7	- 8, 8 17, 8 -20, 8 -52, 6 35, 7	9, 8 -18, 2 -21, 2 -32, 9 -36, 3	-11 4 -18 2 -29 1 33 4 37, 3	-11 + -19, 4 -19, 6 -32, 9 -37, 0	111 1111 2111 2111
dan 31	-37.5	-:7.5	17.9		11 ->	=33 ° =15 ; 2	-33.1 15.47	= 12.4 = 15.81	-32. 0 -16, 38	$\frac{-51.5}{-16.68}$	-31 3 -16.76	-30.9 -16.65	- 31 1	11 17
Mouns.	→14.0t	11.11	11 17	- 11.71	15 17	15:2		A-114, 1-1	-10, 0	111, 415	10.40	10. (5.)	(11, 11)	
Means. Date.	→14,01 3 p. m.	4 p. m.		6 p. m.	7 p m.	Sp.m.			=. 11 p. m.		Daily Means.	Мак.	Min.	
	3 p. m. -11. 0 -20. 7 -17. 1	1				8 p.m. -43.0 -21.0 -21.0 -25.4				12 p. m.	Daily Means.	Max.		
Date.  1882. Jan. 1. Jan. 2. Jan. 3. Jan. 4.	3 p. m. -11, 0 20, 7 -17, 1 16, 4	4 p. m.	5 p. n -10.3 -19.4 -19.6 -26.2 -24.1 -27.6 -29.5 -28.1	6 p. m. -20, 5 -21, 0 -24, 9	7 p m	8 p.m. -43.0 -21.0 -21.0 -25.4	9 p. m. 12. 6 24. 2 20. 9 24. 9	10 p. m.	11 p. m. 11 p. m. -16, 1 -19, 4 -22, 1 -26, 7 -21, 3 -25, 4 -27, 1	12 p. m.  -16 1 -19 1 -19 7 -16 2 -26 1 -24 4 -25 5	Daily Means. 6 61 12 40 18,54 21,63	Max.  45.6  -15.6  -16.2  -19.0  -23.6  -24.4  -24.2  -25.5	Min.	Dip
Bate.  1882. Jan. 1. Jan. 2. Jan. 3. Jan. 4. Jan. 5. Jan. 6. Jan. 6. Jan. 7. Jan. 8. Jan. 9.	8 p. m. -11, 0 -20, 7 +17, 1 -16, 4 -25, 6 -13, 0 -07, 4 -19, 7 -27, 6	4 p. m. 4 p. m. 4 p. m. 4 20.5 -27.5 -24.6 -28.0 -27.5 -20.0 -27.8	5 p. n -10.3 -19.4 -19.6 -26.2 -24.1 -27.6 -29.5 -28.1	9, 7 -20, 5 -21, 0 -24, 9 -23, 8 -27, 6 -27, 8	7 p m	8 p. m. -13.0 -21.0 -21.0 -25.4 -24.0 -27.6 -27.1 -30.2 -28.4	9 p. m. 12.6 24.2 20.9 24.9 27.5 27.2 29.9 28.4	10 p. m. -13, 6 -21, 2 -24, 7 -25, 1 -26, 1 -26, 1 -27, 8	11 p. m. -16, 1 -19, 4 -29, 1 -26, 7 -24, 3 -25, 4 -27, 4 -27, 8	12 p. m. 16 1 19, 1 19, 7 16 2 26, 1 24, 4 25, 2 25, 5 27, 8	Daily Means.	Max.  45. 6  -15. 6  -16. 2  -10. 0  -24. 4  -25. 2  -25. 5  -21. 6  -4. 2  -4. 2  -4. 3  -4. 4  -4. 5  -4. 5  -4. 6  -4. 6  -4. 7  -4. 8  -4.	Min17.1  25.1  25.3  36.4  32.3  33.1  32.4	Dio 10 1 1 1 1 1 2 8 1 1 1 1 2 8 1 1 1 1 1 2 8 1 1 1 1
Date.  1882. Jam. 1. Jam. 2. Jam. 3. Jam. 3. Jam. 4. Jam. 5. Jam. 6. Jam. 7. Jam. 8. Jam. 9. Jam. 10. Jam. 11. Jam. 12. Jam. 12. Jam. 13. Jam. 13. Jam. 13. Jam. 13. Jam. 14. Jam. 13. Jam. 14. Jam. 13. Jam. 14.	<b>8 p. m.</b> -11. 0 -20. 7 -17. 1 -16. 4 -25. 6 -13. 0 -17. 4 -27. 6 -14. 7 -7. 0 -11. 4 -18. 4	4 p. m. 	5 p. n.,  -10, 3 -10, 4 -10, 6 -26, 2 -24, 1 -27, 6 -28, 5 -28, 5 -18, 6 -18, 6	9, 7 -20, 5 -21, 0 -24, 9 -23, 8 -27, 6 -28, 8 -7, 8 -11, 0 -15, 4 -16, 2 -13, 1	7 p m.  10 2  -10 2  -21, 4  -24, 9  -23, 6  27, 4  -27, 2  -28, 6  -22, 9  15, 2  -9, 4  -19, 8	S p. m.  -13, 0 -21, 0 -21, 0 -25, 4 -24, 0 -27, 1 -30, 2 -28, 4 -23, 0 -8, 2 -9, 4 -9, 0 -9, 3 -19, 8	9 p. m.  -12.6 -21.2 -20.9 -24.9 -24.0 -27.2 -29.9 -28.4 -22.2 -6.5 -6.0 -9.8 -9.8	10 p. m.  -13, 6 -21, 2 -21, 5 -24, 7 -25, 1 -26, 1 -20, 7 -27, 8 -4, 6 7, 2 -10, 8 -20, 1	H p.m.  -16, 1 +10, 4 -22, 1 -26, 7 -21, 3 -25, 4 -27, 1 -27, 8 -27, 1 -27, 8 -4, 6 -0, 0 -11, 6 -19, 8 -21, 4 -13, 6 -1, 6	12 p. m.  -16 1 -10.7 -16.2 -26.1 -25.4 -25.5 -27.8 -4.2 -3.2 -12.1 -20.1	Daily Means.  - 6 64	Max.  45.6 -15.6 -16.2 -19.0 -23.6 -24.4 -24.2 -25.5 -21.6 -15.2 -4.2 -17.7 -13.6 -1.6	Min.  -17.1  -25.1  -25.3  -30.1  -30.4  -33.9  -32.4  -33.2  -3.4  -3.2  -4.2  -4.6  -4.6  -4.6  -4.6  -4.6	9 1910 9 1 9 1 11,11 12.8 5,1 7,9 6,9 11,9 12,8 12,1 11,1
Date   1882   Jan 1   1   1   1   1   1   1   1   1   1	3 p. m.  -11. 0 -20. 7 -17. 1 -16. 4 -15. 0 -17. 4 -10. 7 -27. 6 -25. 1 -14. 7 -27. 6 -21. 7 -27. 6 -21. 7 -27. 6 -21. 7 -21. 7 -3. 1 -3. 1 -3. 1 -3. 1 -3. 1 -3. 1	4 p. m.  (-20, 5) (-20, 5) (-27, 6) (-27, 6) (-27, 6) (-27, 8) (-2	5 p. n.,  -10.3 -10.4 -10.4 -10.6 -20.2 -24.1 -27.6 -20.5 -12.8 -10.5 -12.8 -10.5 -11.6 -7.1 -2.1	6 p. m.  9, 7  -20, 5  -21, 9  -23, 9  -23, 8  -27, 6  -28, 8	7 p m.  -11 2 -19, 4 -24, 9 -24, 9 -27, 2 -29, 6 -22, 9 -15, 2 -9, 4 -21, 3 -16, 4 5 -6, 6 -2, 3	8 p. m. -13, 0 -21, 0 -21, 0 -25, 4 -27, 1 -30, 2 -27, 1 -30, 2 -28, 4 -23, 0 -9, 8 -10, 9 -21, 5 -14, 5 -2, 1 -2, 1 -2, 1 -3, 2 -3, 2 -3, 2 -3, 2 -3, 3 -3, 4 -3, 1 -3, 2 -3, 2 -3, 3 -3, 4 -3, 1 -3, 2 -3, 2 -	9 p. m.  -12. 6 -21. 2 -20. 9 -24. 9 -24. 9 -27. 5 -27. 9 -28. 1 -22. 2 -6. 0 -9. 8 -21. 3 -13. 8 -2. 9 -6. 0 -1. 1	10 p. m.  -13, 6 -21, 2 -21, 2 -21, 7 -25, 1 -26, 7 -27, 8 -29, 4 -7, 2 -10, 8 -20, 1 -21, 2 -21, 2	H p. m.  -16.1 -19.4 -22.1 -26.7 -21.3 -25.4 -27.8 -22.1 -4.6 -0.0 -11.6 -19.8 -21.4 -13.6 -5.8 -5.8	12 p. m.  -16 1 -19.1 -19.7 -16 2 -26.4 -25.5 2 -25.8 -21.6 -4.2 -3.2 -12.1 -20.1 -21.2 -12.2 -13.2 -15.5 -5.5 -5.5 -6.5 -6.5	Daily Means.	Max.  -15.6 -16.6 -16.2 -19.0 -23.6 -24.4 -24.2 -25.2 -25.6 -4.2 -12.6 -17.7 -13.6 -5.6 -5.6	Min	10to 10to 10to 10to 10to 10to 10to 10to
Date.  1882. Jan. 1. Jan. 2. Jan. 3. Jan. 4. Jan. 6. Jan. 6. Jan. 6. Jan. 7. Jan. 8. Jan. 10.  Jan. 11. Jan. 12. Jan. 13. Jan. 14. Jan. 15. Jan. 10.  Jan. 14. Jan. 15. Jan. 15. Jan. 16. Jan. 17. Jan. 18. Jan. 19. Jan. 20. Jan. 21. Jan. 22. Jan. 23. Jan. 24. Jan. 23. Jan. 24. Jan. 23. Jan. 26. Jan. 27. Jan. 26. Jan. 27. Jan. 27. Jan. 28. Jan. 27. Jan. 28. Jan. 27. Jan. 28.	### 11.0 0	4 p. m. 9 ( -20, 5 m. 17, 7 m. 18, 17 m. 18, 17 m. 18, 18 m. 18, 1	5 p. n  -10.3 -19.4 -19.4 -20.6 -24.2 -24.2 -25.5 -12.5 -12.5 -14.5 -14.5 -15.5 -	6 p. m.  9, 7  -20, 10  -21, 9  -23, 8  -27, 8  -27, 8  -41, 9  -41, 9  -7, 3  -21, 9  -7, 4  -8, 9  -7, 8  -8, 9	7 p m.  11 2	8 p. m.  -13, 0 -21, 0 -21, 0 -21, 0 -25, 4 -24, 0 -27, 1 -30, 2 -27, 1 -30, 2 -10, 9 -10, 9 -14, 5 -2, 8 -1, 7 -16, 4 -5, 6 -7, -17 -12, 4 -18, 8 -21, 7 -18, 8 -21, 7	$\begin{array}{c} 9 \text{ p. m.} \\ -12.6 \\ -20.9 \\ -20.9 \\ -24.9 \\ -27.5 \\ -27.5 \\ -27.29 \\ -29.2 \\ -29.2 \\ -29.3 \\ -20.3 \\ -20.3 \\ -20.3 \\ -20.3 \\ -20.5 \\ $	10 p. m.  -13, 6 -21, 5 -21, 5 -21, 5 -21, 7 -25, 1 -27, 7 -27, 7 -27, 7 -27, 4 -4, 6 -7, 2 -10, 8 -20, 1 -12, 6 -4, 3 -5, 6 -0, 6 -1, 1 -17, 6 -4, 6 -4, 3 -6, 6 -7, 6 -7, 6 -7, 6 -7, 6 -7, 6 -7, 6 -7, 7	H p. m.  -16, 1 -10, 1 -10, 1 -20, 1 -21, 3 -21, 3 -25, 4 -27, 1 -27, 2 -27, 1 -27, 2 -27, 1 -27, 2 -27, 1 -27, 2	12 p. m.  -16 1 -19, 7 -6 2 -26, 4 -25, 5 -27, 6 -4, 2 -26, 1 -20	Daily Means.  - 6 01 -112 40 -118 41 -21 63 -27 03 -27 03 -27 64 -28 65 -26 12 -16 29 -10 19 -17 37 -21 65 -21 18 28 -7 70 -7	Max.  -5.6 6 -15.6 -10.2	Min	9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Date.  1882. Jan. 1. Jan. 2. Jan. 3. Jan. 4. Jan. 6. Jan. 6. Jan. 6. Jan. 8. Jan 10. Jan. 11. Jan. 12. Jan. 12. Jan. 13. Jan. 14. Jan. 15. Jan. 16. Jan. 17. Jan. 18. Jan. 19. Jan. 20. Jan. 22. Jan. 23. Jan. 24. Jan. 25. Jan. 26. Jan. 27. Jan. 28. Jan. 28. Jan. 28. Jan. 29. Jan. 28. Jan. 28. Jan. 28. Jan. 29. Jan. 28. Jan. 29. Jan. 28. Jan. 29. Jan. 28. Jan. 29. Jan. 30. Jan. 31.	\$ p. m.  -11. 0 -20.7 -17. 1 -23. 6 -25. 6 -27. 6 -27. 6 -27. 6 -27. 6 -11. 7 -21. 7 -	4 p. m. 4 p. m. 4 p. m. 4 p. m. 4 p. m. 4 p. m. 4 p. m. 5 p. 4 p. 4 p. 4 p. 4 p. 4 p. 4 p. 4 p	5 p. n  -10.3 -19.4 -19.4 -19.6 -24.9 -24.9 -25.1 -26.5 -18.9 -	6 p. m.  9, 7  -20, 5  -21 0  -23 8  -1, 8  -26, 8  -17, 8  -26, 8  -16, 9  -10, 1  -21, 1  -4, 0  -21, 1  -4, 0  -21, 1  -4, 0  -21, 1  -4, 0  -1, 1  -4, 0  -1, 1  -4, 0  -1, 1  -4, 0  -1, 1  -4, 0  -1, 1  -4, 0  -1, 1  -4, 0  -1, 1  -1, 2  -1, 1  -1, 3  -1, 4	7 p.m.  11 2 -21.4 -21.4 -24.9 -24.6 -27.2 -28.6 -22.9 -28.6 -27.9 -28.6 -20.0 -28.7 -30.8 -21.3 -40.8 -40.8 -21.3 -40.8 -40.3 -40.8 -40.3	8 p. m.  -13, 0 -21, 0 -21, 0 -21, 0 -25, 4 -24, 0 -27, 1 -30, 2 -27, 1 -30, 2 -10, 9 -10, 9 -14, 5 -2, 8 -1, 7 -16, 4 -5, 6 -7, -17 -12, 4 -18, 8 -21, 7 -18, 8 -21, 7	9 p. m.  -12. 6 -21. 2 -20. 9 -24. 9 -24. 9 -27. 5 -27. 9 -28. 1 -27. 9 -28. 1 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -21. 3 -31. 6 -31. 6 -31. 6 -31. 6 -31. 6 -31. 6 -31. 7 -31. 7 -31. 2	10 p. m.  -13, 6 -21, 2 -21, 5 -21, 5 -24, 7 -25, 1 -27, 8 -22, 4 -4, 6	H p. m.  -16, 1 -19, 4 -22, 1 -26, 7 -21, 3 -27, 4 -27, 8	12 p. m.  -16 1 -10, 1 -16, 2 -26, 1 -25, 5 -27, 8 -2, 1 -20, 1 -21, 2 -12, 2 -13, 2 -14, 2 -25, 5 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -4, 2 -27, 8 -27, 8 -27, 8 -27, 8 -27, 8 -27, 9	Daily Means.  - 6 64 - 119 40 - 118 51 - 22 63 - 27 63 - 27 63 - 27 65 - 26 12 - 27 65	Max.  15.6 6 16.2 6 16.2 6 19.0 0 19.4 4 19.1 6 15.2 6 15.2 1 15.2 1 15.2 1 15.3 1 15.	Min17.1   -25.1   -25.1   -25.3   -30.4   -30.9   -30.9   -30.4   -30.9   -30.4   -30.2   -40.6   -10.6   -	19th 10th 10th 10th 10th 10th 10th 10th 10

Highest reading of standars for maximum of day from January 3/4882, to July 1, 4882.

Continued.

l trum. - 5 hours

p. m. 2 p. h. 

Min.

10 1

23, 00

44.3

Table showing the temperature of the air at Uglaamic from October, 1881, to August, 1883-Continued Height of the thermometer above the surface of the earth. 4 feet. Washington mean time. Correction to reduce to mean local time. Should

[Height of	i the then	nometera	pove the	entlace of	the earti	i. 4 feet.	Washing minutes		time. C	mrection	to ream e	to mean a	ear time.	· hour 4
Pate	£a.m.	2 r. m.	3 л т.	¥a ni.	5 a. m.	6 a. m.	Talm	8.4.30	9 i. iu.	19 a m	Ha in	12 m.	1 p. sa	2 p re
Teb. 1 Feb. 2 Feb. 1 Feb. 1 Feb. 1	4.8 31.7 23.0 16.6	- 7.5, 4 - 5.2, 5 - 27, 6 17, 1	-74.8 - 33.6 -20.5 -17.4	201.9 - 31.7 - 25.1 -18.9	-34, 4 35, 5 -29, 5 -19, 4	-34.3 -36.4 -22.6 -19.4	24 2 26 1 - 22 1 - 20. 1	$-32^{-5}$ $-36^{-1}$ $-22^{-1}$ $21^{-6}$	- 31, 9 - 416, 1 -21, 1 -21, 2	17 3 16 5 22 4 21 9	$\begin{array}{c} -1.1 & 0 \\ -36 & 3 \\ -22.1 \\ -22.1 \end{array}$	37.1 21.5 21.9 - 27.9	-31 7 -21.7 -22.5	5 12 5 5 32 9 21.9 24.7
Pelo a Pala de la Lab de la Pala de la Posta de la	29.9 - 7.6 - 7.9 - 19.0 - 6.1	-33.7 - 3.4 - 8.6 -12.4 6.4	12 a b 6	$\begin{array}{c} -74 & 1 \\ 2.3 \\ 0.1 \\ -12.0 \\ 7.6 \end{array}$	- 23 6 - 2, 5 - 9, 7 - 11 5 - 9, 0	$ \begin{array}{r} -33.1 \\ -2.3 \\ -9.9 \\ -11.0 \\ -9.5 \end{array} $	- 2.1 - 11 1 - 10 1 - 10 1	- 0 7 - 4 1 10, 0 10, 1 1 5, 0	- 4 7 - 11, 0 - 11 0	.9 9 11. 7 -10 5 11. 5	-29 0 -3, 4 -11, 6 -11, 0 -12, 3	28 0 - 1 2 - 12 1 - 10 0 - 12	$\begin{array}{c} -27 & 6 \\ + 3, 2 \\ -12, 3 \\ + 10, 1 \\ -11, 1 \end{array}$	26.4 2.6 -11.9 -10.2 -14.9
Post Holling Post Holling Post Holling Level Holling	- 905 90.0 - 20.5 - 30.5 - 21.5	- 10 6 - 21 3 - 17 5 - 17 7 - 13 9	9 4 - 22, 1 - 29 3 - 19 0 - 23 5	=10, 6 23, 1 29, 2 28, 2 28, 2	-10 4 -24.3 - 70 2 -20 2 -21 a	10.0 - 21.7 - 28.8 - 24.0	10 0 -2 · 0 12 7 17 · 6 24 0		= 10 0 -06 2 = 31 2 -19 3 -14 0	-16 4 21 3 32 1 -37 3 21 5	10. 6 27. 6 32. 1 20. 9 13. 5	10.1 27.2 33.5 28.5 33.8	9 0 - 26 5 - 32 6 - 29 9 -22 1	= 9.5 = 26.7 41.6 = 29.5 = 21.5
10000	- 21. 0 - 12. 6 - 14. 1 - 20. 5	$\begin{array}{c} 21.1 \\ 12.3 \\ \rightarrow 6.2 \\ -11.0 \\ 8.8 \end{array}$	= 21 0 12 4 = 5,3 =11 3	- 20 6 - 11 9 - 5 9 - 15 6 - 8 9	~19, 6 ~13, 0 ~ 6 3 ~13 2 8 9	$-18^{-9}$ $-12^{-0}$ $-6^{-3}$ $-12^{-1}$ $10^{-6}$	-18.6 12 - - 6.3 -12.4 -10.4	- 15 1 17 1 6 1 - 17, 1 11 0	17.5 19.5 7.3 12.1 10.0	10.5 12.1 - 7.7 12.1 12.1	-11.9 -11.0 -5.0 -1.1 -0.1	-10 7 -10 7 -11 1 -11 1	-14.1 9.8 8.8 12.3 12.1	- 11.1 - 9.7 - 9.5 12.3 - 11.1
1 2 .	34 6 37 6 37 6 37 6 47 6	- 26 6 - 35 5 - 17 0 - 11 6	- 11 1 - 11 1 - 12 4	- 27 4 - 27 4 - 17 5 - 17 7	$\begin{array}{c} 11.4 \\ -5.4 \\ -6.7 \\ -6.7 \\ -41.5 \end{array}$	- 13, 0 - 19, 2 - 27, 3 -17, 4 -13, 6	-10.1 -14.1 -15.5 -38.4 -11.6	-11 1 -30 7 -38 7 -13.7	-1 - 1 - 31 - 9 - 758 - 8 - 189 - 1 - 43 - 9	- 1% - 1 1 - 4 4 - 4 1 1	11 1 34.1 10 6 40.6 	- 14 7 - 13 4 - 10 - - 10 - 1 - 0	=14.9 - 31.1 - 40.9 - 10.2 12.3	15 0 33, 8 40, 7 10, 2 12, 3
1001000 10523 1000000	- 29, 0 - 29, 0	47, 5 2, 65, 5 209, 5 209, 5	15 8 - 32, 9 - 8 9 -29, 6	=49.4 - 31.5 -23.0 =50.	16, 5 +34, 6 + 27, 1 +29, 7	-17 3 -50 1 -24 9 28 3	45 1 -35 1 -23 5 -23 5 -25 9	-45 5 +36, 5 +20 7 +23, 8	-48 6 -32 0 -21 2 -22.1	~ 19.1 57 5 - 24 1 -13.5	19.4 - 6.7 - 6.5 - 18.5	18 9 -37, 1 20, 0 +16 4	- 48, 9 - 37, 3 - 31, 5 - 14, 0	- 47. 1 - 37. 5 - 32. 6 - 13. 3
Mo 1.5	21, 03	- 12.94 	-22.98	- 23, 10	23, 40	-2105	2435	21, 29	- 2., 39	25.6	23,84	24.71	11 1	- 23, 19
1'	3 p. m.	1 р. та.	å p.m	6 p m	7 p m.	Sp. m	9 p. m.	10 p.m.	11 р. ш.	42 p. m	Darly memor	Max.	Min	But
180 Por 1 1 0 3 0 1 5 3 0 1 c 4 0	12.8 12.1 21.9 21.9	-33 4 32.8 21.4 -25 1	33, 4 32, 6 21, 2 25, 9	-31.6 -32.1 -21.0 -26.1	34 8 32.1 20.6 -27.2	35, 4 32, 0 20, 7 28, 1	25, 3 32, 1 20, 7 23, 2	- 35, 0 31, 9 29, 3 29, 7	(2.8 30, 3 18, 5 27	- 102 4 - 100 5 - 17 9 - 29 5	31 55 - 33 59 22 54 23 36	-31.9 - 30.3 - 17.9 - 16.6	39, 1 49, 6 33, 6 33, 7	7. 2 10. 3 15. 7 17. 1
Feb. 5 Let 6 Feb. 7 Let 8 Let 8 Let 9	$^{\circ}$ $^{\circ}$	-21.7 $-3.6$ $-12.1$ $-9.0$ $-15.3$	$\begin{array}{c} +17.5 \\ -4.2 \\ -11.5 \\ -9.1 \\ -15.8 \end{array}$	$ \begin{array}{r}   & 16 & 1 \\   & 5 & 1 \\   & -11 & 3 \\   & -7 & 9 \\   & -16 & 1 \end{array} $	$ \begin{array}{r} -15.2 \\ -6.1 \\ -12.7 \\ -6.7 \\ -15.5 \end{array} $	-14, 0 6, 8 12, 7 6, 0 15, 1	$\begin{array}{c} \cdot 12.1 \\ - 6.9 \\ -13.1 \\ - 6.0 \\ -14.8 \end{array}$	$ \begin{array}{r} -9.6 \\ -6.9 \\ -13.0 \\ -6.1 \\ -11.0 \end{array} $	7. 1 6. 1 12. 7 5. 1 12. 2	7.1 -6.2 -12.3 -10.8 -11.2	- 21 01 - 1 28 11, 25 - 9 65 - 12, 08	2.3	40 1 9 8 15 9 - 16 1 - 18,6	13.0 7.5 8.0 10.7 12.2
F D : 1.5 H : 1.5 E : 1.5 B : 1.5 H :	12 1 26 9 20 1 20 8 21 1	-13 2 -27, 2 -27, 2 10, 2 -21 4	- 11.7 27.8 28.0 -25.5 -21.2	$\begin{array}{c} 16.4 \\ -28.0 \\ \pm 32.0 \\ -28.0 \\ -28.0 \\ -21.1 \end{array}$	19. 4 27. 8 31. 7 27. 7 20. 6	- 10 4 27, 9 31 6 27, 1 20 3	- 19/3 -28, 4 -31/6 -26, 1 -20, 6		-13 3 -28 6 -31 5 -20 5 -20 5	20.5 20.8 20.5 20.5 20.7	-13 16 - 26 29 -31 22 - 28 55 - 27 13	1 mm 117 N	- 25, 1 - 34, 1 - 39, 1 - 36, 1 - 28, 6	16. 1 12. 9 11. 3 10. 6 8 3
P. + 15 Leb 1+ . Pr 5 15 . Pr 5 15	-14 1 	17.6 - 7.2 - 13.1 -11.4 11.1	-13, 4 - 6, 9 - 12, 3 -11, 2 -11, 6	- 7 t - 7 t - 12 t - 10 8 - 11 3	-13, 6 - 7, 2 -12, 4 -10, 6 -13, 0	-13 I -7. I -12. 3 -10. 3 -11. 0	$\begin{array}{c} -13.3 \\ -7.3 \\ -12.5 \\ -9.9 \\ -13.2 \end{array}$	-13 5 7 1 -13.2 - 9 5 - 12.6	$-1 \cdot 6$ $-8.0$ $-13.6$ $-8.0$ $-11.0$	42 8 5 6 14 = 9 5 -14 3	16, 00 10, 03 9, 57 	12 8 6 9 5 3 1 8 9 8 8	25.3 16.4 18.1 18.4 19.7	12 5 - 9.5 - 12.8 - 10.4 - 10.9
Labra Labra Labra Labra Labra	19, 1 34, 8 49, 9 49, 0 42, 6	-1.1 9 - 34 0 - 40 7 - 59 2 -12.5	23 4 -33 5 -39.0 -37.7 - 11.4	-23, 4 -31, 4 -39, 5 -36, 4 -40, 9	23, 4 33, 4 39, 6 37, 3 30, 6	-33 3 -33 3 -35 3 -40, 2	=74 0 =53 0 =39 4 =58 1 +41 1	-24. 5 33. 6 39. 2 10. 3 42. 1	- 14 3 - 14 1 - 18 6 - 19, 7 - 11 2	25 1 54 3 37 9 -40 8 -41.8	-(7, 6) - 31, 81 -35, 63	12.9	- 30, 3 40, 4 46, 1 45, 6 49, 1	17 1 13 8 11 5 8 7 5 9
Ps. 3 Policitis 11 Ps. 3-24 Ps. 5-28 (1)	13.5 - 37.5 - 32.6 - 11.5	10, 9 36, 3 32, 6 10, 6	- 10 6 -35.7 -37 6 -10.4	-35 3 -35 3 -22.6 - 8.8	-37, 8 -31, 1 -32, 6 - 8, 1	37 0 -32 5 -31 9 -6 9	- 36 0 - 52.5 - 4.7 - 6.4	- 34 8 - 39.6 - 31.7 5.9	$\begin{array}{c} 13.4 \\ -4.9 \\ -39.6 \\ 0.9 \end{array}$	31.6 - 31.9 - 31.1 - 5.8	1 - 36 34 90 - 29 10 - 17, 16	33.1 -31.9 -20.7	$^{52.5}_{-12.6}^{-12.6}_{-37.3}^{-35.1}$	19 4 10.7 16 6 29,3
Michigan		23 41	21 13		-22.91	22, 71	22.73	22 63	- 22,15	22 41	23, 16	18.39	- il. 19	- 13 33

Table showing the temperature of the air at Uglaumie from October, 1881, to August, 1883—Continued. Height of the thermometerabove the surface of the airth, 4 feet. Washington mean time. Correction to reduce to mean local time, -- 5 hours 17 minutes.]

						11	minutes.	.1						
Date.	t a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 n. m.	8 a. m.	9 a. m.	10 a.m.	11 a.m.	12 m.	i p. m.	2 p. m.
188% Mar 1	5.3	- 5.9	- 5.7	4.8	4, 9	- 5.1	- 5,1	- 5.1	- 5. 2	4.4	- 4.1	- 5.4	C. 0	
Mar. 2 Mar. 3 Mar. 4 Mar. 5 Mar. 6	- 0.7 - 3.4 - 3.3 0.4 - 1.4	- 0.8 - 4.2 - 2.9 - 0.7 - 1.5	- 0.9 - 4.8 - 2.6 - 2.2 - 2.3	- 0, 8 - 5, 5 - 2, 5 - 2, 4 - 3, 1	- 1.0 - 6.9 - 3.2 - 2.8 - 4.4	- 1. 0 - 6. 9 - 3. 0 - 3. 2 - 4. 9	- 0.0 - 6.4 - 2.5 - 2.7 - 5.1	- 0, 9 - 1, 2 - 2, 3 - 2, 7 - 5, 1	- 1.4 - 7.7 - 1.4 - 3.4 - 5.1	- 1.4 - 8.0 - 1.4 - 4.2 - 5.1	- 1.0 - 7.0 - 1.4 - 5.3 - 4.4	$\begin{array}{c} = 0.7 \\ = 7.1 \\ = 1.2 \\ = 5.1 \\ = 1.4 \end{array}$	- 0.7 - 6.9 - 0.7 - 5.1 - 4.5	- 0.5 - 6.7 - 0.3 - 5.4 - 1.8
Mar. 7 Mar. 8 Mar. 9 Mar. 10 Mai. 11	2. 6 19. 7 12. 9	2.4 3.7 19.4 13.9 5.0	- 2.9 4.4 18.0 13.7 4.0	- 3. 4 4. 7 14. 9 13. 3 1. 7	$ \begin{array}{r} -4.5 \\ 3.8 \\ 13.2 \\ 12.2 \\ -6.1 \end{array} $	- 5.3 4.7 14.7 11.8 - 1.8	- 5, 8 6, 0 10, 3 11, 0 - 3, 2	- 6, 3 8, 0 9, 6 10, 8 - 4, 0	- 6, 9 8, 7 10, 8 11, 3 - 5, 5	$ \begin{array}{c c}  & 7.1 \\  & 9.3 \\  & 13.7 \\  & 11.8 \\  & 6.7 \end{array} $	- 6.9 10.0 12.0 12.0 - 7.9	7.1 11.1 33.4 12.5 9.5	- 7. 1 14. 5 16. 4 12. 4 -10. 6	-7.7 17.1 16.9 12.7 10.6
Mar. 12 Mar. 13 Mar. 14 Mar. 15 Mar. 16	- 2. 3 - 2. 9 - 5. 7	-11.9 - 3.1 3.8 - 8.1 -16.9	-14.1 $-4.2$ $6.2$ $-11.4$ $-17.9$	-15. 2 - 4. 8 - 6. 7 -11. 2 -19. 4	$ \begin{vmatrix} -14.7 \\ -7.5 \\ 6.7 \\ -14.5 \\ -19.4 \end{vmatrix} $	-13.5 -10.8 6.0 -15.7 -19.8	-11. 9 -11. 5 5, 8 -15. 4 -19. 8	-11.2 $-12.3$ $-16.6$ $-19.8$	- 8. 6 -12. 3 4. 7 -16. 8 -19. 4	-7.1 -12.4 -4.2 -16.8 -18.6	- 5. 1 -12. 8 4. 0 -17. 3 -17. 7	-2.7 $-13.6$ $3.3$ $-17.8$ $-18.0$	-0.5 -14.1 -19.7 -17.7	-15.3 $-15.3$ $-2.6$ $-10.3$ $-16.9$
Mar. 17 Mar. 18 Mar. 19 Mar. 20 Mar. 21	- 3. 0 - 2. 0 12. 0	- 8.9 - 4.0 - 3.2 - 11.2 - 13.7	$ \begin{array}{r} -9.2 \\ -4.3 \\ -1.6 \\ -8.9 \\ -15.0 \end{array} $	$ \begin{array}{c} -10.3 \\ -5.0 \\ -0.2 \\ -4.4 \\ -23.8 \end{array} $	-11.2 $-6.0$ $0.4$ $2.8$ $-17.0$	$ \begin{array}{c c} -12.1 \\ -6.0 \\ 1.4 \\ 0.1 \\ -17.9 \end{array} $	$ \begin{array}{r} -12.0 \\ -6.0 \\ 2.0 \\ -2.3 \\ -19.4 \end{array} $	$ \begin{array}{r} -12,0 \\ -6.0 \\ 3.7 \\ -4.4 \\ -10.7 \end{array} $	$ \begin{array}{c c} -12.3 \\ -6.0 \\ 3.7 \\ -6.3 \\ -17.8 \end{array} $	-12.6 - 5.5 - 2.3 - 8.0 -18.4	$\begin{array}{r} -13.0 \\ -5.1 \\ 2.3 \\ -9.5 \\ -19.4 \end{array}$	$\begin{array}{c} -13.4 \\ -4.0 \\ -2.2 \\ -11.4 \\ -20.1 \end{array}$	$\begin{array}{c} -12.1 \\ -3.2 \\ 0.2 \\ -10.7 \\ -20.6 \end{array}$	-11.5 -2.4 -1.4 -9.9 -20
Mar. 22 Mar. 23 Mar. 24 Mar. 25 Mar. 26	0.3	-18.4 $-7.0$ $-0.7$ $-1.9$ $-13.5$	$\begin{array}{c} -18.2 \\ -9.5 \\ 0.5 \\ 4.0 \\ -13.3 \end{array}$	-16.4 $-9.5$ $0.7$ $3.5$ $-13.7$	-17, 0 8, 8 0, 2 3, 2 14, 2	-16.1 $-5.1$ $-0.3$ $3.2$ $-14.2$	$\begin{array}{c} -15.6 \\ -2.3 \\ -0.5 \\ -3.2 \\ -14.0 \end{array}$	$ \begin{array}{r} -13.8 \\ -1.8 \\ -0.7 \\ 3.4 \\ -12.3 \end{array} $	$ \begin{array}{r} -9.9 \\ +1.4 \\ -9.9 \\ -3.2 \\ -11.4 \end{array} $		$\begin{bmatrix} -1.8 \\ -1.7 \\ -0.7 \\ 2.3 \\ -12.1 \end{bmatrix}$	- 0, 3 - 2, 0 - 0, 7 0, 2 -14, 9	- 1. 4 - 0. 8 - 0. 9 - 15. 0 - 14. 5	0.6 0.4 - 0.7 - 16.6 - 13.
Mar. 27 Mar. 28 Mar. 29 Mar. 30 Mar. 31	-22.9 - 4.9 - 3.3	-13.5 $-23.4$ $-4.8$ $-5.1$ $-14.1$	-13.1 $-23.9$ $-2.4$ $-6.8$ $-14.9$	-12.3 -24.6 -3.9 -7.4 -15.7	-14.5 $-27.1$ $-5.3$ $-7.9$ $-15.0$	$ \begin{array}{r} -15.6 \\ -27.3 \\ -5.3 \\ -7.9 \\ -16.8 \end{array} $	$ \begin{array}{r} -16.6 \\ -27.3 \\ -5.5 \\ -7.7 \\ -16.8 \end{array} $	$ \begin{array}{r} -18.4 \\ -26.5 \\ -6.3 \\ -7.2 \\ -16.9 \end{array} $	$ \begin{array}{c c} -19.7 \\ -25.9 \\ -6.9 \\ -6.0 \\ -17.5 \end{array} $	-20, 0 -24, 4 - 6, 9 - 6, 4 -16, 1	$ \begin{array}{r} -21.2 \\ -23.3 \\ -6.9 \\ -6.4 \\ -14.1 \end{array} $	-21.7 $-21.5$ $-4.5$ $-6.0$ $-11.1$	$ \begin{array}{r} -22.1 \\ -19.5 \\ -6.9 \\ -6.5 \\ -10.5 \end{array} $	
									-		-			
Means .	- 3.63	4.19	- 4.57	5, 35	6, 01	, — ft, 25	- 6.37	- 6.40	- 6. 26	- 6.04	5, 93	- 5, 85	- 6.10	- 5 - 5
Means . Date.	- 3.63 3 p. m.	- 4. 19 4 p. m.	— 4, 57 5 р. ш.	5, 35 <b>6</b> p. m.	6, 01		9 p. m.				Daily means.	— 5, 85 Max.	— 6. 10 Min.	15 m.
Date											Daily			
Date.  1882. Mar. 1.  Mar. 2  Mat. 3  Mat. 3  Mat. 4  Mat. 5	3 p. m 6 7 0 5	4 p. m.	5 p. m.	6 p. m.	7 p. m.	<b>5</b> p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Diff.
1882. Mar. 1. Mar. 2. Mar. 3. Mar. 4. Mar. 5. Mar. 6. Mar. 6. Mar. 8. Mar. 9.	3 p. m. 6 7 6 8 6 8 0.2 6.6	4 p. m. - 8.0 - 5.5 - 6.6 - 5.3	5 p. m. = 8 4 = 5.4 = 5.4 1.9 = 5.1	6 p. m.  - > 1 - 0.1 - 5.0 1 7 - 5.1	7 p. m.  7 4  - 0, 1  - 4, 6  1, 7  - 5, 5	Sp. in.  - 6 4 - 0.0 - 4.8 - 1.6	9 p.m. 4.6 4.9 4.9 4.9 4.9	10 p.m. - 3.4 - 0.5 - 5.1 - 1.5 - 3.7	11 p. m 1. 8 - 2. 1 - 4. 6 - 2. 2 - 2. 0	12 p.m. - 1.7 - 4.0 - 4.5 0.4	Daily means.  - 5, 42  - 6, 84  - 5, 85  - 0, 76  - 3, 78	Max.  = 1.7  - 0.2  - 3.4  - 2.2  - 1.0  0.8  22.0  22.8	Min11.5 - 6.1 -12.1 - 6.1 - 6.1 - 9.1	Diat.
Date.  1882. Mar. 1. Mar. 2 Mar. 3. Mar. 4 Mar. 4 Mar. 5 Mar. 5 Mar. 7 Mar. 8 Mar. 7 Mar. 10 Mar. 10 Mar. 10 Mar. 11 Mar. 12	3 p. m. - 6 7 - 6 8 - 0 2 - 6 6 - 5 7 - 20 2 20 2 20 3 12.7 - 10 8 - 4.6 - 24.0 - 2.8 2 - 2.8 2 - 3.8 2 - 4.6 2 - 5 1 - 5 2 - 6 8 - 7 1 - 10 8 - 7 1 - 8 1 - 9 1	4 p. m,  - \$.0  - \$.5  - \$.5  - \$.5  - \$.4  - \$.4  - \$.4  - \$.3  - \$.4  - \$.3  - \$.4  - \$.3  - \$.4  - \$.5	5 p.m. - 8 4 - 5 4 - 5 4 - 3 2 - 2 - 2 - 2 - 2 - 2 - 2 - 3 5 - 2 - 2 - 3 5 - 2 - 3 5 - 3 5	6 p. m.  - \$ 1 - 5.0 1 7 - 5.1 - 5.1 - 5.1 - 5.1 - 5.7	7 p. m.  7 4  0.4  -4.6 -5.7 -5.5 -1.4 -17.2 -18.6 -13.3	S p. m. = 6/4 = 0.0 = 4.8 = 1.6 = 2.4 = 0.9 = 16.8 = 14.7 = 12.5	9 p. m. 4. 6 4. 9 1. 6 4. 2 1. 4 0. 7 20. 7 11. 0	10 p. m. - 3, 4 - 0, 5 - 5, 1 - 1, 5 - 3, 7 - 1, 0 - 0, 8 - 22, 0 - 14, 1 - 10, 5	11 p. m.  - 1, 8  - 2, 1  - 4, 6  - 2, 2  - 2, 0  - 0, 4  - 21, 7  - 14, 3  - 9, 6	12 p. m. - 1. 7 - 4. 0 - 4. 5 - 0. 4 - 2. 7 - 0. 8 - 19. 6 - 14. 0 - 8. 1	Daily means.  - 5, 42  - 0, 85  - 0, 76  - 3, 78  - 3, 77  12, 77  15, 80  12, 13	Max.  - 1. 7,  - 0. 2  - 3. 4  2 2, 4  - 1. 0  0. 8  22. 0  22. 8  13. 9  6. 4  12. 9	Min.  -11. 5  - 6. 1  -12. 1  - 6. 1  - 9. 1  - 9. 5  - 11. 5  - 0. 1  - 6. 5	Diff.  6, 1  8, 7  9, 9  12, 1  13, 1  14, 1  7, 4
Date.  1882. May 1. May 2. May 2. May 3. Mat 4. May 4. May 6. May 6. May 6. May 10. Ma	3 p. m. 6 7 6 8 0 5 6 8 0 2 6 8 5 1 20 2 20 3 12 7 10 8 14 0 2 9 14 7 10 5	4 p. m. - \$.0 - \$.5 - \$.5 - \$.4 - \$.3 - \$.4 - \$.3 - \$.4 - \$.3 - \$.4 - \$.5 - \$.3 - \$.4 - \$.5 - \$.5	5 p.m.  - 8 4 - 5.1 - 3.2 - 22.8 - 16.5 - 7.2 - 9.7 - 18.1	6 p.m. - 5 1 - 5.0 1.7 - 5.1 - 5.1 - 5.1 - 1.4 15.7 - 11.4 - 7.2 - 5.1 - 7.2 - 7.2 - 7.1	7 p.m.  7 4  -4.6 -1.7 -5.5 -1.4 -17.2 -18.6 -18.3 -11.4 -17.5 -1.4 -1.7	\$ p. m. = 6/4 = 0.0 = 4.8 = 5.5 = 2.1 = 0.9 16.8 14.7 12.5 = 11.3 = 2.7 4.4 = 15.6	9 p. m.  - 4. 6  - 4. 9  - 4. 9  - 4. 9  - 4. 2  - 4. 2  - 7  - 11. 0  - 11. 2  - 1. 0  - 3. 8  - 15. 6	10 p. m. - 3.4 - 0.5 - 5.1 - 1.5 - 3.7 - 1.0 - 0.8 22.0 - 10.5 - 10.	H p.m.  - 1.8  - 2.1  - 3.6  - 2.0  - 2.0  - 0.4  21.7  11.7  12.7  10.9  - 0.2  - 0.4  - 0.4  - 0.5	12 p. m. - 1, 7 - 4, 0 - 4, 5 - 0, 4 - 2, 8 19, 6 14, 0 8, 1 - 1, 5 - 1, 5 - 1, 6 16, 5	Daily means.  - 5, 42 - 0,81 - 5,85 - 0,76 - 3,78 - 0,15,80 - 12,13 - 6,45 - 1,61 - 3,91 - 15,68	Max.  - 1. 7  - 2. 3. 4  - 2. 2  - 3. 4  - 1. 0  - 22. 8  - 1. 0  - 22. 8  - 1. 0  - 22. 8  - 3. 7  - 5. 7  - 5. 7  - 3. 2  - 0. 2  - 13. 5	Min.  -11, 5  - 6, 1  -12, 1  - 6, 1  - 9, 4  - 9, 4  - 6, 5  -13, 5  - 15, 1  - 20, 7  - 4, 4  - 20, 7  - 4, 4	Dim.  6.5 6.7 7.7 12.1 12.1 13.4 21.5 1.0 1.0 1.1 14.1 18.1
Date.  1882, May. 1.  May. 2.  May. 1.  May. 2.  May. 4.  May. 5.  May. 6.  May. 6.  May. 6.  May. 1.  May. 2.	3 p. m	4 p. m. - 8. 0 - 0. 1 - 5. 5 - 0. 6 - 5. 3 - 4. 4 - 21. 3 - 20. 0 - 11. 9 - 3. 2 - 11. 9 - 3. 2 - 15. 6 - 10. 15 - 2. 7 - 2. 7 - 2. 7	$\begin{array}{c} 5 \text{ p.m.} \\ + 8 \text{ 4} \\ + 5.4 \\ + 5.4 \\ + 5.4 \\ + 3.2 \\ + 22.5 \\ + 22.5 \\ + 10.5 \\ - 41.2 \\ + 9.7 \\ + 5.6 \\ + 12.6 \\ + 27.2 \\ + 27.2 \\ - 27.2 \\ \end{array}$	6 p.m.  - 8 1 - 0.1 - 5.0 - 1.7 - 5.1 - 2.0 - 1.4 - 18.1 - 22.0 - 1.4 - 7.2 - 5.1 - 7.0 - 12.1 - 7.2 - 1.4 - 7.2 - 1.4 - 7.2 - 6.0 - 1.4 - 6.0	7 p.m.  7 4  -0.1  -4.6  1.7  -5.5  -2.3  15.2  18.6  -11.4  -17.5  -10.6  -7.4  -6.5	\$ p. m. = 6.4 = 0.0 = 4.8 = 1.6 = 5.5 = 2.1 = 0.9 = 16.8 14.7 = 11.3 = 2.7 = 4.4 = 15.6 = 9.5 = 1.6 = 9.5 = 1.6 = 9.5 = 1.6 = 9.5 = 1.6 = 9.5 = 1.6 = 1.6	9 p. m.  - 4. 6  0. 0  - 4. 9  1. 6  - 4. 2  - 1. 1  20. 7  13. 7  -11. 2  - 1. 0  - 3. 8  - 9. 5  - 5. 0  11. 4  - 7. 7	10 p. m. = 3, 4 = 0, 5 = 5, 1, 5 = 3, 7 = 1, 0 = 22, 0 11, 15 = 11, 2 12, 3 = 0, 5 = 11, 2 12, 3 = 0, 5 = 12, 0 14, 15 = 15 = 0, 5 = 10, 0 14, 15 = 10, 0 = 10, 0	H p. m.  - 1. 8  - 2. 1  - 4. 6  - 2. 2  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 2. 0  - 3. 0  - 0. 2  - 4. 6  - 9. 8  - 9. 8  - 9. 8  - 9. 8  - 9. 8  - 9. 8  - 9. 8  - 12. 8	12 p. m. - 1. 7 - 4. 0 - 4. 5 - 0. 4 - 2. 8 - 2. 7 - 0. 8 - 11. 5 - 11. 5 - 7. 6 - 3. 2 - 2. 0 - 13. 5 - 13. 5	Daily means.  - 5, 42 - 0,84 - 5,85 - 0,76 - 0,76 - 3,78 - 3,77 15,80 - 1,277 15,80 - 6,45 - 1,61 - 3,93 - 1,5,43 - 9,4,54 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,45 - 3,47 - 4,74	Max.  - 1, 7, 6, 2, 4, - 1, 6, 4, 12, 9, 6, 4, 12, 9, 6, 7, - 7, 6, 6, 7, 12, 13, 5, 12, 5, 1	Min.  -11, 5  -6, 1  -12, 1  -6, 1  -9, 1  -8, 1  -8, 1  -8, 1  -8, 1  -9, 1  -9, 1  -9, 1  -10, 1  -20, 5  -11, 5  -11, 5  -11, 5  -11, 5  -12, 1  -13, 1  -14, 1  -25, 5  -14, 9  -12, 1  -15, 7  -16, 1	Dim.  6.3  8.7  9.5  40.4  7.5  40.4  7.4  7.4  7.4  10.4  10.5  10.7
Date.  1882. May 1. May 2. May 2. May 3. Mat 4. May 4. May 6. May 6. May 6. May 10. Ma	3 p. m. - 6 7 - 6 8 8 - 6 6 6 - 5 5 - 20 2 - 20 2 - 20 3 - 12 7 - 14 6 - 14 6 - 14 7 - 10 8 - 14 7 - 10 7 - 10 8 - 10	4 p. m. - 8. 0 0. 1 - 5. 5 0. 6 - 5. 3 - 4. 4 - 3. 4 20. 3 20. 3 13. 2 - 11. 9 3. 2 - 18. 3 - 15. 6 - 10. 1 - 0. 5 - 15. 6 - 16.	$\begin{array}{c} 5 \text{ p. m.} \\ -8 \text{ f.} \\ -5.1 \\ -5.1 \\ -5.1 \\ -5.1 \\ -2 \\ -2.0 \\ -2.0 \\ -2.2 \\$	6 p. m.  - \$1 - 5.0 - 5.0 - 1.7 - 5.1 - 7.0 - 1.4 - 20.0 - 1.4 - 7.2 - 5.1 - 17.7 - 11.4 - 7.2 - 5.1 - 17.9 - 1.4 - 7.9 - 1.4 - 6.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4 - 1.4 - 0.4	7 p.m.  7 4  -4.6 -5.7 -2.3 -1.4 -1.5 -1.5 -1.4 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5	S p. m.  - 6 4 - 4.8 - 1.6 - 5.5 - 2.1 - 0.9 - 14.3 - 11.3 - 2.7 - 4.4 - 15.5 - 6.9 - 1.3 - 6.9 - 1.3 - 6.9 - 1.4 - 1.4 - 1.4	9 p. m.  - 4. 6 - 4. 9 - 4. 9 - 4. 6 - 4. 2 - 1 4 - 0, 7 - 13, 7 - 13, 7 - 14, 0 - 14, 2 - 1, 0 - 3, 8 - 15, 6 - 9, 5 - 5, 3 - 0, 0 - 11, 4 - 7, 7 - 11, 4 - 7, 7 - 13, 4 - 14, 4 - 13, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 13, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 5 - 14, 6 - 14, 6 - 15, 7 - 15	10 p. m.  - 3. 4 - 0.5 - 5.1 - 1.5 - 3.7 - 1.0 - 0.8 - 22.0 11.5 - 11.2 - 2.8 - 11.5 - 11.2 - 11.4 - 13.4 - 13.4	H p. m.  - 1. 8  - 2. 1  - 4. 6  - 2. 0  - 2. 0  - 2. 0  - 2. 1  - 1. 8  - 2. 0  - 2. 0  - 2. 1  - 1. 5  - 1. 2  - 1. 5  - 1.	12 p. m.  - 1. 7  - 4.5  - 0.4  - 2.8  - 2.7  14.0  18.1  - 1. 7  - 2.3  - 1. 1  - 2.3  - 1. 1  - 3.2  - 2.3  - 3.2  - 3.2  - 3.2  - 3.4  - 3.4  - 3.5  - 3.4  - 3.5  - 3.	Daily means.   -5, 42   -0,84   -5, 85   -0,76   -0,76   -3,78   -0,18   -3,77   15,80   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,68   -1,5,41   -1,5,50   -1,5,	Max.  -1. 7.  0.2  -3. 4  -1. 6  0.2  0.4  -1. 0  0.5  22.8  12. 9  3. 6. 4  -1. 6  -1. 7  -1. 7  -1. 7  -1. 8  -1. 9  -1. 10	Min.  -11, 5 -6, 1 -12, 1 -6, 1 -8, 5 -14, 5 -15, 1 -20, 7 -15, 1 -20, 7 -16, 9 -13, 1 -21, 8	Dist
Date.  1882. Mar. 1. May. 2. Mar. 2. Mar. 3. Mar. 4. Mar. 4. Mar. 4. Mar. 5. Mar. 6. Mar. 6. Mar. 6. Mar. 10. Mar. 10. Mar. 10. Mar. 10. Mar. 10. Mar. 10. Mar. 11. Mar. 11. Mar. 11. Mar. 12. Mar. 14. Mar. 14. Mar. 16. Mar. 16. Mar. 17. Mar. 20. Mar. 21. Mar. 21. Mar. 21. Mar. 22. Mar. 23. Mar. 24. Mar. 25. Mar. 27. Mar. 25. Mar. 27. Mar. 28. Mar. 29. Mar. 20.	3 p. m.  - 6 7  - 6 8  - 6 8  - 5 6  - 5 5  - 20 2  - 20 3  - 12 7  - 14 6  - 14 6  - 14 7  - 16 5  - 3 7  - 18 8  - 14 7  - 18 8  - 14 7  - 18 8  - 14 7  - 18 8  - 14 8  - 14 8  - 14 8  - 14 9  - 3 0 7  - 18 8  - 14 9  - 15 9  - 16 8  - 11 8  -	4 p. m.  - \$. 0  - \$. 0  - \$. 5. 5  - 0. 1  - 5. 5 5  - 0. 6 2  - 1. 0  - 1. 2  - 11. 0  - 18. 2  - 11. 0  - 18. 2  - 17. 7  - 10. 6  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 10. 1  - 2. 0  - 2. 0  - 10. 1  - 2. 0  - 2. 0  - 10. 1  - 2. 0  - 2. 0  - 3. 0  - 4. 4  - 5. 1  - 5. 1  - 6. 6  - 7. 7  - 8. 8  - 9. 9  - 9. 9  - 9. 9  - 9. 9	5 p. m.  - 8 4  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 1  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 2  - 0 3  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 4  - 0 5  - 0 7  - 0 9  - 0 4  - 0 4  - 0 4  - 0 7  - 0 9  - 0 4  - 0 9  - 0 4  - 0 9  - 0 4  - 0 9  - 0 4  - 0 9  - 0 4  - 0 9	6 p. m.  - \$ 1 - 5.0 - 5.0 - 5.1 - 5.0 - 1.4 - 1.4 - 1.4 - 1.4 - 5.1 - 7	$\begin{array}{c} 7 \text{ p.m.} \\ 7 \text{ 4} \\ -4.6 \\ -4.6 \\ -5.5 \\ -2.3 \\ -2.3 \\ -11.4 \\ -13.6 \\ -13.3 \\ -14.4 \\ -15.6 \\ -10.6 \\ -2.1.6 \\ -10.$	\$ p. in.  - 6 4 - 4.8 - 1.65 - 2.1 - 10.8 - 11.3 - 10.8 - 2.4 - 4.4 - 15.5 - 2.1 - 10.8 - 2.5 - 13.3 - 14.4 - 15.5 - 15.8 - 15.9	9 p. m.  - 4. 6 - 4. 9 - 4. 9 - 4. 9 - 1. 4 - 0. 7 - 13. 7 - 11. 2 - 1. 2 - 1. 3. 8 - 15. 6 - 9. 5 - 3 - 0. 0 - 1. 4 - 7 7 - 14. 0 - 1. 8 - 1. 4 - 7 7 - 1. 1 - 1. 2 - 1. 3 - 1. 4 - 1. 4 - 1.	10 p. m.  - 3. 4 - 0.5 - 5.1 - 1.5 - 3.7 - 1.0 - 0.8 - 10.1 - 11.5 - 11.2 - 12.9 - 11.8 - 15.8 - 0.2 - 11.2 - 11.2 - 11.2 - 11.2 - 11.2 - 11.3 - 11.3 - 11.4 - 11.5 - 11.5 - 11.6	H p. m.  - 1. 8 2. 1 - 2. 2 - 2. 0 - 2. 0 - 2. 0 - 2. 1 - 3. 4 - 3. 6 - 3. 7 - 12. 8 - 10. 9 - 12. 8 - 10. 9 - 12. 8 - 10. 9 - 12. 8 - 10. 9 - 12. 8 - 10. 9 - 12. 8 - 10. 9 - 10. 1 - 10.	12 p. m.  - 1, 7  - 4, 0  - 4, 5  - 0, 4  19, 6  19, 6  19, 6  19, 7  - 1, 6  - 1, 6  - 7, 6  - 3, 2  - 10, 5  - 7, 6  - 3, 2  - 10, 5  - 7, 6  - 3, 2  - 10, 5  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 4  - 11, 1	Daily means.   -5, 42   -0, 84   -0, 67   -0, 76   -0, 76   -0, 76   -15, 86   -15, 46   -15, 46   -15, 52   -15, 52   -15, 52   -15, 52   -15, 53   -15, 52   -15, 53   -15,	Max.  - 1.7  - 0.2  - 0.2  - 0.4  - 2.4  - 2.2  - 0.1  - 1.0  - 2.0  - 1.3  - 2.2  - 3.4  - 1.0  - 3.4  - 1.0  - 2.2  - 3.4  - 3.4  - 3.2  - 3.7  - 3	Min.  -11, 5  -6, 1  -12, 1  -6, 1  -8, 5  -11, 5  -9, 1  -9, 1  -9, 7  -15, 1  -24, 8  -23, 1  -36, 7  -16, 8  -24, 8  -27, 1  -37, 1  -47, 6  -47, 6  -47, 6  -47, 6  -47, 6  -48, 9	Dist

Tables showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.

[Height of the thermometer above the surface of the earth, 4 feet., Washington mean time. Correction to reduce to mean local time, -5 hours

							_							
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	, 10 а. т.	11 a. m.	12 m.	1 p. m.	$2~\mathrm{p.~m.}$
1882. Apr. 1 Apr. 2 Apr. 3 Apr. 4 Apr. 5	= 4.3 = 4.9 = 6.9	= 1.5 $= 4.0$ $= 5.2$ $= 8.9$ $= 8.5$	1 = 1.6 $= 3.9$ $= 6.3$ $= 11.5$ $= 2.3$	$\begin{array}{c} 0.0 \\ -3.7 \\ -7.4 \\ -12.1 \\ -8.9 \end{array}$	$ \begin{array}{r} 0.8 \\ -3.7 \\ -9.0 \\ -13.5 \\ -7.9 \end{array} $	- 0.5 - 4.2 10.1   -13.8 - 5.4	-0.8 $-4.2$ $-10.6$ $-13.0$ $-9.5$	$\begin{array}{c} -1.4 \\ -4.2 \\ -10.6 \\ -11.4 \\ +10.7 \end{array}$	- 2.1 - 4.2 -10.6 -10.4 -12.1	- 2.0 - 4.2 - 10.6 - 9.0 - 13.2	$\begin{array}{c} -2.3 \\ -4.4 \\ -10.6 \\ -9.1 \\ -14.1 \end{array}$	$\frac{-9.8}{-7.7}$	$\begin{array}{c} -2.3 \\ -4.4 \\ +8.6 \\ -7.5 \\ -14.1 \end{array}$	- 2.3 - 1.3 - 6.3 - 7.0 13.6
Apr. 6 Apr. 7 Apr. 8 Apr. 9 Apr. 10	-13.3 0.4 7.7 6.7	-13, 8 0, 6 6, 7 6, 0 13, 7	$\begin{array}{c c} +15.3 \\ -1.8 \\ -5.3 \\ -6.7 \\ -10.5 \end{array}$	-16, 9 2, 1 2, 1 5, 7 9, 0	$ \begin{array}{c c} -17.8 \\ 2.1 \\ -0.5 \\ 5.5 \\ 6.0 \end{array} $	$\begin{array}{c} -18.9 \\ = 0.8 \\ -0.8 \\ 5.8 \\ 4.2 \end{array}$	$\begin{array}{c} -19.6 \\ -0.8 \\ -0.8 \\ 6.0 \\ 3.4 \end{array}$	-19.6 - 2.1 - 2.0 - 4.0	$ \begin{array}{r} -18.9 \\ 5.8 \\ -4.2 \\ 6.0 \\ 4.9 \end{array} $	-17.7 $-6.0$ $6.0$ $6.0$ $6.0$	16. 6 5. 9 6. 7 8. 0 8. 7	-14.7 $-6.0$ $-0.9$ $-10.4$	-13. 6 6. 8 -4. 6 10. 6 10. 8	-12.1 $-3.2$ $-3.2$ $12.7$ $12.4$
Apr. 11 Apr. 12 Apr. 13 Apr. 14 Apr. 15	1. G 0. G 4. 9	$\begin{array}{c} -1.6 \\ 0.6 \\ -2.0 \\ 4.2 \\ -1.6 \end{array}$	$\begin{array}{c} -2.0 \\ -0.5 \\ -4.0 \\ 3.2 \\ -2.4 \end{array}$	$\begin{vmatrix} -2.6 \\ -0.7 \\ -5.7 \\ -3.7 \\ -3.3 \end{vmatrix}$	$\begin{array}{c} -6.4 \\ -2.5 \\ -5.3 \\ -3.2 \\ -6.2 \end{array}$	$ \begin{array}{r}                                     $	$\begin{array}{c} -8.0 \\ -5.3 \\ -0.7 \\ -3.1 \\ -8.8 \end{array}$	$\begin{array}{c} = 8.8 \\ = 6.3 \\ 1.8 \\ = 9.5 \end{array}$	- 8, 6 - 6, 9 - 4, 4 3, 2 -10, 8	- 8.6 - 6.9 8.0 0.4 -11.8	$ \begin{array}{r} -10.4 \\ -8.8 \\ 11.0 \\ -0.7 \\ -11.4 \end{array} $	-10.3 $-7.2$ $-16.6$ $-2.7$ $-11.2$	$\begin{bmatrix} -8.9 \\ -6.3 \\ -16.2 \\ -4.4 \\ -10.6 \end{bmatrix}$	-6.5 $-4.5$ $-15.4$ $-3.1$ $-8.7$
Арт. 16 Арт. 17 Арт. 15 Арт. 19 Арт. 29	- 3.2 1.9	$\begin{array}{c} 1 & 5.0 \\ -7.2 \\ -5.1 \\ 3.0 \\ -6.3 \end{array}$	$ \begin{array}{r} 5.2 \\ -7.6 \\ 3.4 \\ -8.2 \end{array} $	5.3 6.3 - 6.8 3.9 - 9.3	$\begin{array}{r} 4.2 \\ 5.2 \\ -4.2 \\ 4.2 \\ -10.6 \end{array}$	$^{9.8}_{\stackrel{9.5}{2.5}}_{\stackrel{9.5}{3.0}}_{\stackrel{9.6}{3.0}}$	$\begin{array}{r} 3.7 \\ 0.4 \\ -2.7 \\ 3.0 \\ -9.1 \end{array}$	$\begin{array}{c} -1.9 \\ -1.6 \\ -1.7 \\ -2.3 \\ -7.9 \end{array}$	$ \begin{array}{r} 0.4 \\ -2.3 \\ -1.4 \\ -6.7 \end{array} $	- 0, 0 - 4, 0 0, 0 - 0, 9 - 5, 1	$\begin{array}{c} 0.1 \\ -4.4 \\ -0.5 \\ -0.7 \\ -0.5 \\ \end{array}$	$\begin{array}{c} 1.0 \\ -6.5 \\ 0.2 \\ -0.5 \\ -2.5 \end{array}$	$-\frac{1.6}{7.5}$ $-\frac{0.9}{0.5}$ $-\frac{0.5}{2.5}$	$\begin{array}{c} -2.4 \\ -7.0 \\ 1.0 \\ 0.2 \\ -2.5 \end{array}$
Apr. 11 Apr. 22 Apr. 23 Apr. 24 Apr. 25	$\begin{array}{c} -4.0 \\ 9.3 \\ -0.5 \\ 11.6 \\ 24.6 \end{array}$	- 5.0 -10.1 - 2.5 12.9 24.4	$\begin{array}{c} -\cdot  8.4 \\ -\cdot  9.2 \\ -\cdot  4.2 \\ -\cdot  4.2 \\ 12.9 \\ 23.7 \end{array}$	-8.7 $-10.1$ $-4.9$ $-12.7$ $-23.6$	$ \begin{array}{r} -10.6 \\ -10.6 \\ -6.7 \\ -6.7 \\ 12.0 \\ -90.3 \end{array} $	-11.8 $-11.2$ $-7.1$ $-13.5$ $-23.0$	$\begin{array}{c} -13.2 \\ -11.2 \\ -7.6 \\ 14.1 \\ -22.7 \end{array}$	-14.5 10.0 8.4 	-14.7 - 8.8 - 9.2 - 16.2 - 21.5	-14.7 -13.0 -10.6 -16.6 -21.3	$\begin{array}{c} \cdot 13.0 \\ -7.9 \\ -9.5 \\ 17.8 \\ 20.3 \end{array}$	-11.5 $-6.2$ $-8.1$ $-19.4$ $-20.6$	$\begin{array}{c} -10.1 \\ -5.5 \\ -7.7 \\ -20.4 \\ 20.7 \end{array}$	- 9, 6 5, 3 6, 2 21, 7 21, 7
Apr 27 Apr 25 Apr 25 Apr 20 Apr 50	22, 6 23, 4 32, 2 25, 1 31, 1	22, 4 23, 4 31, 3 22, 5 27, 7	21, 4 22, 6 29, 8 21, 7 23, 9	20. 3 23. 4 29. 8 19. 8 20. 3	19. 1 22. 3 27. 4 18. 1 18. 2	18, 6 23, 3 25, 8 17, 0 16, 8	17. 4 23. 0 25. 2 16. 8 16. 4	16, 1 23, 9 25, 9 18, 1 14, 5	15. 6 23. 5 26. 2 16. 8 12. 7	14. 9 23. 5 25. 9 16, 9 12. 5	14.9 23.3 25.9 18.9 11.0	14.7 23.5 24.1 20.4 11.6	14 6 24.0 22.9 20.7 11 8	13.6 25.4 23.3 23.1 12.0
May 118	5, 04	4, 52	3, 46	2.15	1. 83	1.51	1. 21	1, 09	0, 90	0.71	30.4	1.74	2, 11	3. 02
Dist.	3 p. m.	1 p. m.	5 p. m.	6 р. г	7 р. ш.	<b>⋄</b> p. m.	9 p. m.	10 p. m.	tt p. m.	12 p. m.	Daily means.	Max.	Min.	10000 -
1582.	- 2.3 - 3.6	4 p. m. = 2.4 = 2.5 = 4.3 = 3.2 = 11.1	5 p. m. = 3, 2 = 1, 7 = 3, 2 = 1, 6 =10, 6	6 p. m.  - 3.2 - 3.7 - 3.2 - 1.2 - 9.5	7 p. in.  = 3 0 = 0.1 = 2.7 = 2.3 = 9.3	~ p. m. = 2.8 = 0.7 = 2.1 = 3.2 = 9.0	9 p. m. = 2.9 = 1.7 = 0.9 = 3.4 = 9.5	- 3.2 - 1.6 - 2.1	- 3.7 - 3.2	12 p. m. - 4. 0 - 4. 7 - 5. 5 - 6. 9 - 11. 1	means.	Max.  - 0, 8  - 0, 1  - 0, 9  - 1, 2  - 7, 7	Min.  - 6 1 - 6.5 -15.6 -15.6 -15.6	0.01 6.9 6.7 14.4 17.1 11.9
1582. Apr. 1 Apr. 2 Apr. 3	- 2.3 - 3.6 - 5.1 - 6.3	$= \frac{2.4}{2.5}$ $= \frac{4.3}{3.2}$	- 3.2 - 1.7 - 3.2 - 1.6	= 3.2 = 3.2 = 1.2	$ \begin{array}{r} -3.0 \\ -0.1 \\ -2.7 \\ -2.3 \end{array} $	$-\frac{2.8}{-0.7}$ $-\frac{2.1}{-3.2}$	$-\frac{2.9}{-1.7}$ $-\frac{9.9}{-3.4}$	$\begin{array}{c} -3.2 \\ -1.6 \\ -2.1 \\ -5.1 \end{array}$	- 3.7 - 3.9 - 3.6 - 6.1	- 4.0 - 4.7 ! - 5.5 ! - 6.9	- 2.10 - 3.28 - 6.39 - 7.55	0, 8 - 0, 1 - 0, 9	- 6.1 - 0.5 -15.0 -18.0	6, 9 6, 7 11, 4 17, 1
1882. Apt. 1 Apt. 2 Apt. 3 Apt. 5 Apr. 6 Apr. 6 Apr. 7 Apr. 8 Apt. 9	- 2.3 - 3.6 - 5.1 - 6.3 - 13.3 - 10.4 - 8.9 - 1.9 15.8 14.0 - 2.1 - 3.0 - 2.1 - 14.5	- 2.4 - 2.5 - 4.3 - 3.2 -11.1 - 7.3 - 11.0 - 1.4 - 18.1	$\begin{array}{c} -3.2 \\ -1.7 \\ -3.2 \\ -1.6 \\ -10.6 \\ -7.8 \\ 12.7 \\ 0.8 \\ 10.6 \end{array}$	$\begin{array}{c} -0.2 \\ -0.7 \\ -0.2 \\ -0.2 \\ -0.5 \\ -0.0 \\ 14.2 \\ 2.8 \\ 20.7 \end{array}$	- 3 0 - 0.1 - 2.7 - 2.3 - 9.3 - 4.4 - 14.7 4.2	$\begin{array}{c} -2.8 \\ -0.7 \\ -2.1 \\ -3.2 \\ -9.0 \\ -2.3 \\ 14.7 \\ 4.9 \\ 22.0 \end{array}$	$\begin{array}{c} -2.9 \\ -1.7 \\ -0.9 \\ -3.4 \\ -9.5 \\ -0.7 \\ 13.7 \\ -3.4 \\ 22.5 \end{array}$	- 3.2 - 1.6 - 2.1 - 5.1 - 9.7 - 0.2 - 13.3 - 22.8	- 3.7 - 3.2 - 3.6 - 6.1 -10.6 1.6 12.2 7.0 10.8	- 4.0 - 4.7 ! - 5.5 ! - 6.9 -11.1 0.8 10.3 7.4	; means. - 2, 10 - 3, 28 - 6, 30 - 7, 55 - 10, 67 - 11, 25 7, 73 0, 90 12, 51	$\begin{array}{c} 0.8 \\ -0.1 \\ -0.9 \\ -1.2 \\ -7.7 \\ 1.6 \\ 14.7 \\ 7.7 \\ 22.5 \end{array}$	$\begin{array}{c} -6.1 \\ -0.5 \\ -15.3 \\ -18.6 \\ -10.6 \\ -23.5 \\ -2.0 \\ -3.0 \end{array}$	6, 9 6, 7 11, 4 17, 1 11, 9 25, 1 17, 9 17, 7 18, 6
1882. Apt. 1 Apt. 2 Apt. 3 Apt. 4 Apt. 5 Apt. 6 Apt. 7 Apt. 8 Apt. 9 Apt. 10 Apt. 10	- 2.3 - 3.6 - 5.1 - 6.3 - 13.3 - 10.4 - 8.9 - 1.9 15.8 14.0 - 2.1 - 3.0 - 2.1 - 14.5	- 2.4 - 2.5 - 4.3 - 3.2 - 11.1 - 7.3 - 11.0 - 4.4 - 18.1 - 13.5 - 0.5 - 0.5 - 0.5	- 3, 2 - 1, 7 - 3, 2 - 1, 6 - 10, 6 - 7, 8 12, 7 6, 8 19, 6 14, 5 0, 9 3, 0 12, 6 0, 9	- 3,2 - 6,7 - 3,2 - 9,5 - 9,0 - 14,2 - 20,7 - 14,9 - 3,3 - 5,1 - 10,8	- 3 0 - 0.1 - 2.7 - 2.3 - 9.3 - 4.4 14.7 4.2 22.1 15.3 5.6 6.9 10.0 3.2	- 2.8 - 0.7 - 2.1 - 3.2 - 9.0 - 2.3 - 4.9 - 22.0 14.7 - 6.8 - 8.0 - 8.0 - 8.0	$\begin{array}{c} -2.97 \\ -1.7 \\ -0.9 \\ -9.5 \\ -0.7 \\ -13.7 \\ -22.5 \\ -12.7 \\ -2.8 \\ -2.8 \\ -2.9 $	- 3, 2 - 1, 6 - 2, 1 - 5, 1 - 9, 7 - 0, 2 - 13, 3 - 6, 3 - 22, 3 - 9, 4 - 5, 8 - 8, 6 - 6, 1 - 4, 0	- 3.7 - 3.6 - 6.1 - 10.6 12.2 7.0 19.8 7.5 4.4 6.0 5.8 2.5	-4.0 -4.7 !-5.5 !-6.9 -11.1 0.8 10.3 7.4 15.4 4.2 2.7 3.2 6.2 0.4	; means. - 2.10 - 3.28 - 6.09 - 7.55 - 10.67 - 11.25 - 0.9, 12.51 - 9.97 - 2.40 - 0.42 - 6.20 - 1.65	$\begin{array}{c} 0.8 \\ -0.1 \\ -0.9 \\ 0.9 \\ -1.2 \\ -7.7 \\ \hline 1.6 \\ 14.7 \\ -2.5 \\ 15.3 \\ -6.8 \\ 8.8 \\ 8.6 \\ 4.9 \\ \end{array}$	$\begin{array}{c} -6.1 \\ -0.5 \\ -15.0 \\ -18.6 \\ -12.6 \\ -23.5 \\ -2.2 \\ -40.0 \\ 0.9 \\ -10.9 \\ -12.0 \\ -6.5 \end{array}$	6, 9 6, 7 11, 4 17, 1 11, 9 25, 1 16, 9 17, 7 18, 6 14, 4 20, 7 20, 8 23, 8 11, 4
15-2 Apt 2 Apt 2 Apt 3 Apt 3 Apt 4 Apt 5 Apt 6 Apt 7 Apt 10 Apt 10	- 2.3	- 2.4 - 2.5 - 4.3 - 3.2 - 11.1 - 7.3 - 11.0 - 1.4 - 18.1 - 13.5 - 0.5 - 0.5	$\begin{array}{c} -3.2\\ -1.7\\ -3.2\\ -1.6\\ -10.6\\ -10.6\\ -7.8\\ 10.6\\ -7.8\\ 10.6\\ 0.9\\ -3.6\\ 0.9\\ -2.3\\ -2.3\\ -4.6\\ 4.7\\ 4.7\\ -4.6\\ -4.7\\ -$	- 0.2 - 0.7 - 0.2 - 0.5 - 0.0 14.2 20.7 14.8 20.7 14.9 5.1 10.8 0.2 - 1.9 5.1 10.8 10.2 10.8 10.2 10.8 10.2 10.8 10.	- 0 0 1 - 2.7 - 2.7 - 9.3 - 4.4 4 2 2.1 1 15.6 6.9 10.0 3.2 2.3 - 8.2 7 - 5.6 1.8 1 1.8	- 2.8	$\begin{array}{c} -2.97 \\ -1.0.9 \\ -2.57 \\ -0.9 \\ -2.57 \\ -0.77 \\ -2.57 \\$	$\begin{array}{c} -3.2 \\ -1.6 \\ -2.1 \\ -9.7 \\ 0.23 \\ 0.3 \\ 22.3 \\ 0.4 \\ -5.8 \\ -6.6 \\ -6.1 \\ -4.0 \\ 3.4 \\ -2.5 \\ -5.3 \\ -6.3 $	- 0.7 - 0.2 - 3.6 - 10.6 - 10.6 - 1.6 - 12.2 - 7.0 - 19.8 - 4.4 - 6.0 - 5.8 - 8.1 - 6.1 - 6.0 - 5.5 - 5.6 - 6.1		means.	$\begin{array}{c} 0.8 \\ -0.1 \\ -0.9 \\ -1.7 \\ -7.$	- 6 1 - 6.5 - 15.6 - 13.6 - 13.6 - 23.5 - 10.0 - 12.0 - 12.0	6, 9 6, 7 71, 4 17, 1 11, 9 25, 1 11, 7 18, 6 11, 4 20, 7 20, 8 25,
Apr. 1	- 2.3	- 2.4 - 2.5 - 4.3 - 3.2 - 11.1 - 7.3 - 11.0 - 1.4 - 13.5 - 0.5 - 0.5 - 1.8 - 0.5 - 1.8 - 1.9 - 1.8 - 1.9 - 1.9 - 1.9 - 1.8 - 1.9 - 1.9	- 3, 2 - 1, 7 - 3, 2 - 1, 6 - 10, 6 -	- 0.2 - 0.7 - 1.2 - 9.5 - 9.5 - 14.2 20.7 11.9 - 0.5 - 1.9 - 0.5 - 2.8 - 0.2 - 1.2 - 2.8 - 3.8 - 3	- 3 9 - 0.1 - 2.3 - 2.3 - 0.3 - 1.4 - 7.2 - 1.5 3 - 1.5 3 - 1.5 3 - 1.5 3 - 1.7 - 6.9 - 1.	$\begin{array}{c} -2.8 \\ -0.71 \\ -2.1 \\ -2.0 \\ -2.3 \\ -2.0 \\ -2.0 \\ -2.4 \\ -2.7 \\ -$	$\begin{array}{c} -2.9 \\ -1.79 \\ -1.79 \\ -0.34 \\ -9.5 \\ -13.7 \\ -0.37 \\ -13.7 \\ -0.88 \\ -1.9 \\ -0.89 \\ -2.0 \\ -0.89 \\ -2.0 \\ -1.0 \\ $	- 0.2 - 1.6 - 2.1 - 2.1 - 2.1 - 0.2 - 13.3 - 0.2 - 13.3 - 0.2 - 13.3 - 0.2 - 13.3 - 0.2 - 13.3 - 0.2 - 13.3 - 0.4 - 0.4 - 0.5 - 0.4 - 0.5 - 0	- 3,7 - 3,26 - 6,1 - 10,6 1,2,2 7,0 17,8 - 7,8 - 3,1 - 6,8 2,5 8,8 8,3 1,1 1,5 6,6 1,5 6,1 1,3 2,4 3,2 4,4 4,4 4,4 4,4 4,4 4,4 4,4 4,4 4,4 4		means.	$\begin{array}{c} 0.8\\ -0.1\\ -0.9\\ -7.7\\ 7.7\\ 14.7\\ 7.7.5\\ 15.3\\ -6.8\\ 8.8\\ 16.6\\ 4.9\\ 5.8\\ -1.7\\ -4.0\\ 1.6\\ 6.11.3\\ -1.7\\ -4.0\\ -4.0\\ -4$	- 6 1 - 6.5 - 15.6 - 15.6 - 12.6 - 23.5 - 22.2 - 0.9 - 12.9 - 12.9 - 12.9 - 14.9 - 2.5 - 11.3 - 14.5 - 14.5 - 14.5 - 14.6 - 16.6 -	6.9 6.7 11.1 11.9 25.1 11.4 20.7 29.8 11.4 20.7 11.4 20.7 11.4 11.5 12.8 11.4 11.5 12.8 11.4 11.5 12.8 11.5 12.8 15.9 12.8 15.9 12.8 15.9 12.8 11.4 11.3 15.9 12.8 11.5 11.5 11.5 11.5 11.5 11.5 11.5 11
Apr. 1	- 2.3 - 3.6 - 5.1	$\begin{array}{c} -2.4 \\ -2.5 \\ -2.5 \\ -3.2 \\ -11.1 \\ -11.1 \\ -15$	$\begin{array}{c} -3.2\\ -1.7\\ -1.06\\ -1.06\\ -7.8\\ 10.6\\ -1.5\\ 10.8\\ 11.5\\ -2.3\\ -2.3\\ -4.6\\ 21.\\ -2.1\\ -1.1\\ 22.3\\ -1.1\\ 28.9\\ -2.8\\ -1.1\\ 28.9\\ -2.8\\ -1.1$	- 0.2 - 0.2 - 0.2 - 1.5 - 0.0 14.8 20.8 20.8 - 0.0 - 1.8 - 0.0 - 0.0	- 0 0 - 0.17 - 2.0 0 - 0.17 - 2.0 0 - 0.17 - 2.0 0 - 0.17 - 0.0 0 - 0.17 - 0.0 0 - 0.0	- 2.87 - 2.17 - 3.00 - 2.07 - 2.07 - 4.90 - 2.07 - 4.90 - 2.07 - 5.07 - 6.07 - 1.27 - 6.3 - 2.27 - 2.27 - 3.20 - 3.20	- 2.97 - 1.79 - 3.45 - 0.77 - 13.75 - 0.77 - 12.77 - 0.28 - 7.49 - 7.49	- 0.2 - 1.6	- 0.7 - 0.26 - 6.1 - 10.6 12.0 17.0 17.5 - 4.4 16.8 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5		means.	0, 8 -0, 1 -0, 9 -1, 2 -7, 7 -7, 7 -7, 7 -2, 5 -1, 6 -8, 8 -8, 9 -7, 9 -8, 8 -8, 9 -7, 9 -1, 1 -1, 3 -1, 3 -1, 3 -1, 5 -1,	$\begin{array}{c} -6.1 \\ -0.8 \\ -1.8 \\ -1.8 \\ -1.8 \\ -1.8 \\ -1.6 \\ -1.6 \\ -1.0 \\ -1$	6, 9

H. Ex. 44--30

2 p m.

tinued.

5 hours

- - 0,5 - 0,3 - 0,3 - 5,4 - 1,8 - 7,7 - 7,1 - 20,6 - 2,5 - 15,3

-11 5 -2 1 -1 1 - 9 9 -20 -- 0,7 -16 6 --11 8

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883-Continued.

IR eight of the thermometer above the surface of the earth, 4 ft. Washington mean time. Correction to reduce to mean local times - 5 hours 17 minutes.

						11	muutes.							
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	Ha. m.	12 m.	1 p. m.	2 p. m.
	18, 0 12, 8 1 6, 7 1 9 2 7, 1	17, 6 10, 8 6, 7 9, 9 6, 7	(7.9) 11.5 6.1 5.7 6.3	16, 4 11, 9 5, 9 8, 7 6, 5	16, 7 12, 3 4, 0 8, 7 6, 0	15, 8 12, 5 4, 4 7, 5 5, 1	13, 8 16, 2 4, 2 7, 8 4, 2	15. 9 11. 1 3. 7 7. 6 3. 9	15 6 8 5 9.8 7.4 9 0	15, 7 6, 3 1, 7 7, 2 1, 0	15. 6 5. 1 6. 0 7. 4 2. 3	17. 1 4. 9 6. 4 7. 2 2. 5	15. 1 4. 9 6. 4 7. 8 2. 5	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
May 6 May 7 May 8 May 9 May 10	7. 2 11. 1 16. 0 17. 9 15. 6	6.3 11.0 16.3 16.0 15.9	6, 1 11, 1 16, 4 16, 8 16, 3	5 9 11, 0 16, 5 16 8 16 9	1. 9 19. 0 15. 8 16. 3 15. 5	4. 4 9. 6 15. 8 15. 8 15. 6	4, 0 9, 6 15, 8 15, 6 15, 7	4, 4 9, 8 15, 9 15, 4 11, 8	5.1 9.8 15.8 14.6 14.5	4. 9 10. 0 15. 8 13. 7 14. 9	5.3 10.6 16.1 13.5 15.1	6, 3 10, 6 16, 1 13, 6 15, 1	7, 5 11, 0 15, 8 13, 6 15, 4	11 / 1 11 / 1 13 / 5
May 11 May 12 May 13 May 14 May 15	31.6	19, a 42, 8 32, 6 31, 5 20, 3	19 5 32.0 31.6 31.1 30.3	19, 9 31, 5 31, 2 50, 5 50, 1	21. 0 30. 8 29. 4 39. 1 28. 6	11. 5 50. 5 50. 5 19. <b>1</b> 24. 2	20, 3 29, 9 30, 5 29, 2 27, 9	19, 4 19, 4 00, 5 24, 4 28, 0	24, 9 29, 2 50, 1 28, 2 28, 4	25, 4 29, 5 30, 5 25, 7 29, 1	26, 6 30, 1 31, 5 29, 6 29, 8	26 8 20, 0 32, 1 30, 1 30, 1	27, 2 92, 6 93, 1 90, 3 90, 8	32 A
May 16 May 17 May 18 May 19 May 20	30. \$	28, 3 29, 9 33, 2 50, 4 21, 0	75. 2 20. 6 52. 5 19. 2 53. 7	24, 6 29, 6 32, 1 17, 9 51, 1	19, 8 28, 6 31, 7 26, 2 31, 1	10. 4 28. 5 -1. 6 25. 4 3-1	18, 1 23, 8 31, 3 21, 0 34, 0	16. 0 28. 7 31. 3 22. 5 33. 0	15 7 59, 0 30, 3 20, 5 33, 3	15, 6 29, 2 29, 5 19, 4 33, 3	17, 4 56, 9 28, 6 19, 8 51, 0	20 3 50, 7 20 0 20, 7 34 8	99 5 31 5 29, 0 21, 8 75, 6	- 1 - 1 - 1 - 1 - 1 - 1 - 1
May 21 May 22 May 23 May 24 May 25	21.9	21 0 23 4 28.7 23,3 19,5	33.9 53.3 57.4 21.7 19.4	$\begin{array}{c} 5 & 8 \\ 13 & 1 \\ 26 & 7 \\ 19 & 9 \\ 10 & 4 \end{array}$	1.3, 3 33, 6 25, 8 18, 0 13, 3	104.3 121.5 10.1 15.2	33, 1 32, 0 24, 5 10, 3 18, 2	33, 0 32, 3 24, 3 18, 4 17, 9	12.9 32.1 24.3 18.4 17.6	33. 1 32. 1 24. 5 17. 8 18. 0	50, 3 32, 5 24, 9 17, 6 18, 8	531. 0 325. 4 25. 2 17. 4 15. 8	31. 0 33. 5 26. 2 19. 1 15. 8	11 11 11 11 11 11
May 26 May 27 May 18 May 19 May 30	23, 6 24, 8 19, 8 18, 9 24, 7	22, 0 29, 7 1 s. 5 17, 5 24, 6	23, 0 20, 3 17, 0 17, 6 24, 3	21. 4 20. 1 15. 7 16. 5 24. 0	21, 9 15, 6 13, 7 15, 6 23, 7	21, 8 13, 1 12, 6 14, 9 23, 0	21. 0 11. 6 12. 5 14. 5 22. 5	20, 0 11, 4 11, 8 15, 2 22, 7	19.6 11.6 12.5 16.4 23.0	18. 8 12. 5 13. 4 17. 1 23. 3	18.4 13.9 14.3 18.0 24.3	18. 8 15. 8 15. 1 10. 4 24. 7	19. 1 18. 0 17. 1 19. 4 25. 4	10 G 10 G 17-1 29-1 21-3
May 31	29, 5	28. 6	27. 8	27. 6	26.4	26. 2	26, 0	25, 8	26. 1	26. 2	26.5	27. 2	26.7	
Means .	22. 86	*22.25	21, 51	21, 12	20, 52	20, 16	19,73	19, 50	19, 43	19,39	19, 92	20.43	21.14	21. 4
Pate.	3 p. m.	4 p. m.	5 p. m. i	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Dif
May 1 May 2 May 3 May 4 May 5	19. 6 7. 8 6. 8 9. 5 2. 4	20, 0 7, 4 6, 6 10, 6 4, 6	20.3 6.2 7.0 11.3 5.6	20, 5 6, 2 7, 8 10, 6 5, 9	10.6 7.5 8.4 9.8 6.5	19. 6 7. 6 8. 9 9. 4 7 4	18.1 7.0 9.4 8.9 7.8	15, 8 6, 7 9, 9 8, 4 8, 2	15.3 7.9 9.5 8.2 8.6	13, 5 6, 9 9, 1 7, 4 7, 0	17, 32 8, 32 6, 65 8, 65 5, 22	$\begin{array}{c} 20, 5 \\ 12, 8 \\ 0, 9 \\ 11, 5 \\ 8, 6 \end{array}$	12. 2 3. 4 0. 9 5. 0 —1.7	11
May 6 May 7 May 8 May 9 May 40	9, 2 12, 2 16, 1 15, 4 16, 4	10, 2 13, 3 16, 4 15, 4 17, 4	14. 6 13. 2 16. 5 15. 6 17. 6	11. 8 13. 8 15. 5 16. 5 18. 3	11 3 14 1 17 6 16, 4 19, o	12. n 14. 7 18. 6 16. 4 19. 4	12. 2 14. 9 18. 5 16. 0 19. 6	12. 0 16. 4 19. 1 16. 6 19. 7	11.7 16.3 18.8 19.5 18.9	10. 3 15. 3 18. 0 17. 8 18. 0	3, 05 12, 10 16, 70 15, 89 16, 72	12. 2 16. 4 19. 1 19. 5 19. 7	2, 0 7, 3 14, 2 11, 0 13, 3	1:
May 11 May 12 May 13 May 14 May 15	29. 6 33. 5 33. 9 31. 7 31. 3	30, 7 34, 2 34, 2 32, 1 31, 5	22. I 24. 7 54. 6 32. I 31. 7	53.4 55.7 25.7 21.2 4.3	33. 2 34. 5 - 32. 8 52. 3 54. 1	77 7 74 2 32.4 22.5 33.9	33, 3 (1 0 32, 1 33, 1 30, 6	33, 5 33, 7 34, 8 35, 1 36, 4	04. 8 23. 0 01. 5 32. 9 30. 2	32. 9 33. 0 31. 1 31. 4 29. 2	26-98 32, 33 32, 05 30, 95 30, €8	35, 2 35, 7 35, 7 31, 7	17 0 28 0 26 0 27, 2 26, 8	7.7
May 16 May 17 May 18! May 19 May 20	26, 6 32, 6 29, 1 24, 3 35, 8	28, 4 33, 1 29, 6 25, 7 36, 0	28.9 53.3 28.9 27.4 49.2	29 7 11 7 23 4 25 4 26 6	30, 8 54, 5 54, 6 30, 5 <b>37, 0</b>	31, 5 33, 4 31, 9 31, 8 56, 4	31. 9 35. 3 52. 1 33. 2 36. 1	31, 6 24, 6 52, 5 33, 3 35, 2	31 3 31 0 32 2 33 5 35 2	30, 3 33, 3 51, 5 52, 1 55, 2	24, 95 31, 40 50, 82 26, 80 , 4, 7,	31, 9 35, 2 33 5 33 5 37,0	14 1 27, 8 27 0 18, 0 32, :	
May 21 May 22 May 23 May 24 May 25	34, 4 35, 0 26, 1 19, 1 19, 1	34, 4 35, 4 26, 8 19, 6 19, 1	35, 0 25, 4 26, 9 19, 6 19, 8	35. 9 35. 4 27. 4 10. 8 21. 5	35, 9 35, 0 27, 4 20, 1 23, 0	34, 8 33, 5 27, 3 20, 3 23, 3	31.4 53.5 27.2 21.3	34. 2 33. 1 27. 2 21. 0 23. 4	34 2 32.6 27.4 21.3 23.7	33 5 32 2 26 4 20 6 23 5	34, 93 54, 41 26, 40 19, 85 20, cd	35, 9 35, 4 29, 8 24, 9 23, 7	31, 8 80, 8 21 15 o 16 3	0 1 1 6 2 0 9 6 7 1
May 26 May 27 May 28 May 29 May 30	20, 1 21 0 18, 4 21 1 26, 4	20, 8 22, 3 18, 9 22, 5 27, 2	21, 3 23, 3 19, 6 23, 0 27, 4	21. 5 23. 5 20. 1 21. 5 27. 7	21, 7 23, 6 20, 9 24, 5 28, 4	22. 0 23. 5 20. 5 24. 8 28. 9	21. 5 23. 5 21. ‡ 25. 0 29. 3	21. 3 24. 0 10. 8 24. 5 20. 2	21, 9 22, 6 19, 9 23, 9 29, 7	21. 5 21. 0 19. 5 24. 5 29. 4	21, 00 18, 90 17, 65 19, 99 25, 82	23. 6 23. 6 10. 9 25. 0 29. 7	15. 8 10. 9 10. 0 12. 8 21. 2	10.1 10.9 11.1
May 31	28.6	29.4	30. 1	30, 1	30.9	31. 2	31.0	31, 6	31. 6	30.5	28. 61	31.6	24.0	7.3
	28.6	29, 4	23 1)	30.4	30.9 24.17	31, 2 24, 25	31. 0 24.37	21. 21	31. 6 24. 25	23, 46	28. 61	31. 6	24. 0 16. ×3	- ( ::

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued. [Height of the thermometer above the surface of the carth, 4 feet. Washington mean time. Correction to reduce to mean local time, -- 5 hours 17 minutes.]

								,						
Date.	1 a. m.	2 a.m.	3 n.m.	4 n. m.	5 a.m.	6 a.m.	7 n.m.	S a. m.	9 a.m.	10 a.m.	11 a.m.	12 m.	1 p.m.	2 p. m.
June 1 June 2 June 3 June 4	50, 5 30, 5 29, 2 30, 5	194.8 30, 4 28, 8 32, 7	29, 6 29, 2 28, 2 32, 4	28. 2 20. 2 28. 2 32. 3	27. 7 27. 9 27. 4 21. 5	27. 2 27. 6 27. 4 31. 1	26 4 27, 6 27, 6 20, 5	26.4 28. 2 27. 7 30. 3	26, 4 27, 6 28, 9 30, 7	27. 3 20. 7 29. 4 31. 1	25, 6 26, 6 30, 6 51, 7	29. 7 16. 2 31. 5 32. 1	29. 1 27. 1 22. 5 33. 1	50 d 28 2 33, 1 34 5
June 5 June 5 June 8 June 9	34. 4 38. 3 40. 3 38. 2 38. 3	33. 6 36. 0 39. 3 37. 1 37. 0	32. 6 35. 6 38. 3 36. 2 35. 5	32. 4 35. 3 35. 4 34. 2 34. 2	31. 8 53. 6 52. 6 30. 3 31. 7	31, 3 33, 3 34, 3 29, 5 30, 7	31. 2 34. 2 32. 3 29. 4 31. 5	30. 3 31. 1 32. 7 29. 7	30. 1 33. 8 33. 7 70. 5 33. 6	19 9 35 2 33.7 32.8 32.0	00. 7 36. 5 34. 8 39. 5 22. 9	30 7 35 1 36 7 34 1	31. 5 29 1 18. 4 34 1 33 1	32 8 39, 5 40 0 24 5 31 7
June 10 June 11 June 13 June 14	34, 0 84, 4 46, 2 35, 6 33, 7	13. 1 33. 4 42. 0 36. 1 34. 0	32. 4 33. 5 40. 1 35. 2 33. 2	32. 1 33. 1 38. 6 34. 1 33. 2	31, 5 52, 5 58, 6 33, 3 32, 7	31. 5 32. 5 38. 7 32. 9 32. 7	31. 5 32. 5 37. 9 33. 5 32. 9	31. 6 92. 2 36. 3 33. 1 33. 0	32. 5 32. 7 38. 3 32. 5 33. 0	10.7 33.8 38.3 92.5 53.1	31. 0 31. 7 39. 3 35. 7 36. 5	1.4. 0 21. 9 40. 7 24. 8 31. 0	04 4 15 8 41, 2 35 0 04, 0	36.9 39.8 31.4 31.0
June 17 June 16 June 17 June 17 June 19	34, 4 33, 2 35, 4 34, 4 41, 2	34. 2 32. 4 33. 5 33. 5 40. 1	34, 2 31, 6 35, 2 32, 9 38, 1	33. 7 31. 3 33. 7 32. 4 37. 3	30, 2 30, 5 31, 0 31, 8 37, 1	31.1 29.9 30.2 32.9 36.2	33. 1 30. 1 20. 7 34. 4 36. 8	32. 7 30. 1 34. 5 35. 8 37. 4	30, 5 30, 5 32, 5 34, 8 37, 9	21.4 31.2 32.9 38.6 38.5	3 7 31, 4 32, 9 53, 9 53, 9	00 6 02.0 00 5 10.0 1.0 6	04 3 01, 9 34 6 41, 8 39 6	33 1 33 1 35 0 12 9 40 5
Jam 11 June 24 June 22 June 23 June 24	38, 9 35, 3 33, 1 32, 4 34, 0	37, 0 34, 5 31, 3 32, 0 36, 2	36, 0 34, 0 29, 8 31, 5	36, 2 33, 5 30, 1 31, 3 36, 6	35, 4 33, 2 29, 3 30, 5 31, 9	34. 0 32. 7 28. 2 30. 7 33. 3	28.6 28.6 30.9	31. 6 32. 8 23. 1 30. 5 70. 7	31. 6 32. 9 28. 8 30. 5 31. 3	01. 1 50. 1 29. 0 02. 3 02. 7	25 0 53.5 29 9 82.5 53 1	17-1 31-7 30,4 32-5 35-6	3.5 ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ±	26 1 34 0 30 7 32.5 23 0
June 25 June 27 June 27 June 23 June 23	41. 0 38 8 33. 0 32. 1 31. 3	41. 7 58. 1 32. 6 31. 6 32. 3	49, 1 34, 4 32, 5 31, 4 32, 4	38, 5 33, 5 32, 6 31, 2 31, 6	36 4 33, 5 32, 5 30, 7 31, 5	36, 6 33, 5 92, 5 30, 5 32, 5	38, 3 33, 5 32, 4 30, 5 32, 5	40. 9 33. 5 31. 6 30. 3 32. 5	41. 0 33. 1 31. 5 30. 3 32. 5	09. 8 92. 3 91. 5 93. 5 92. 7	31.8 32.5 31.5 50.5 33.8	13. 0 52. 5 31. 5 31. 5 31. 5	14. 2 52. 5 31. 0 32. 5 35. 1	45 4 52 5 52.5 53.6 53.6 56.4
Fune 30	31.2	34.3	34.0	33. 7	33, 7	33.5	33. 5	33. 5	33, 5	33, 5	81.9	34.9	115, 2	35, 2
Means	35, 33	34. 62	33. 90	33, 26	32, 24	31.93	32.05	22.01	32, 55	32, 87	33, 54	34.18	04.66	35, 09
Date.		4 p.m.		6 p. m.	7 p.m.		9 p. m.			12 p. m.	Daily means.	Max.	Min.	Diff.
June 1 June 2 June 1	31. 1 28. 2 34. 0 34. 0	32. 1 28. 6 35. 0 34. 0	32. 1 28. 9 35. 1 31. 9	32. 3 29. 4 35. 0 35. 0	32. 5 28. 6 34. 7 35. 2	32. 8 29. 4 34. 4 35. 2	32. 5 30. 2 34. 2 34. 9	32. 1 29. 9 34. 0 35. 2	92. 0 29. 8 33. 4 35. 8	31.3 29.2 33.5 31.9	29, 92 28, 58 31, 41 33, 29	32. 8 30. 5 35. 1 38. 9	24.5 25.0 26.5 20.3	8. d 5. 5 8. d 9. d
June 6 1 June 8 June 9 June 9	33. 8 39. 1 30. 8 34. 7 34. 0	39, 1 1 36, 0 1 35, 7 34, 4	37. 9 36. 7 37. 2 35. 2	37, 8 37, 2 37, 0 36, 7	37. 9 37. 9 37. 2 37. 4 36. 0	37. 7 37. 5 87. 0 37. 2 33. 4	37. 9 39. 3 37. 0 37. 2 35. 3	37. 4 40. 1 38. 4 36. 7 34. 9	37. 1 38. 1 34. 5	37. 5 41. 7 28. 1 40. 0 34. 2	37, 10 36, 20 34, 83 34, 18	41.7 40.3 40.0 38.3	29 1 31, 8 30, 8 27, 4 28, 8	9, 8 9, 9 9, 5 12, 6 9, 5
June 11 June 12 June 14 June 14 June 14	35. 0 38. 3 37. 9 35. 0 35. 2	35, 8 39, 5 38, 5 35, 4 35, 3	36. 4 41. 2 38. 7 35. 2 36. 4	36. 4 41. 3 38. 5 35. 6 37. 0	36, 6 41, 1 39, 3 34, 4 36, 9	36. 4 38. 7 39. 3 34. 0 36. 7	36. 9 39. 3 38. 3 34. 0 36. 5	36, 1 41, 5 37, 9 34, 0 36, 9	35. 5 42. 9 36. 4 34. 0 35. 8	1.6, 2 45, 2 1 35, 7 33, 6 34, 7	14, 25 36, 75 39, 62 34, 25 34, 25	16.6 45.2 46.2 36.1 37.0	30, 0 31, 6 55, 4 31, 8 32, 0	6, 6 13, 6 10, 8 4, 3 5, 0
dune 15dune 17dune 17dune 18dune 19d	53. 1 55. 1 45. 2 41. 5	35, 0 33, 1 36, 2 40, 5 40, 9	24 6 33 0 35 9 40.1 40.5	54. ‡ 33.3 35.7 40.6 38 -	54. 0 33, 8 55, 8 40, 3 39, 9	33, 5 33, 8 36, 4 39, 3 33, 9	33, 8 34, 0 36, 9 39, 1 38, 6	33, 5 34, 6 36, 6 42, 5 38, 3	5 1, 6 34, 4 36, 0 44, 3 39, 1	34. 2 35. 2 31. 3 45. 0 38. 0	32, 41 32, 41 34, 20 38, 55 38, 94	35 0 35 9 36 9 45.2 41.5	31 9 29 1 20 0 30, 9 35, 1	1 1 6. 1 7 9 11 3 6 4
June 21 June 21 June 22 June 24 June 34	37. 9 34. 2 31. 1 32. 5 33. 9	08 3 1 30, 7 31, 4 32, 5 35, 0	38, 6 34, 9 31, 5 32, 0 33, 9	34. 0 32. 0 31. 7 35. 4	28.7 33.7 34.0 31.7 36.0	58 5 33.7 32.7 32.1 30.0	32. 5 32. 5 32. 9 32. 0 35. 9	37, 8 32, 5 32, 7 32, 0 35, 9	37, 1 33, 1 33, 1 32, 3 36, 4	35.7 32.4 32.3 33.9 37.0	33, 57 33, 52 33, 92 31, 85 11, 58	18 9 35, 3 34, 9 33, 2 37, 3	31.0 29.8 29.0 29.0	5.9 4.3 7.5 4.2 7.2
June 25 June 27 June 27 June 24 June 29	47 2 33.7 33.7 33.5 36.4	18, 8 34, 0 33, 5 31, 4 35, 4	19 7 34 1 33.5 : 34 1 37, 1 .	50. 5 34. 2 32. 7 34. 2 36. 2	52. 0 34. 0 32. 5 34. 9 35. 4	33.5 34.0 32.1 34.4 35.4	51. 2 34. 2 31. 7 34. 2 36. 4	52, 2 33, 9 31, 5 33, 0 35, 6	51, 3 34, 2 32, 4 33, 4 35, 2	11 9 33.3 32.1 31.3 34.0	14, 50 33, 93 32, 27 32, 29 34, 20	53.5 38.8 38.7 34.9 37.1	31, 0 32, 0 19, 6 29, 3 29, 8	19, 5 6, 8 4, 1 5, 6 7, 6
June 30	55.4	35, 1	35.4	35.4	25, 4	35.4	. 35.4	38. 3	39. 0	40.6	35, 14	40, 6	32.0	h. 6
Menns .	35, 52	35, 78	36, 10	36. 19	36,30	36. 05	36, 15	36. 13	36, 29	35, 95	34, 53	38.31	30 22	ь. 09

ntinued,

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hour, 17 minutes.]

Date.	fa.m.	2 a. m.	3 a. m.	La. m.	5 a. m	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. r.,
1882. July 1 July 2 July 3 July 4	37, 9 38, 9 39, 8 35, 0	33. 4 39. 5 39. 3 35. 1	93. 5 41. 2 37. 4 94. 5	03. 0 40. 7 57. 0 34. 0	32. 8 37. 4 35. 8 33. 7	33, 5 38, 8 35, 6 34, 3	38, 8 35, 1 36, 4 34, 1	40. 7 37. 4 37. 2 34. 1	38. 3 37. 4 37. 8 38. 3	40. 1 37. 4 37. 9 38. 3	40, 3 38, 8 35, 4 38, 3	40, 2 40, <b>6</b> 34, 4 37, 1	40. 8 44. 0 53. 1 58. 3	40, 4 44, 2 51, 3 55, 4
July 5 July 6 July 7 July 8 July 9	40. 1 43. 3 48. 2 49. 0 41. 1	05. 1 4.1 8 49. 8 46. 2 39. 7	36, 2 42, 8 49, 2 40, 9 1 8, 2	34. 7 40. 8 45. 0 41. 4 55. 0	04. 4 41. 0 46. 9 19. 1 33. 5	33, 9 42, 2 45, 0 38, 3 32, 0	04. 4 43. 4 48. 2 36. 8 31. 0	35. 6 42. 4 50. 2 40. 3 30. 7	57, 4 44, 0 51, 0 42, 4 31, 5	40, 3 45, 2 53, 2 43, 2 32, 5	43. 0 44. 7 55. 5 44. 5 33. 9	46, 2 45, 2 56, 2 45, 4 34, 4	46, 0 45, 0 49, 2 45, 4 34, 4	10, 2 15, 2 56, 4 7, 9 14, 9
July 10 July 11 July 12 July 13 July 14	40, 8 40, 8 43, 2 39, 1 48, 2	39, 4 41, 5 43, 2 36, 9 49, 2	40, 3 59, 7 44, 7 36, 6 45, 8	41. 1 38. 3 45. 2 37. 0 41. 0	38. 3 38. 1 42. 7 37. 2 39. 1	39, 1 40, 1 42, 7 37, 3 38, 9	43. 4 42. 0 42. 5 37. 2 40. 6	47, 0 46, 2 42, 2 38, 0 41, 2	50, 2 47, 8 41, 9 39, 3 42, 9	52, 8 52, 7 44, 2 39, 3 42, 7	55, 2 56, 0 44, 2 38, 9 41, 2	49. 7 56. 2 47. 2 38. 3 40. 7	52, 2 56, 7 44, 2 38, 3 40, 1	45 7 50,0 42,2 38,3 39,5
July 15 July 16 July 17 July 18; July 19	33, 5 37, 4 34, 9 37, 3 40, 4	93, 5 165, 9 34, 8 36, 6 39, 9	31. 0 36. 3 34. 5 35. 3 58. 1	30, 1 34, 0 34, 3 35, 0 38, 3	29, 0 34, 2 34, 4 34, 9 38, 3	29, 0 32, 5 34, 4 34, 6 38, 1	28.6 32.5 34.1 34.4 37.9	02, 5 32, 5 33, 7 34, 4 39, 1	31, 5 33, 5 33, 7 34, 9 40, 5	33, 1 34, 2 32, 7 35, 6 41, 2	32, 3 85, 4 33, 7 36, 1 43, 4	32, 5 36, 9 34, 4 37, 7 46, 3	93, 1 96, 7 94, 6 97, 7 50, 7	93.5 35.9 35.2 28.3 19.0
July 20 July 21 July 22 July 23! July 24!	46, 3 46, 5 45, 8 46, 8 56, 7	41, 6 43, 2 41, 4 16, 5 52, 0	45, 2 41, 3 44, 1 45, 1 49, 0	44. 8 41. 2 43. 3 43. 4 48. 9	43, 9 40, 5 42, 6 43, 2 50, 5	44. 0 40. 3 42. 2 43. 4 51. 2	43, 6 40, 3 41, 8 42, 5 50, 9	47, 4 39, 6 41, 4 43, 2 51, 2	48. 9 39. 3 42. 2 45. 7 52. 1	47, 2 39, 3 43, 4 49, 5 53, 9	48, 0 40, 1 45, 6 49, 2 57, 2	45. 2 42. 2 44. 7 50. 4 57. 2	46. 2 14. 7 47. 2 50. 4 61. 3	0.7 11.4 17.7 55.2 62.5
July 25 July 26 July 27 July 28 July 29	61. 3 54. 3 44. 7 35. 9 36. 2	59, 1 54, 0 43, 1 35, 9 35, 5	55, 1 52, 8 41, 0 36, 3 55, 2	55, 2 51, 2 41, 5 36, 6 35, 0	52, 2 51, 2 41, 2 36, 1 35, 2	53, 2 50, 9 41, 2 95, 4 95, 7	53, 2 50, 5 41, 0 34, 6 34, 9	53. 9 51. 6 41. 0 33. 9 34. 9	57, 2 52, 2 40, 3 33, 5 35, 9	60, 3 53, 4 41, 0 33, 9 35, 9	61. 1 54. 2 40. 3 34. 9 36. 9	55. 2 54. 7 41. 7 34. 9 38. 8	53, 7 55, 2 43, 0 35, 9 37, 4	51, 2 53, 4 43, 0 86, 5 10, 3
July 30 July 31	40. 9 54. 7	39. 4 54. 6	38, 5 54, 6 ;	05.45 50.0	97, 9 51, 2	36. 7 50. 1	26, 9 58, 7	36, 9 50, 2	38. 3 50. 9	39, 5 52, 7	40. 3 51. 6	$\begin{bmatrix} 41, 2 \\ 52, 2 \end{bmatrix}$	43. 2 52. 7	11. 1
Means	43, 20	42, 13	41, 23	40, 50	39, 53	39,51	39, 77	40. 69	41. 64	42. 79	43, 50	43, 82	44.24	44, 50
Date.	3 p. m.	4 p. m. '	5 p. m. '	6 p. m.	7 p. m.	8 p. m.	9 p.m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Din.!
1882. July 1 July 2 July 3 July 1	40, 7 47, 5 34, 2 38, 1	40, 8 48, 7 30, 2 39, 3	09, 3 48, 0 34, 0 09, 8	40 ± 47 7 143, 9 10, 7	41, 4 47, 0 03, 8, 40, 5	41, 0 46, 7 33, 0 39, 6	41, 8 46, 2 13, 1 40, 2	42. 0 45. 2 34. 2 40. 1	42. 0 42. 8 34. 4 41. 2	43, 4 40, 8 34, 6 41, 2	39, 10 42, 18 35, 37 37, 72	43, 4 48, 7 39, 8 41, 2	32, 2 34, 0 31, 6 32, 2	11.2
July 5 July 6 July 7 July 8 July 9	47. 4 45. 2 56. 8 47. 0 31. 2	46. 7 46. 7 58. 0 47. 2 34. 4	46, 2 46, 2 59, 3 49, 0 35, 4	45, 4 45, 0 60, 4 49, 0 55, 6	44, 2 12, 7 60, 6 48, 7 36, 4	44. 0 43. 2 59. 1 48. 6 87. 9	43, 4 44, 8 57, 7 18, 2 13, 4	44. 2 43. 4 56. 4 43. 7 43. 2	43, 2 44, 0 56, 0 39, 3 40, 3	44. 7 45. 0 52. 2 40. 2 10. 3	41, 50 43, 97 53, 55 44, 28 55, 98	47, 4 46, 7 60, 6 49, 0 43, 4	33, 2 39, 8 42, 2 36, 2 29, 8	13.7 6 + 18.4 12.5 13.6
July 10 July 11 July 12 July 15 July 14	49, 0 56, 7 42, 7 38, 8 38, 8	51, 7 59, 1 41, 8 39, 3 38, 3	70, 1 55, 7 41, 2 39, 9 38, 3	40.7 50.4 40.3 40.5 58.4	4.1 4 4*. 2 10, 1 40, 6 .15, 3	42.7 45.2 39.8 40.4 17.8	45, 2 46, 0 38, 8 41, 0 37, 4	51 2 43. 0 37. 4 42. 0 56, 6	53, 2 45, 2 38, 0 10, 8 35, 7	51, 3 42, 0 08, 5 49, 2 05, 0	40° 51° 47, 82° 12, 65° 59, 70° 49, 04°	55, 2 59, 9 47, 2 49, 2 49, 2	37. 3 56, 5 35, 5 35, 6 35, 9	17. 1 13. ‡ 11. 7 11. 2 15. 7
duly 15 July 16 July 17 July 18 July 19	33, 7 36, 9 35, 6 38, 3 51, 7	31, 0 36, 9 36, 6 38, 3 47, 8	04. 4 07. 1 	35, 4 37, 8 37, 9 38, 1 48, 0	54. 6 27. 8 38. 5 38. 1 45. 8	34, 4 37, 6 37, 8 38, 5 16, 7	35, 2 36, 7 37, 2 38, 8 19, 0	35, 4 35, 6 36, 1 39, 3 48, 3	57, 1 55, 5 37, 4 53, 9 16, 8	57, 4 55, 6 96, 9 99, 3 43, 7	93-12 95, 64 95, 44 97, 66 44, 69	37. 4 37. 8 38. 5 39. 9 51. 7	27.1 01.9 32.8 33.7 37.0	19, 1 5, 9 5, 7 6, 2 14, 7
July 20.	46, 2 45, 4	46, 2 47, 0 48, 0	47, 4 $47, 7$ $48, 2$ $60, 9$	48.7 45.2 48.4 61.1	45, 2 42, 7 50, 0 54, 4 58, 3	48, 4 43, 0 51, 8 55, 7 55, 4	48, 2 43, 4 52, 5 57, 4 56, 6	47, 2 43, 8 52, 3 57, 8 77, 2	47. 3 45. 0 5 5. 7 55. 4 57. 8	\$6.4 \$6.5 50.0 55.2 61.6	46, 98 42, 62 46, 62 51, 21 56, 46	48. 9 47. 7 53. 7 61. 1 65.5	45.7 58.3 40.7 11.5 48.0	0, 3 9, 4 13, 0 19, 4 17, 5
July 21 July 22 July 23 July 24	47. 7 57. 2 63. 7	65, 3	05.5	59, 1	4.4 2 19									
July 22 July 23	57. 2 63. 7 49. 7 54. 2 41. 0 37. 8 41. 0	65, 3 49, 2 54, 2 42, 2 36, 6 41, 2	50, 5 52, 0 43, 2 56, 4 41, 8	59, 1 53, 4 54, 8 45, 0 37, 2 43, 2	55. 1 52. 7 42. 2 36. 8 43. 0	56, 0 52, 4 40, 5 36, 4 43, 0	57, 1 49, 5 29, 0 36, 4 42, 8	56 7 49, 4 37, 5 36, 9 43, 5	54, 8 47, 8 35, 9 87, 3 42, 2	55, 6 45, 8 36, 2 36, 8 41, 8	54, 99 52, 19 41, 12 35, 95 38, 80	61, 3 55, 2 45, 0 37, 8 43, 5	48.1 43.8 95.0 93.8 93.8	13. 2 11. 4 10. 0 5. 0 9. 7
July 22 July 23 July 24 July 25 July 26 July 27 July 28	49. 7 54. 2 41. 0 87. 8	65, 3 49, 2 54, 2 42, 2 36, 6	50, 5 52, 2 43, 2 36, 4	53. 4 54. 8 45. 0 37. 2	55. 1 52. 7 42. 2 36. 8	52. 4 40. 5 36. 4	49, 5 29, 0 36, 4	49, 4 37, 5 36, 9	47, 8 35, 9 37, 3	45, 5 36, 2 36, 8	52, 19 41, 12 35, 95	55, 2 45, 0 37, 8	43. 8 35. 0 32. 8	11. 4 10. 0 5. 0

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Beight of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, —5 hours 17 minutes.]

		_						1	4.00					
Date.	I a. m.	2 a. m.	8 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1682. Aug. 1 Aug. 2 Aug. 3	55, 5 42, 9 53, 7	55, 2 42, 8 53, 4	55, 9 43, 0 48, 0	54. 8 43. 0 45. 2	50. 2 44. 2 43. 5	49. 2 44. 7 41. 7	47. 7 44. 2 40. 7	47. 7 44. 2 40. 3	48. 2 44. 4 40. 6	19. 6 44. 7 38. 6	50, 3 45, 2 38, 8	50, 2 46, 9 98, 8	50, 0 49, 0 38, 8	52, 0 49, 9 38, 3
Aug. 4 Aug. 5 Aug. 6 Aug. 7 Aug. 8	40, 4 32, 7 40, 2 51, 8 43, 8	42. 7 34. 1 40. 3 50. 7 41. 6	38, 5 34, 0 40, 2 49, 0 41, 3	38, 1 34, 1 40, 8 49, 0 41, 0	38, 3 34, 0 41, 2 43, 7 40, 6	39. 6 32. 5 41. 9 43. 2 44. 6	40, 3 32, 7 43, 2 42, 8 40, 1	40. 9 32. 9 44. 4 42. 2 40. 0	41. 7 33. 7 44. 7 41. 7 41. 2	43, 4 34, 9 45, 5 41, 9 41, 2	45, 8 30, 4 49, 0 41, 4 43, 4	47, 2 37, 6 49, 7 41, 9 45, 5	41. 8 38. 7 50. 7 41. 2 46. 2	41. 4 39. 5 53. 7 41. 3 48. 1
Aug. 9 Aug. 10 Aug. 11 Aug. 12 Aug. 13	52, 7 33, 6 53, 3 57, 9 35, 1	52. 0 33. 1 52. 0 54. 4 35. 2	51. 9 32. 7 50. 6 50. 6 34. 2	52. 0 33. 6 50. 1 50. 2 33. 1	51. 2 33. 3 50. 2 48. 6 32. 5	50. 7 33. 3 50. 0 48. 2 31. 7	50, 2 34, 9 50, 2 47, 7 32, 0	49. 7 36. 1 50. 2 47. 7 31. 8	49, 2 38, 3 50, 2 46, 8 31, 8	49. 4 40. 3 50. 2 46. 2 32. 0	49, 4 41, 0 50, 2 46, 2 32, 0	48, 5 42, 2 51, 7 41, 2 31, 9	48. 0 43. 4 53. 4 39. 1 31. 0	48, 7 43, 6 53, 2 37, 6 31, 0
Aug. 14 Aug. 15 Aug. 16 Aug. 17 Aug. 18	31. 6 34. 0 33. 9 33. 1 33. 4	31, 3 33, 7 32, 5 32, 5 33, 1	30, 5 33, 5 32, 3 32, 3 33, 3	30, 5 33, 5 32, 3 32, 2 32, 5	30, 3 32, 7 32, 3 31, 8 32, 5	30, 0 32, 5 32, 0 31, 0 32, 1	30, 3 32, 5 32, 3 31, 7 31, 9	30, 3 32, 5 32, 1 32, 2 31, 5	31, 0 33, 1 32, 1 32, 8 31, 8	31, 0 33, 3 32, 1 32, 3 32, 2	32, 0 33, 6 32, 5 32, 4 32, 5	32, 0 34, 4 32, 5 32, 4 33, 2	33. 5 34. 8 32. 5 33. 0 33. 6	34. 0 36. 0 34. 2 33. 0
Aug. 19 Aug. 20 Aug. 21 Aug. 22 Aug. 23	34, 2 38, 1 37, 5 36, 4 35, 4	32, 5 37, 5 36, 5 36, 4 35, 4	31, 4 37, 0 35, 4 33, 1 35, 2	30, 7 36, 9 36, 7 33, 3 35, 2	30, 3 36, 4 38, 3 83, 2 35, 2	29. 9 36. 1 37. 2 33. 2 34. 9	30, 1 35, 4 30, 4 33, 6 34, 9	30, 3 35, 4 35, 6 33, 3 34, 6	92, 5 95, 6 35, 2 33, 3 55, 4	95, 5 35, 9 34, 4 33, 5 34, 6	35, 5 35, 9 34, 4 35, 1 34, 7	36, 2 36, 6 33, 7 35, 7 34, 4	37. 4 33. 5 36. 4 34. 9	37, 4 38, 1 33, 9 37, 1 35, 4
Aug. 24 Aug. 25 Aug. 26 Aug. 27 Aug. 28	36. 4 33. 5 33. 5 31. 5 39. 4	32, 5 32, 5 33, 3 30, 5 28, 6	31. 1 32. 0 33. 3 20. 6 28. 5	31. 0 32. 3 33. 3 28. 5 28. 2	30, 5 32, 5 33, 3 <b>28,1</b> 28, 6	30. 9 32. 3 33. 0 28. 2 28. 4	31, 5 32, 3 33, 0 28, 6 28, 1	31, 5 32, 5 33, 2 29, 3 27, 8	31, 5 33, 3 32, 9 29, 6 27, 4	31, 5 33, 1 32, 8 20, 6 27, 6	31, 7 33, 5 32, 5 29, 8 29, 1	32, 8 33, 3 32, 5 30, 5 30, 1	32. 8 33. 5 33. 2 30. 5 50. 5	32, 8 33, 0 33, 5 30, 8 30, 2
Aug. 20 Aug. 30 Aug. 31	29. 1 31. 3 31. 3	29, 0 30, 9 32, 0	28. 7 31. 3 32. 3	28, 9 30, 6 32, 3	28. 8 30. 5 32. 5	28, 6 30, 5 32, 5	28, 6 30 3 33, 0	28, 8 30, 5 33, 0	29, 2 29, 6 32, 3	29, 4 29, 8 32, 3	29, 6 30, 5 32, 3	30, 5 31, 3 32, 0	31, 3 32, 1 32, 2	32. 0 32. 3 32. 5
Means.	38, 62	38, 01	37, 15	36. 90	36, 43	36, 30	36,15	36, 21	36, 47	26.74	37. 31	37. 66	37. 88	38. 33
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Diff.
Date. 	3 p. m. 52.2 48.7 37.8	4 p. m. 52. 7 48. 7 38. 3	5 p. m.	6 p. m. 48. 8 48. 0 08. 5	7 p. m. 47. 4 47. 9 36. 7	\$ p. m. 48. 2 48. 2 36. 6	9 p. m. 	10 p. m. 45. 4 50. 0 35. 2	42, 6 53, 9 56, 1	<b>12</b> p. m. <b>42</b> , 2 55, <b>1</b> 37, 2		Max. 57, 6 55, 0 56, 1	Min. 40.8 40.7 33.6	Diff. 16. 8 14. 3 22. 5
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1882. Aug. 1 Aug. 2 Aug. 3 Aug. 4 Aug. 5 Aug. 6 Aug. 7	52. 2 48. 7 37. 8 41. 5 40. 1 54. 2	52. 7 48. 7 38. 3 41. 2 55. 2 42. 2	50. 3 48. 3 38. 4 37. 1 41. 2 56. 7 43. 0	48. 8 48. 0 08. 5 35. 6 40. 4 57. 9 43. 9	47. 4 47. 9 36. 7 35. 7 39. 8 57. 0 43. 3	48, 2 48, 2 36, 6 35, 8 39, 5 50, 4 43, 0	46. 4 49. 9 35. 0 30. 3 30. 6 55. 3 42. 7	45. 4 50. 0 35. 2 36. 2 39. 8 53. 5 42. 8	42. 6 53. 9 56. 1 35. 1 39. 9 53. 0 41. 3	42. 2 55. 1 37. 2 34. 2 40. 6 52. 6 41. 1	49, 70 46, 99 40, 42 39, 45 37, 08 40, 02 43, 62	57, 6 55, 0 56, 1 47, 5 42, 0 57, 5 53, 6	40. 8 40. 7 33. 6 33. 0 31. 7 39. 3	16.8 14.3 22.5 14.5 10.3 18.2 14.0
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Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.

[Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes.]

He

						**	minute con.							
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1852. Sept. 1 Sept. 2	33, 5 33, 3	34. 4 30. 1	33. 5 29. 5	33, 5 30, 2	32. 3 30. 5	32. 3 30. 5	31. 3 80. 5	30, 5 20, 6	30. 1 29. 3	30. 0 29. 4	29. 9 29. 1	29, 9 28, 5	30. 1 28, 9	30, 8 30, 5
Sept. 3 Sept. 4 Sept. 5 Sept. 6 Sept. 7	36. 2 35. 5 40. 4 33. 2 29. 8	35, 5 34, 5 37, 9 32, 3 50, 5	35. 2 33. 9 37. 6 31. 3 31. 3	31. 0 33. 1 36. 4 31. 3 31. 7	31. 2 33. 5 35. 4 31. 0 32. 6	33. 5 33. 0 34. 4 30. 1 32. 5	33. 7 32. 5 33. 9 29. 8 32. 5	33. 3 32. 7 33. 3 30. 1 32. 3	33. 0 33. 1 33. 3 30. 1 33. 3	33, 4 33, 4 33, 3 30, 1 33, 0	33. 5 35. 4 33. 2 30. 3	33, 5 35, <b>6</b> 35, <b>0</b> 32, 3 33, <b>0</b>	35. 0 37. 0 36. 9 32. 4 32. 9	36.9 39.5 39.1 35.1 36.2
Sept. 8 Sept. 9 Sept. 10 Sept. 11 Sept. 12	20, 2 20, 2 27, 6 30, 4 30, 3	30, 3 29, 0 28, 3 30, 3 30, 3	29, 6 28, 5 28, 6 30, 2 31, 1	29, 4 28, 3 28, 6 30, 1 30, 5	30. 1 28. 1 28. 6 29. 6 30. 9	30, 5 29, 4 28, 8 29, 8 31, 3	30, 5 26, 4 28, 8 29, 6 31, 3	30. 5 25. 6 28. 6 29. 6 31. 1	30. 3 25. 1 29. 1 29. 6 31. 0	30, 3° 25, 0 28, 4 29, 3 30, 5	29. 6 24. 8 28. 5 29. 3 30. 5	29, 5 25, 4 29, 1 29, 5 30, 7	29. 6 25. 5 29. 4 30. 3 31. 1	29. 2 25. 4 30. 2 31. 3 31. 2
Sept. 13 Sept. 14 Sept. 15 Sept. 16 Sept. 17	31. 9 32. 1 28. 1 30. 3 30. 1	31, 7 32, 3 26, 1 30, 3 29, 7	32, 3 32, 4 26, 3 30, 0 29, 4	32. 4 32. 5 27. 6 29. 6 29. 3	32. 5 32. 5 29. 1 29. 6 29. 4	92. 5 32. 5 28. 6 20. 6 29. 6	32. 4 32. 3 26. 6 29. 4 29. 8	32, 3 32, 3 28, 3 29, 6 30, 4	32. 0 31. 7 26. 6 29. 6 30. 5	31. 5 31. 8 27. 0 30. 1 31. 3	31, 0 31, 3 26, 8 30, 3 31, 3	31. 0 31. 8 27. 9 31. 0 32. 2	31. 5 32. 5 28. 1 31. 8 32. 0	31. 7 33. 1 52. 4 32. 3 32. 3
Sept 18 Sept 10 Sept. 20 Sept. 21 Sept. 22	31, 8 32, 1 20, 5 29, 4 28, 2	03. 2 02. 0 01. 2 29. 2 28. 4	23.4 32.2 30.5 30.1 28.4	32. 4 32. 0 29. 4 30. 2 28. 4	32, 5 31, 5 27, 8 30, 2 28, 4	32. 5 31. 5 27. 6 30. 1 28. 4	32. 0 31. 6 27. 4 30. 1 28. 3	31. 5 31. 3 26. 6 29. 8 28. 1	31. 3 26. 4 29. 4 28. 0	31, 2 31, 3 20, 1 29, 4 27, 4	20, 5 31, 3 25, 6 29, 4 27, 2	32. 3 31. 6 25. 8 20. 4 27. 6	32. 4 31. 8 25. 7 20. 2 27. 4	1 02.5 1 01.9 26.4 19.2 27.5
Sept. 23 Sept. 24 Sept. 25 Sept. 26 Sept. 27	25.6	25. 2 27. 1 27. 0 20. 4 01. 6	25, 6 26, 6 26, 9 25, 3 31, 6	25. 9 25. 8 27. 4 22. 7 31. 7	25, 5 25, 6 27, 7 23, 6 31, 6	25. 4 25. 2 27. 6 21.7 31. 0	25, 1 25, 2 26, 8 22, 9 30, 5	25. 6 25. 4 26. 1 24. 5 31. 0	25, 8 25, 2 25, 7 25, 5 31, 2	26, 4 25, 0 25, 8 25, 4 21, 5	26, 4 24, 7 24, 7 25, 7 31, 4	27, 6 24, 9 25, 4 26, 0 31, 8	27, 9 24, 7 25, 8 27, 2 32, 6	24.5 26.5 28.6 28.6 20.6
Sept. 28 Sept. 29 Sept. 30	35, 7 35, 1 35, 4	35. 6 34. 5 33. 9	35, 5 34, 2 32, 3	35, 5 33, 6 31, 7	34. 9 93. 3 34. 5	35, 3 33, <b>0</b> 52, 3	34. 4 33. 0 33. 0	34. 4 33. 0 33. 3	34. 4 34. 2 33. 3	34, 1 35, 4 33, 3	35. 1 35. 5 33. 7	34, 2 35, 3 34, 0	34, 0 35, 0 34, 2	44. 1 35. 0 34. 1
Mema	31.10	30.91	30.74	30, 54	30, 46	30, 35	30, 05	30.02	29,94	30, 60	29, 97	30, 39	30, 76	31, 45
Date	3 p. tn.	4 p. m.	5 p. m.	1 6 p. m.	, 7 p. m.	8 p. m.	9 p. m.	10 p. m.	1 1 p. m.	12 p. m.	Dails	Max.	Min.	Diff.
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Sept. 3 Sept. 4 Sept. 5 Sept. 6 Sept. 7	38. 0 42. 0 41. 6 33. 2 33. 0	10, 1 43, 4 42, 7 33, 3 34, 2	39, 1 45, 2 43, 0 33, 3 34, 2	42.5 46.5 42.9 93.3 34.2	42, 5 47, 2 43, 7 33, 0 33, 9	43.7 48.7 41.8 32.5 33.5	43. 2 49. 4 41. 0 32. 2 33. 5	43. 3 50.6 39. 9 32. 0 32. 3	41, 2 47, 6 39, 2 30, 5 32, 0	38. 5 49. 3 36. 7 30. 3 32. 0	37, 20 39, 69 38, 63 31, 71 32, 68	44. 6 51.3 48. 4 41. 1 36. 9	31. 7 30. 7 31. 7 28. 3 28. 4	12.9 20.6 16.7 12.8 8.5
Sept. 8 Sept. 9 Sept. 10 Sept. 11 Sept. 12	27. 6 25. 6 30. 4 31. 3	27, 7 25, 6 30, 8 31, 6 31, 5	28. 0 26. 9 31. 2 31. 3 31. 5	27. 1 27. 8 31. 5 31. 7 31. 9	26, 4 28, 1 31, 5 32, 0 32, 5	26, 0 28, 6 32, 3 32, 0 32, 0	27, 4 28, 6 32, 5 32, 0 33, 0	28, 4 29, 1 32, 4 31, 9 32, 9	28. 0 28. 6 31. 7 31. 0 31. 7	28. 7 28. 0 31. 4 30. 3 32. 7	29, 01 27, 20 29, 90 30, 58 31, 37	38, 6 33, 3 34, 4 35, 7 36, 5	24.4 24.4 26.4 27.5 29.1	14.2 8.9 8.0 8.2 7.4
Sept. 13 Sept. 14 Sept. 15 Sept. 16 Sept. 17	33, 1 32, 7	32. 1 34. 4 34. 0 33. 5	31, 9 34, 2 32, 5 33, 4	32. 3 34. 4 35. 2 32. 0 33. 5	32, 4 34, 2 35, 1 33, 0 33, 5	32. 0 34. 2 35. 0 31. 3 33. 0	31. 9 33. 5 34. 9 31. 1 33. 3	31. 7 32. 5 33. 5 31. 3 33. 4	31. 8 31. 3 32. 5 30. 9 32. 7	31. 7 29. 5 30. 9 30. 3 32. 6	31, 95 32, 70 30, 33 30, 92 31, 61	34. 6 30, 8 35. 9 35. 9 35. 0	29, 5 28, 0 24, 1 27, 6 27, 7	5.1 2.8 11.8 8.3 7.3
Sept. 18 Sept. 19 Sept. 20 Sept. 24 Sept. 22	33. 0 32. 0 26. 6	33 2 32.9 26.9 29.4 27.3	33, 5 32, 4 28, 1 29, 4 27, 4	33. 7 31. 5 29. 4 29. 4 27. 6	39, 5 30, 7 30, 3 29, 4 27, 6	33. 3 31. 1 30. 3 29. 0 27. 4	30. 1 31. 7 30. 6 28. 6 27. 3	32. 9 31. 5 30. 3 28. 5 27. 3	32. 3 30. 7 29. 0 28. 3 26. 2	32. 1 30. 5 29. 5 28. 1 25. 4	32, 42 31, 58 28, 29 29, 35 27, 61	35, 6 36, 9 34, 8 35, 5 33, 2	29. 7 29. 2 24. 1 26. 7 24. 1	5.9 7.7 10.7 8.8 9.1
Sept. 23 Sept. 24 Sept. 25 Sept. 26 Sept. 27	26.4 30 B	29, 9 25, 9 26, 9 22, 1 24, 6	30, 1 27, 6 27, 8 33, 5 36, 2	31, 3 27, 9 28, 4 33, 0 36, 4	20, 7 27, 6 28, 6 32, 5 36, 9	29. 9 27. 4 28. 8 32. 5 37. 2	29. 4 26. 3 28. 6 32. 6 36. 7	28. 9 25. 7 28. 6 31. 9 36. 6	28, 4 25, 0 28, 4 31, 7 36, 2	28. 0 25. 0 26. 2 31. 9 35. 7	27, 49 25, 85 26, 96 28, 08 33, 45	33. 5 33. 7 31. 6 36. 5 37. 8	23. 8 22. 8 23. 1 19.5 29. 3	9, 7 10, 9 8, 5 17, 0 8, 5
Sept. 23 Sept. 29 Sept. 30	34, 9 45, 9 33, 9	36. 7 15. 5 53. 2*	38, 2 35, 4 32, 6	37, 2 35, 6	37. 8 35. 8 32. 3	39, 1 35, 9 32, 3	39, 3 36, 3 32, 3	37, 5 35, 9 32, 5	36, 5 35, 7 32, 5	35. 9 35. 6 32. 8	35, 82 24, 88 33, 63	42.3 41.3 38.3	32. 8 31. 8 31. 2	9.5 9.5 7.1
Молиа	31.00	32, 45	32,94	23, 25	33.37	33.34	33,37	33, 15	32.46	31. 99	\$1.46	37.43	27, 44	0.99

<sup>\*</sup> Interpolated.

tinued.

-5 Lours

2 p.m.

50,8 50,5 9 50,5

Diff.

10:00 (10:3) (20:4) (20

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Height of the therm energy above the surface of the earth, 4 free. Washington mean time. Correction to reduce to mean local time, -5 hours

(Height of co.			17 minutes	. [				
11ste \$ 6 m. 2 a.m.   3	а. п. 4 а. т.	å s.m.	8 a. m T a. m.	8 a. m. ' !	9 a. m 16	nam., 11 n.m.	12 m 1 p.	m. 2 p. m.
1882	32. 6   32. 7 37. 9   37. 5	32, ft 37, 1	33.2 13.8 38.5 38.1	83, 6 87, 6	34 fi 37. 2	95. 0 94. 6 37. 4 97. 0	34. 8 35 36 8 37	1 35, 5 1 37, 4
Oct 3 01 9 01.4 Oct 4; 25 40 2576 Oct 5 22.5 21.8 Oct 6 20.9 20.2 Oct 7 48.6 18.0	30, 3   30, 3 25, 3   25, 4 20, 9   10, 8 20, 3   20, 0 18, 7   18, 7	20. 1 25. 1 20. 0 20. 0 18. 7	29. 6 29. 4 25. 1 24. 9 19. 6 19. 6 20. 1 19. 7 19. 9 19. 3	28.7 21.7 19.6 19.6 19.0	27. 9 24. 4 19. 2 19. 6 19. 4	27. 5 20. 9 24. 2 23. 7 19. 6 20. 1 19. 5 19. 5 19. 5 19. 5	26. 4 26 23. 4 29 20. 4 16 10. 1 14 10. 4 19	5 20, 6 .5 18.7
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	18.4 15.4 14.5 14.5 8.1 6.9 1.5 7.8 7.7	17. 8 15. 0 12. 4 6. 2 8. 0	$\begin{array}{cccc} 17,2 & & 16,8 \\ 15,1 & & 15,2 \\ 12,1 & & 12,1 \\ 6,2 & & 6,0 \\ 8,7 & & 9,1 \\ \end{array}$	16 6 15, 0 10, 0 6, 7 8, 8	16.3 15.4 9.8 7.6 9.0	16 1 16 5 14.9 14 8 9.1 8.5 6.7 7.2 6.1 5 3	8.3 8	10, 5 14, 8 1 6, 9 5 9, 4 5 1, 7
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccccc} 4,2 & & 5,8 \\ 3,9 & & 3,4 \\ 2,7 & & 2,6 \\ 1,2 & & 3,0 \\ 2,4 & & 1,7 \end{array}$	5, 2 2, 5 3, 0 6, 0 1, 6	5, 0 5, 1 3, 2 1, 6 2, 7 1, 8 6, 5 6, 7 1, 4 3, ‡	4, 4 1, 4 1, 5 5, 1 2, 5	0. 4 1. 1 0. 2 4. 2 2. 3	$\begin{array}{cccc} 0.6 & \leftarrow 0.5 \\ 0.4 & \leftarrow 0.9 \\ 1.6 & 0.7 \\ 4.2 & 4.2 \\ 1.6 & 0.6 \end{array}$	0.6 0	$\begin{array}{cccc} 9 & -1.5 \\ .4 & 5.5 \\ .5 & 2.1 \\ .6 & 0.4 \\ .7 & 0.4 \end{array}$
Oct 15	$\begin{array}{cccc} 4,3 & & 4,9 \\ 6,7 & & 6,1 \\ 4,2 & & 4,9 \\ 3,4 & & 2,6 \\ 5,1 & & 5,3 \end{array}$	5, 3 6, 0 5, 1 2, 1 5, 5	$\begin{array}{cccc} 5,7 & 5,4 \\ 5,7 & 5,4 \\ 5,9 & 3,4 \\ 0,1 & -1,4 \\ 0,0 & 6,2 \end{array}$	5, 3 4, 8 3, 5 - 2, 1 6, 3	5, 0 4, 9 4, 2 - 2, 1 6, 0	5. 0 4 9 5. 0 5 0 4 2 4. 5 2. 3 - 2. 2 4. 5 0. 2	4.4 4 -0.5 -1	$\begin{array}{cccc} 9 & & 6.7 \\ 4 & & 3.4 \\ 2 & & 4.2 \\ 6 & & -1.1 \\ 4 & & 1.4 \end{array}$
Oct 23 9.0 7.9 — Oct 24 9.5 6.6 Oct 25 9.1 2.1 1 Oct 25 9.2 2.9 Oct 27 4.5 — O.1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} -6.2 \\ 1.0 \\ 1.8 \\ -0.1 \\ -7.2 \end{array}$	$\begin{array}{ccccc} -6.0 & -5.3 \\ 0.4 & 0.4 \\ 1.7 & 2.1 \\ -1.2 & -1.9 \\ -7.5 & -8.0 \end{array}$	0.2	- 4.5 0.2 2.5 - 2.5 - 9.3	5.2 - 5.2 0.6 - 0.3 2.5 - 2.6 - 2.9 - 3.4 11.1 - 8.4	0,4 0	.2 - 24
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c cccc} 10, 4 & -8, 2 \\ 7, 2 & -9, 6 \\ 2, 9 & -3 \\ 16, 9 & 16, 9 \end{array} $	6, 0 17. 0	- 5 8 - 4.5 -13.2 -14.9 8.1 8.7 17.0 17.4	-10.7 7.7 15.8	11.1	2.9 — 2.1 -17.3 — 16.2 -1.4 — 3.1 13.9 — 14.5	15.3 49	.4 3.2 .0 . 18.5
M (na) 9,51 · 9,39 ]	C. 05 9. 05	9, 07	9.04 8.00	8,49	8,05 -	7, 66 7, 19	7.71 7	.71 8 17
Pate 3 p.m. 1 p.m. 5	р. п 6 р. п.	7 p. m.	5 p. m.   9 p. m.	10 p. m = 1	11 p. m 13	2 p. m. Daily Means.	Max. j Mi	n Diff
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	30, 9 37, 9 38, 1	37. 2 38. 1	37. 2 38. 7 37. 9 37. 6	37 8 36. 9	36.5	36. 1 + 35. 19 32. 5   37. 23	59, 5 31 10.7 31	, 6 7. 9 , 6 9. 1
0.1 5 20.6 20.5 1 0.1 5 43.6 18.6	26, 6   26, 4 23, 5   23, 5 20, 7   20, 7 19, 1   19, 1 20, 5   20, 9	26.3 23.4 20.5 18.6 21.0	26. 3 26. 6 23. 2 23. 4 20. 5 20. 5 18. 6 18. 9 20. 7 19. 5	26. 3 23. 3 20. 3 18. 9 19. 0	26, 2 23, 0 20, 3 18, 9 18, 1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	31.8 21 29.6 17 26.2 17	.4 12.9 .4 10.4 .8 11.2 .1 9.1 .8 6.2
0:1 5 46.7 16.7 0:1 9 11.8 11.9 0:1 10 7.7 7.0 0:0.11 6.5 5.7 0:0.12 4.5 5.6	16.7 : 16.8 15.5 : 15.5 9.1 : 9.7 5.5 : 5.7 7.0 : 7.0	16, 9 15, 2 10, 0 5, 7 5, 1	$\begin{array}{cccc} 16.8 & & 16.9 \\ 14.9 & & 14.7 \\ 9.9 & & 9.7 \\ 5.3 & & 5.7 \\ 4.2 & & 3.4 \end{array}$	16 7 15 0 9 8 5 7 3 1	16. 0 14. 4 8. 9 5. 8 5. 3	15. 8 , 10. 94 , 15. 05 8. 8 10. 13	21. ( 12 20. 5 7 10. 2 3	. 5 10. 7 1.8 8. 6 1.1 15. 5 1.2 7. 0 1.3 10. 6
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4, 4 : 4, 6 10, 0 : 9, 5 3, 4 : 3, 2 4, 4 : 4, 4 2, 9 : 2, 7	4.7 7.0 2.5 4.4 2.3	$\begin{array}{cccc} \textbf{4.4} & \textbf{4.4} \\ \textbf{6.8} & \textbf{6.2} \\ \textbf{1.8} & \textbf{-0.7} \\ \textbf{4.8} & \textbf{7.2} \\ \textbf{1.8} & \textbf{2.8} \end{array}$	- 2 6 - 3 8 - 3 0 - 7 0 2 6	3, 8 5, 3 0, 7 5, 8 2, 5	4.5 : 2.97 6.0 : 4.55 - 0.2 : 1.65 - 4.3 : 3.78 - 4.8 : 2.15	14.4 — 4 9.8 — 6 12.2 — 7 11.4 — 4 12.7 — 8	1,8 . 10,6 3 17,5 6 16,0
Or (*)     6, 4     6, 3       O(4, 1, 1)     3, 5     3, 9       O(4, 2)     4, 3     4, 5       O(4, 2)     -0, 6     0, 4       O(1, 2)     -0, 4     -0, 3	$\begin{array}{cccc} 6,4 & & 5,7 \\ 4,7 & & 4,9 \\ 5,1 & & 6,2 \\ 1,4 & & 1,8 \\ 1,0 & \longrightarrow 3,2 \end{array}$	5. 1 5. 0 7. 0 2. 1 — 6. 6	1. 6 1. 8 5. 1 5. 4 6. 7 5. 7 2. 1 0. 3 - 7. 5 - 5. 3	5 9 5 9 4 7 2 5 — 6.7	5 0 5 0 3 6 2.2 - 7.5 -	5, 2 4, 5 3, 0 3, 0 4, 65 3, 1 7, 0 9, 99	6 7 1 7, 0	.4 5.5 .6 5.1 .5 5.5 .9 9.8 .0 18.3
Oct 25	0.0 - 6.7 0.6 - 0.6 3.6 - 3.0 -2.4 - 1.9 -7.7 - 9.3		$\begin{array}{ccccc}  & -2.5 & -2.7 \\  & 0.9 & 1.8 \\  & 3.6 & 2.9 \\  & -1.7 & -1.1 \\  & -10.5 & -13.1 \\ \end{array}$		- 0.3 1.7 2.4 - 1.5 -14.8	0 2 - 3.24 2.0 0 63 2.5 2.60 1.9 - 1.36 -15 2 - 9.21	- 0. 2 - 12 2. 0 - 2 3. 5   - 6 - 0. 7 - 10	1.4 4.4 1.0 3.5 1.1 9.1
Oct. 30 § 49.8 14.4	$\begin{array}{cccc} 0.5 & \leftarrow 0.3 \\ 6.1 & -5.3 \\ 19.2 & 20.1 \\ 47.6 & 16.8 \end{array}$	- 0.2 - 4.1 19.8 10.3	0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{0.4}{1.7}$	- 2.2 - 1.3 - 18.2 14.5	- 5.3 - 3.76 - 0.9 - 9.28 19.2 8.90 14.6 16.46	$\begin{array}{cccc}  & 2.2 & -10 \\  & 1.3 & -2 \\  & 20.4 & -6 \\  & 21.5 & 15 \end{array}$	.8 20.5
Menna 8.61 , 9.03	9,63 9,64	9, 30	9, 29 9, 10	8, 92	8.79	8.07 S.77	11.88	11.83

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883-Continued.

[Height of the thermemeter above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes.]

								,						
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 n. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1882. Nov. 1	13.7	12.1	12.8	13. 1	11.8	8, 7	8.0	11.0	12. 0	11.5	9, 8	6. 2	5, 9	2.7
Nov. 2 Nov. 3 Nov. 4 Nov. 5 Nov. 6	- 6.0	3.6 - 4.3 - 3.4 - 5.2 - 3.8	$\begin{array}{r} -3.4 \\ -3.8 \\ -3.6 \\ -4.0 \end{array}$	5.1 - 4.0 - 3.6 - 5.2 - 4.0	7.4 + 2.2 - 2.5 - 4.5 - 5.8	$\begin{array}{r} -3.0 \\ -1.8 \\ -2.3 \\ -5.4 \\ -7.1 \end{array}$	$\begin{array}{r} -7.7 \\ -1.4 \\ -2.5 \\ -6.6 \\ -8.2 \end{array}$	$ \begin{array}{r} 7.3 \\ -3.0 \\ -3.0 \\ -5.3 \\ -8.6 \end{array} $	7.3 - 3.9 - 4.3 - 5.1 - 8.6	7.2 - 4.0 - 6.0 - 4.4 - 8.7	5. 9 - 4. 9 - 5. 0 - 4. 0 - 7. 5	$\begin{array}{r} -3.6 \\ -5.0 \\ -5.9 \\ -3.8 \\ -7.8 \end{array}$	$\begin{array}{c} -1.2 \\ -4.9 \\ -6.1 \\ -4.9 \\ -7.1 \end{array}$	- 5.8 - 4.8 - 4.9 - 5.3 - 7.4
Nov. 7 Nov. 8 Nov. 9 Nov. 10 Nov. 11	- 7. 6 1. 2	- 3.8 - 7.4 1.6 27.9 5.9	- 3, 8 - 6, 6 1, 2 26, 4 5, 1	- 3. 0 - 5. 4 - 0. 4 - 26. 6 - 5. 5	- 3. 4 - 4. 9 2. 1 26. 4 6. 3	- 3.2 - 4.2 3.4 26.6 6.8	$\begin{array}{c} -5.1 \\ -1.9 \\ -3.0 \\ 26.7 \\ 6.2 \end{array}$	- 3. 8 - 0. 2 5. 7 26. 3 5. 1	- 4.0 1.1 8.9 23.8 4.4	4, 9 1, 2 9, 9 27, 4 2, 9	- 6, 6 0, 6 11, 0 24, 5 1, 4	-6.8 $0.6$ $12.0$ $-22.4$ $-0.5$	$ \begin{vmatrix} -7.5 \\ 0.1 \\ 13.0 \\ 19.0 \\ -1.2 \end{vmatrix} $	$\begin{array}{c} -7.0 \\ -0.5 \\ 13.8 \\ 14.2 \\ -2.6 \end{array}$
Nov. 12 Nov. 13 Nov. 14 Nov. 15 Nov. 16	-25. 3 -24. 6 -30. 5	-13. 9 -24. 9 -24. 8 -30. 0 -18. 6	-14.7 -25.8 -25.2 -30.3 -18.8	-10.7 -25.9 -24.7 -29.5 -19.9	-17.7 $-26.1$ $-25.9$ $-30.0$ $-18.7$	-18.7 -25.9 -25.8 -29.1 -18.4	-20.1 $-25.2$ $-26.9$ $-28.9$ $-18.6$	-21.0 -25.7 -27.2 -27.1 -10.4	$\begin{array}{c} -21.0 \\ -25.8 \\ -28.6 \\ -25.9 \\ -18.5 \end{array}$	-21.2 -24.8 -28.3 -26.5 -19.1	-21. 0 -24 6 -29. 8 -26. 0 -18. 5	-21, 2 -24, 2 -29, 2 -24, 6 -18, 4	$\begin{array}{c c} -21.4 \\ -24.3 \\ -29.5 \\ -23.6 \\ -18.3 \end{array}$	$\begin{array}{c} -21.1 \\ -24.6 \\ -29.1 \\ -29.1 \\ -18.5 \end{array}$
Nov. 17 Nov. 18 Nov. 19 Nov. 20 Nov. 21	-12.5 - 5.4 -10.4 - 5.1 - 6.6	-13. 0 6. 0 9. 7 6. 5 5. 2	-12.1 -7.3 -10.0 -7.0 -4.2	$ \begin{array}{r} -12.0 \\ + 6.3 \\ - 9.7 \\ - 8.6 \\ - 4.9 \end{array} $	-11.2 -6.3 -10.0 -8.2 -4.9	-10. 2 - 7. 0 -10. 0 - 8. 4 - 1. 7	- 9, 6 - 7, 9 - 9, 8 - 8, 8 - 4, 0	- 8.9 - 8.8 - 9.9 - 8.7 - 2.3	= 8,5 = 9,1 =10,2 = 8,7 = 2,2	$\begin{array}{c} -0.3 \\ -8.5 \\ -0.7 \\ -0.0 \\ -2.4 \end{array}$	7.0 - 7.8 - 8.6 - 6.7 - 2.4	- 9.3 - 8.4 - 7.5 - 4.2 - 2.5	= 9.5 = 9.2 = 7.0 = 3.1 = 1.7	- 8.7 - 9.5 - 7.7 - 2.5 - 1.2
Nov. 22 Nov. 23 Nov. 24 Nov. 25 Nov. 26	- 0.7 - 8.6 - 1.6 11.4	6. 2 - 0. 3 - 8. 8 - 4. 3 - 11. 7	$\begin{array}{c} 11.0 \\ 0.3 \\ -0.7 \\ -7.0 \\ -16.7 \end{array}$	11. 7 0. 4 - 4. 0 - 9. 2 -18. 8	$ \begin{array}{r} 12.7 \\ -1.9 \\ -3.8 \\ -10.6 \\ -19.3 \end{array} $	12. 4 - 1. 7 - 3. 2 -11. 7 -18. 5	$\begin{array}{c} 12, 2 \\ -0.7 \\ -3.3 \\ -12.1 \\ -19.2 \end{array}$	$ \begin{array}{r} 0.8 \\ -1.7 \\ -4.0 \\ -12.3 \\ -18.6 \end{array} $	- 2.5 - 6.2 - 12.6 - 17.5	- 3, 1 - 6, 6 -13, 0 -18, 1	$ \begin{array}{r} 7.5 \\ -3.1 \\ -6.8 \\ -12.8 \\ -18.4 \end{array} $	$ \begin{array}{r} 6.7 \\ -3.1 \\ -8.8 \\ -12.1 \\ -18.4 \end{array} $	$\begin{vmatrix} -5.1 \\ -3.3 \\ -10.8 \\ -12.0 \\ -18.5 \end{vmatrix}$	$\begin{array}{r} 3.6 \\ -3.3 \\ -10.9 \\ -12.0 \\ -18.2 \end{array}$
Nov. 27 Nov. 28 Nov. 29 Nov. 30	- 9.5 -12.8 -10.5 - 7.5	7. 9 14. 5 10. 6 7. 1	- 6. 6 -13. 3 -10. 2 - 6. 6	$ \begin{array}{r} -6.9 \\ -11.7 \\ -9.7 \\ -6.3 \end{array} $	- 7. 3 -11. 5 -10. 2 - 6. 9	- 7.5 -11.3 -10.4 - 7.5	7.8 -10.6 -10.5 -7.1	-9.3 -10.2 -11.5 -5.8	-10.0 -10.0 -11.5 -6.0	-11.8 - 8.9 -11.0 - 7.0	$ \begin{array}{r} -12.1 \\ -7.7 \\ -11.5 \\ -6.7 \end{array} $	-11.7 - 7.6 - 9.5 - 4.6	-11.3 - 8.0 - 9.1 - 3.6	-11.0 - 9.5 - 9.4 - 3.3
	- 6.42		0.01	- 6.27	-6.24	6.27	0.20	- 6.37	- 6, 42	0.00	- 6, 66	0.05	- 7, 10	-
Means		G. 38	- 0, 31	(). 21	U.21	0. 61	0, 50	- 0.01	- 0.45	- 0.00	- 0.00	- 0, 00	(1 (1)	→ 7.41
*******			. r.						1	1	Daily		1	
		4 p. m.	5 p. m.				9 p. m.		1	12 p. m.		Max.	Min.	— 7.41 Diff.
*******			. r.					10 p. m. 5. 1	1	1	Daily		1	
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m. 2. 5	12 p. m.	Daily means.	Max.	Min.	Diff.
1882. Nov. 1 Nov. 2 Nov. 3 Nov. 4 Nov. 5	3 p. m.  3.4  -5.8  -4.8  -3.9  -5.3	4 p. m.  - 0. 6  - 5. 2  - 4. 5  - 3. 2  - 5. 2	5 p. m. - 2. 1 - 5. 2 - 3. 0 - 3. 2 - 5. 1	6 p. m.   - 3 2 - 3.8 - 3.2 - 4.9 - 5.1	7 p. m.   - 2.6 - 4.0 - 2.1 - 5.3   4.9	S p. m	9 p. m. 8, 0 - 6, 2 - 1, 0 - 5, 0 - 4, 2	5. 1 - 6. 8 - 1. 4 - 4. 8	2.5 - 7.0 + 2.1 - 4.2 - 4.6	12 p. m. - 1. 2 - 7. 1 - 3. 0 - 4. 9 - 4. 1	Daily means.  6, 25  0, 02  - 3, 39  - 4, 18  - 4, 88	Max.  15.4  7.7  - 0.6  - 1.6  - 4.0	Min 6.5 - 9.8 - 9.2 - 9.7 - 9.7 - 8.7	Diff1.0 -17.5 -5.6 -6.1 -1.7
Date.  1882. Nov. 1 Nov. 2 Nov. 3 Nov. 3 Nov. 4 Nov. 6 Nov. 7 Nov. 8 Nov. 9 Nov. 10 Nov. 11 Nov. 12 Nov. 13 Nov. 14 Nov. 14 Nov. 15	3 p. m.  3.4  -5.8  -4.8  -3.9  -5.3  -7.4  -9.5  -1.7  14.9  12.7	4 p. m. - 0.6 - 5.2 - 4.5 - 3.2 - 5.2 - 5.2 - 6.9 - 9.7 - 1.9 14.7 11.1 - 4.2 - 21.0 - 25.6 - 29.1 - 21.0	5 p.m. - 2.1 - 5.2 - 3.2 - 5.1 - 6.9 - 8.9 - 1.6 14.7 11.0	6 p. m.   - 3 2   - 3.2   - 4.9   - 5.1   - 6.7   - 6.7   - 15.3   - 9.9   - 9.9	7 p. m.   -2.6   -4.9   -5.3   -4.9   -7.3   -11.2   0.1   16.6   0.5	8 p. m	9 p. m. 8. 0  - 6. 2  - 1. 0  - 5. 0  - 4. 2  - 6. 3  - 8. 6  1. 1  19. 7  8. 8	5. 1 - 6. 8 - 1. 4 - 4. 8 - 4. 7 - 5. 5 - 8. 6 - 2. 0 - 21. 1 - 8. 7	2.5 - 7.0 + 2.1 - 4.2 - 4.6 - 4.4 - 8.2 - 2.5 7.3	12 p. m. - 1. 2 - 7. 1 - 3. 0 - 4. 9 - 4. 1 - 4. 2 - 7. 6 2. 7 25. 6 6. 8	Daily means.  6, 25  0, 02  3, 39  4, 18  4, 88  6, 47  6, 58  1, 32  11, 35  18, 48  0, 93  -20, 26  -24, 98	Max.  15.4  7.7  -0.6 -1.6 -1.0 -3.2  -4.2 -2.8 -25.5 -28.8	Min.  - 6.5 - 9.8 - 9.2 - 9.7 - 11.7 - 13.3 - 10.6 - 1.2 - 5.8	Die
Date.  1882. Nov. 1  Nov. 2 Nov. 3 Nov. 4 Nov. 6 Nov. 6  Nov. 7 Nov. 8 Nov. 9 Nov. 10 Nov. 11 Nov. 12 Nov. 13 Nov. 14 Nov. 14 Nov. 15	3 p. m.  3.4  -5.8 -4.8 -3.9 -5.3 -7.4 -9.5 -1.7 -12.8 -21.0 -18.4 -21.0 -18.4 -10.2 -8.4 -2.2 -8.4 -2.2 -2.8	4 p. m. - 0.6 - 5.2 - 4.5 - 3.2 - 5.2 - 5.2 - 6.9 - 9.7 - 1.9 - 14.7 - 11.1 - 4.2 - 29.1 - 29.1 - 21.0 - 29.1 - 21.0 - 29.6 - 29.7 - 29.7	5 p. m. - 2. 1 - 5. 2 - 3. 0 - 3. 2 - 5. 1 - 6. 9 - 1. 6 - 14. 7 - 11. 0 - 20. 8 - 20. 8 - 20. 8 - 20. 8 - 20. 1	8 p. m.   -3 2	7 p. m.   -2.6   -2.1   -5.3   -4.9   -7.3   -7.3   -11.2   0.1   16.6   9.5   -7.9   -24.7   -28.7   -20.8   7	8 p. m	8,0 - 6,2 - 1,0 - 4,2 - 6,3 - 8,6 1,1 19,7 8,8 8,6 - 22,9 - 24,3 - 30,7	5. 1 - 6. 8 - 1. 4 - 4. 8 - 4. 7 - 5. 3 - 8. 6 - 20 - 21. 1 - 8. 7 - 9. 7 - 9. 7 - 9. 6 - 30. 6 - 19. 7	11 p. m. 2. 5 - 7. 0 + 2. 1 - 4. 2 - 4. 6 - 4. 4 - 8. 2 - 2. 5 - 23. 5 - 7. 0 - 24. 7 - 30. 5 - 19. 4 - 12. 8 - 4. 4	12 p. m. - 1, 2 - 7, 1 - 3, 0 - 4, 9 - 4, 2 - 7, 6 - 2, 7 - 6, 8 - 10, 9 - 22, 8 - 24, 7 - 29, 4 - 18, 4	Daily means.  6, 25  0, 02  -3, 39  -4, 18  -4, 18  -6, 58  -1, 32  11, 35  18, 48  -0, 03  -20, 26  -24, 98  -24, 12  -24, 40  -17, 03	Max.  15.4	Min.  - 6.5 - 9.8 - 9.7 - 9.7 - 11.7 - 13.3 - 10.6 - 1.2 - 5.8 - 14.2 - 27.5 - 31.1 - 35.5 - 35.5	Diff.  -1.9  17.5  8.6  8.1  1.7  8.5  9.1  12.4  20.7  21.0  17.1  9.9  12.6
Date.  1882. Nov. 1 Nov. 2 Nov. 3 Nov. 4 Nov. 6 Nov. 6 Nov. 10 Nov. 10 Nov. 11 Nov. 11 Nov. 12 Nov. 12 Nov. 14 Nov. 15 Nov. 16 Nov. 17 Nov. 18 Nov. 19 Nov. 19 Nov. 19 Nov. 19 Nov. 19 Nov. 19 Nov. 20 Nov. 20 Nov. 21 Nov. 21 Nov. 21 Nov. 22 Nov. 23 Nov. 24 Nov. 24 Nov. 25	3 p. m.  3.4  -5.8  -4.8  -3.9  -5.9  -7.4  -9.5  12.7  14.9 12.7  -2.8  -21.0  -18.4  -29.0  -18.4  -21.0  -18.4  -21.0  -18.4  -21.0  -18.4	4 p. m.  - 0. 6 - 5. 2 - 4. 5 - 3. 2 - 5. 2 - 6. 9 - 1. 9 - 14. 7 - 11. 1 - 4. 2 - 21. 0 - 25. 6 - 20. 7 - 17. 3 - 7. 9 - 10. 0 - 25. 6 - 21. 1 - 17. 3 - 7. 9 - 10. 0 - 25. 6 - 21. 1 - 17. 3 - 7. 9 - 10. 0 - 25. 6 - 21. 1 - 18 - 18 - 18 - 3. 3	5 p. m. - 2.1 - 5.2 - 3.0 - 3.2 - 5.1 - 6.9 - 1.6 11.0 - 5.8 - 20.8 - 20.8 - 20.8 - 17.8 - 19.6 - 17.8 - 19.8 - 19.8	6 p. m.   -3 2   -3.8   -3.2   -4.9   -5.1   -6.7   -5.1   -6.7   -5.1   -7.1	7 p. m.   -2.6   -4.9   -2.1   -5.3   -4.9   -7.9   -11.2   -6.1   -6.1   -7.9	8 p. m	9 p. m. 8.0 - 6.2 - 1.0 - 5.0 - 4.2 - 6.3 - 8.6 - 8.6 - 20.9 - 30.7 - 21.2 - 11.7 - 8.8 - 30.7 - 21.2 - 11.7 - 8.6 - 20.9 - 30.7 - 21.2 - 30.7 - 21.2 - 30.7 - 21.2 - 30.7 - 21.2 - 30.7 - 21.2 - 30.7 -	10 p. m. 5. 1 - 6. 8 - 1. 4 - 4. 8 - 4. 7 - 5. 3 - 8. 6 - 2. 0 - 21. 1 - 8. 7 - 9. 7 - 23. 6 - 30. 6 - 19. 7 - 11. 7 - 8. 6 - 4. 8 - 1. 7 - 24. 6 - 19. 7 - 11. 7 - 8. 6 - 6. 6 - 6. 6 - 6. 6 - 6. 6	11 p. m.  2. 5  - 7. 0  - 2. 1  - 4. 6  - 4. 6  - 8. 2  - 2. 5  - 7. 3  - 10. 2  - 23. 6  - 24. 7  - 30. 5  - 12. 5  - 8. 4  - 12. 5  - 8. 4  - 11. 1  - 5. 1  - 6. 0	12 p. m.  - 1, 2  - 7, 1  - 3, 0  - 4, 9  - 4, 1  - 4, 2  - 7, 25, 6  - 10, 9  - 22, 7  - 20, 4  - 12, 1  - 7, 3  - 10, 8  - 4, 3  - 4, 3  - 6, 5	Daily means.  6, 25  0, 02  3, 39  4, 18  4, 48  6, 58  1, 32  11, 35  18, 48  0, 90  22, 19  24, 40  17, 03  8, 78  8, 78  8, 78	Max.  15.4  7.77  -0.6 -1.6 -1.6 -1.0 -3.2 2.8 25.8 10.5 -10.4 -12.2 -23.5 -10.4 -12.2 -7.5 -4.3 -2.4 24.2	Min.  - 6.5 - 9.8 - 9.7 - 9.7 - 11.7 - 13.6 - 10.8 - 11.7 - 13.5 - 14.2 - 27.5 - 35.5 - 21.0 - 16.5 - 14.5 - 14.2 - 12.0	Die1.9 -1.9 -1.9 -1.9 -1.9 -1.1 -1.9 -1.1 -1.1
Date.  1882. Nov. 1 Nov. 2 Nov. 3 Nov. 4 Nov. 5 Nov. 6 Nov. 6 Nov. 6 Nov. 1 Nov. 12 Nov. 13 Nov. 14 Nov. 13 Nov. 14 Nov. 13 Nov. 14 Nov. 15 Nov. 16 Nov. 16 Nov. 17 Nov. 18 Nov. 18 Nov. 18 Nov. 19 Nov. 20 Nov. 21 Nov. 21 Nov. 22 Nov. 23 Nov. 23 Nov. 24 Nov. 25 Nov. 27 Nov. 28 Nov. 29 Nov. 30	3 p. m.  3.4  -5.8 -3.9 -5.9 -7.4 -9.5 -1.7 -14.9 -12.8 -21.0 -18.4 -29.0 -18.4 -29.0 -18.4 -29.0 -18.4 -29.0 -18.4 -29.0 -18.4 -29.0 -18.4 -19.2 -19.	4 p. m.  - 0. 6 - 5. 2 - 4. 5 - 3. 2 - 5. 9 - 7. 11. 1 - 4. 2 - 21. 0 - 25. 6 - 29. 7 - 17. 1 - 21. 2 - 21. 3 - 21. 8 - 3. 2 - 11. 8 - 10. 8 - 3. 0 - 9. 6 - 7. 6	5 p. m. - 2. 1 - 5. 2 - 3. 2 - 5. 1 - 6. 9 - 1. 6 - 14. 7 - 11. 0 - 5. 8 - 23. 8 - 29. 1 - 19. 6 - 17. 8 - 7. 9 - 9. 8 - 3. 2 - 4 - 5. 3 - 6. 9 - 7. 9 - 9. 5 - 10. 0 - 1	6 p. m.   3 2   3 2   3 2   4 9   5 1   5 1   7   6 7   7   6 7   7   7   7   7   7	7 p. m.   -2.6   -4.9   -2.1   -5.3   -4.9   -7.3   -11.2   -7.3   -10.1   -24.7   -24.7   -28.7   -20.3   -14.6   -3.2   -16.2   -3.3   -3.2   -16.2   -11.9	8 p. m	9 p. m.   8, 0   6, 2   1, 0   5, 10   6, 3   6, 3   6, 6   1, 1   19, 7   21, 2   11, 7   21, 2   11, 7   21, 2   11, 7   21, 2   11, 7   21, 2   21, 7   21, 2   21, 7   21, 2   21, 7   21, 2   21, 7   21, 8, 3   21, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 7   21, 8, 6   7, 17, 8   21, 7, 9	5. 1 - 6. 8 - 1. 4 - 4. 8 - 4. 7 - 5. 6 - 2. 0 - 21. 0 - 22. 0 - 22. 0 - 24. 6 - 30. 6 - 10. 7 - 11. 7 - 8. 4 - 10. 2 - 6. 6 - 6. 10. 7 - 11. 7 - 11. 5 - 6. 2 - 6. 2 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	11 p. m.  2. 5  - 7.0  - 2.1  - 4.2  - 4.6  - 4.2  - 8.2  - 2.5  - 23.0  - 24.7  - 23.0  - 24.7  - 10.1  - 6.0  - 0.4  - 11.5  - 11.5  - 11.5  - 11.5  - 10.7  - 11.5  - 10.7  - 11.5  - 10.7	12 p. m.  - 1. 2  - 7. 1  - 3. 0  - 4. 9  - 4. 1  - 4. 2  - 7. 6  - 6. 8  - 10. 9  - 22. 8  - 24. 7  - 12. 1  - 7. 3  - 10. 2  - 7. 3  - 11. 3  - 11. 3  - 11. 3  - 11. 3  - 10. 4  - 10. 4  - 10. 5  - 6. 6	Daily means.  6, 25  9, 02  9, 3, 39  14, 18  14, 18  16, 47  11, 32  11, 33  18, 48  19, 24, 19  11, 33  11, 35  11,	Max.  15. 4  7. 7  9. 6  1. 6  1. 6  2. 8  25. 8  10. 5  10. 4  21. 2  28. 8  10. 5  10. 4  21. 2  23. 8  10. 6  10. 6  10. 6  10. 7  10. 8  10. 8  10. 8  10. 8	Min.  - 6, 5 - 9, 8 - 9, 8 - 9, 7 - 11, 7 - 11, 7 - 11, 6 - 1, 8 - 11, 2 - 27, 5 - 31, 1 - 35, 2 - 21, 0 - 16, 5 - 14, 2 - 12, 2 - 12, 6 - 14, 2 - 12, 6 - 14, 8 - 18, 4 - 21, 5 - 16, 5	Din.  -1.9 17 5 8.6 1 17 7 5 8.1 1 17 7 5 8.1 1 12 1 12 1 12 1 1 1 1 1 1 1 1 1 1 1

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883-Continued. (Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local than, --5 hour-

i Height us						**	minutes ]							
Date.	La. m.	2 a. m.	3 a. m.	in m.	3 n. m. :	6 a. m.	Ta. m.	8 a. m.	9 a. m.	10 a.m.	H a. m.	12 m.	1 p. m.	2 p. n.,
1882. Dec. 1	Ø, O	_ 0.7	- 6.4	- 5.8	- 5.2	5.1	43	- 3. o	- 2.3	- 2.0	- 2.1	- 2.3	- 2.3	- 3.0
Dec. 2 Dec. 4 Dec. 5 Dec. 6	$\begin{array}{c} -8.9 \\ -3.4 \\ -12.1 \\ -12.3 \\ -12.7 \end{array}$	- 0.2 - 3.0 -12.6 -12.3 - 12.1	$\begin{array}{c} -10.2 \\ -2.4 \\ -11.5 \\ -12.4 \\ -11.1 \end{array}$	$\begin{array}{c} -0.7 \\ -2.1 \\ -12.8 \\ -12.8 \\ -10.2 \end{array}$	$\begin{array}{c} -10.6 \\ -2.2 \\ -13.2 \\ -13.0 \\ -10.6 \end{array}$	-10. 0 - 4. 5 -13. 0 -13. 6 - 0. 7	$\begin{array}{c} -11.5 \\ -6.5 \\ -12.3 \\ -12.6 \\ -9.5 \end{array}$	$\begin{array}{c} -12.0 \\ -7.7 \\ -11.0 \\ -13.2 \\ -10.0 \end{array}$	11, 9 8, 4 10, 6 14, 2 8, 4	= 11 8 = 7 9 = 10.5 = 14.5 = 6 8	-11.7 9.8 10.4 14.7 5.6	-11. 9 9. 7 10. 5 14. 8 4. 7	-11 1 -11 2 -10, -13 7 -3 7	-11.8 - 10.2 -11.2 -11.0 - 3.3
Dec. 7 Dec. 8 Dec. 9 Dec. 10 Dec. 11	18. 0 20. 5	$\begin{array}{r} -5.1 \\ -21.5 \\ -19.6 \\ -20.9 \\ -10.8 \end{array}$	$\begin{array}{c} -6.2 \\ -21.0 \\ -20.3 \\ -20.8 \\ -9.5 \end{array}$	$\begin{array}{c} -0.7 \\ -21.2 \\ -20.5 \\ -20.9 \\ -8.0 \end{array}$	$\begin{array}{c} -7.1 \\ -21.0 \\ -21.2 \\ -20.8 \\ -7.5 \end{array}$	-8.2 $-20.1$ $-21.4$ $-20.1$ $-7.0$	$\begin{array}{c} -0.7 \\ -10.6 \\ -21.5 \\ -10.8 \\ -7.1 \end{array}$	$\begin{array}{c} -10.5 \\ -19.4 \\ -11.0 \\ -19.7 \\ -7.6 \end{array}$	-11.0 -17.3 -21.0 -10.4 -7.0	-11.2 -11.1 -20.1 -19.4 - 2.3	-12.2 $-13.1$ $-29.0$ $-19.1$ $-8.5$	-13, 4 -11, 8 -18, 4 -18, 9 - 8, 9	-13.5 -11.5 -18.4 -17.9 - 9.1	-15 4 -11 : -18.8 -17 8 -9 :
Dec. 12 Dec. 13 Dec. 14 Dec. 15 Dec. 16	20. 6 14. 1 18. 8	-17. 0 -19. 6 -14. 8 -16. 2 -21. 9	-17.7 $-18.2$ $-16.0$ $-10.6$ $-25.2$	-17. 0 - 17. 3 -17. 2 -10. 4 -25. 1	-17. 9 -16. 4 -17. 8 -14. 5 -25. 7	-18.8 -15.4 -18.3 -13.8 -25.2	$\begin{array}{c c} -20.8 \\ -15.2 \\ -19.5 \\ -13.8 \\ -24.7 \end{array}$	$\begin{array}{l} -20.1 \\ -15.6 \\ -20.1 \\ -12.8 \\ -23.7 \end{array}$	- 21.5 -15.4 -21.0 -12.1 -21.5	-21.4 $-14.5$ $-21.7$ $-12.6$ $-23.0$	-22.7 $-14.4$ $-20.4$ $-14.0$ $-21.8$	$\begin{array}{c} -21.0 \\ -14.1 \\ -20.3 \\ -15.3 \\ -19.0 \end{array}$	$\begin{array}{c} -24.4 \\ -13.8 \\ -20.5 \\ -16.0 \\ -19.4 \end{array}$	~ 23, 3 13, 6 19, 5 16, 9 19, 2
Dec. 17 Dec. 18 Dec. 19 Dec. 20 Dec. 21	-19, 5	18. 4 19. 4 24. 5 18. 0 10. 9	-18.4 $-20.3$ $-24.8$ $-18.1$ $-16.6$	-18.7 -22.0 -24.0 -18.4 -13.8	$ \begin{array}{r r} -19.2 \\ -23.4 \\ -23.8 \\ -19.7 \\ -13.1 \end{array} $	-19.8 $-23.1$ $-24.3$ $-16.6$ $-13.6$	-19. 6 -29. 2 -23. 3 -17. 3 -13. 6	-19.2 $-22.0$ $-22.4$ $-19.0$ $-13.2$	-18.7 $-23.2$ $-22.1$ $-20.4$ $-13.9$	-17.5 $-22.6$ $-20.8$ $-21.1$ $-15.5$	$\begin{array}{c} -16.9 \\ -22.7 \\ -21.7 \\ -21.6 \\ 16.6 \end{array}$	$\begin{array}{c} 18.7 \\ -23.0 \\ -22.4 \\ -21.3 \\ -16.3 \end{array}$	$\begin{array}{c} -20, 2 \\ -23, 6 \\ -13, 1 \\ -21, 2 \\ -17, 2 \end{array}$	19, 7 23, 4 23, 2 21, 0 18, 6
Dec. 22 Dec. 23 Dec. 24 Dec. 25 Dec. 26	-25. 8	-23, 3 -27, 7 -26, 7 -30, 0 -10, 9	$\begin{array}{c} -23, 2 \\ -27, 7 \\ -27, 0 \\ -29, 9 \\ -16, 0 \end{array}$	$\begin{array}{c} -23.1 \\ -27.7 \\ -27.2 \\ -27.8 \\ -10.9 \end{array}$	$\begin{array}{c} -22.0 \\ -27.8 \\ -27.2 \\ -26.5 \\ -16.9 \end{array}$	-22 4 -27. 7 -28. 0 -25. 1 -15. 7	$\begin{array}{c} -22.1 \\ -27.6 \\ -28.8 \\ -24.6 \\ -15.4 \end{array}$	-23.2 $-27.1$ $-28.6$ $-23.1$ $-15.2$	-24. 0 -27. 1 -18. 2 -22. 4 -14. 6	$\begin{array}{c} -27.3 \\ -26.6 \\ -28.7 \\ -21.3 \\ -11.1 \end{array}$	$^{-23.4}_{-25.8}$ $^{-25.8}_{-20.5}$ $^{-20.5}_{-13.8}$	$\begin{array}{c}22, 0 \\20, 1 \\23, 2 \\19, 7 \\12, 5 \end{array}$	$\begin{array}{c} -23 & 1 \\ -26 & 2 \\ -28 & 6 \\ -19 & 1 \\ -12 & 8 \end{array}$	20 6 - 26 0 28 7 - 18 8 12 9
Dec. 27 Dec. 28 Dec. 29 Dec. 30 Dec. 31	-12.8 1.2 -31.6	-14.6 -14.5 2.3 -31.7 -21.0	-14.7 -16.3 -2.5 -31.5 21.0	-14. 9 -15. 6 3.2 -32. 5 -21. 0	-15, 8 -15, 9 2, 8 -33, 6 -20, 8	-16.9 $-16.4$ $2.5$ $-34.9$ $-20.0$	$ \begin{array}{r} -16.9 \\ -17.6 \\ -7.1 \\ -35.1 \\ -19.4 \end{array} $	-17. 6 -17. 7 -12. 3 -32. 9 -19. 2	-17. 7 -18. 5 -14. 9 -31. 9 -19. 1	-18.7 -18.9 -18.3 -31.0 -19.4	-17. 6 -17. 1 -20. 4 -30. 6 -18. 9	$\begin{array}{c} -16.9 \\ -18.0 \\ -21.7 \\ -29.5 \\18.0 \end{array}$	$\begin{array}{c} -16.4 \\ -18.2 \\ -22.9 \\ -29.1 \\ -17.5 \end{array}$	17, 6 18, 3 23, 2 27, 6 17, 4
Means	-16.82	17. 07	17.11	16. 93	17. 05	-17.00	-17.39	-17, 39	17. 56	-17.37	17.58	17, 09	-17.27	17.53
										4				
Date.	3 p m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	1 <b>0</b> թ. ա.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Din.
1682.	3 p m.	4 p. m. - 4.1	5 p. m. - 4.3	6 p. m. 5, 3	7 p. m.	- 7.7	- 7.1		11 p. m.	12 p. m.	Daily means.	arns.	Min.	Din.
1682.	- 3. 4 11. 2 10. 4 11. 0 14. 0				- 6.9 - 9.3 -10.9 - 9.1 -14.7						- 5. 19 - 9. 71 - 8. 42 - 10. 98	arns.		1
1882. Dec. 1 Dec. 2 Dec. 3 Dec. 4 Dec. 5	- 3.4 -11.2 -10.4 -11.0 -14.0 - 2.5 -16.5 -10.7 -18.9 -17.7	- 4.1 -10.6 -10.5 -10.7 -13.5	- 4.3 -10.4 -10.5 -10.4 -15.6 -3.0 -19.2 -10.4 -19.9	- 5, 3 -10, 2 -10, 8 10, 4 -15, 5	- 6.9 - 9.3 -10.9 - 9.1 -14.7	- 7.7 - 7.5 -12.2 - 8.9 -14.3	- 7.1   - 5.2   -12.5   - 9.7   - 10.3	- 8, 3 - 5, 1 -12, 4 -10, 2 -13, 1	-10, 5 - 5, 3 -12, 6 -10, 4 -13, 2	- 9.3 - 5.3 -12.7 -11.2 -13.2	means.   - 5, 19   - 9, 71   - 8, 42   -10, 98   -13, 71   - 6, 20   -14, 91	- 2.3 - 1.8 - 2.7 -10.0 -10.5	-12.7 -15.4 -16.3 -16.4 -19.0	10. 4 10. 4 10. 6 13. 6 6, \$
1882. Dec. 1 Dec. 2 Dec. 3 Dec. 4 Dec. 4 Dec. 6 Dec. 7 Dec. 8 Dec. 9. Dec. 10	- 3, 4 -11, 2 -10, 4 -11, 0 -14, 0 -14, 0 -16, 5 -16, 7 -18, 9 -17, 7 - 9, 6 -18, 9 -17, 7 - 13, 6 -18, 9 -17, 5	- 4.1 -10.6 -10.5 -10.7 -13.5 - 2.5 -17.5 -10.7 -19.7 -17.3	- 4. 3 -10. 4 -10. 5 -10. 4 -15. 6 -3. 0 -19. 2 -10. 4 -19. 9 -14. 8	- 5, 3 -10, 2 -10, 8 -10, 4 -15, 5 - 3, 2 -20, 1 -10, 0 -20, 1 -14, 0	$ \begin{array}{c cccc} - 0.9 \\ - 0.3 \\ - 10.9 \\ - 9.1 \\ - 14.7 \\ - 2.5 \\ - 20.1 \\ - 9.7 \\ - 20.3 \\ - 14.5 \\ \end{array} $	$\begin{array}{c} +7.7 \\ -7.5 \\ -10.2 \\ -8.9 \\ -14.3 \\ -1.9 \\ -10.5 \\ -20.5 \\ -24.7 \end{array}$	- 7. 1 - 5. 2 - 12. 5 - 9. 7 - 13. 3 - 2. 6 - 21. 6° - 12. 3 - 20. 4 - 14. 8	$\begin{array}{c} -8.3 \\ -5.1 \\ -12.4 \\ -10.2 \\ -13.1 \\ -3.5 \\ -21.7 \\ -14.0 \\ -20.4 \\ -14.7 \end{array}$	-10, 5 - 5, 3 -12, 6 -10, 4 -13, 2 - 4, 1 -21, 9 -16, 0 -20, 0 -14, 8	- 9.3 - 5.3 -12.7 -11.2 -13.2 - 4.6 -21.4 -17.8 -20.4 -13.1	means.   - 5, 19   - 9, 71   - 8, 42   -10, 98   -13, 71   - 6, 20   -14, 01   -15, 27   -20, 1;   -17, 73	- 2.3 - 4.8 - 2.7 - 10.0 - 10.5 - 2.6 - 3.8 - 10.3 - 16.9 - 11.2	-12.7 -15.4 -16.3 -16.4 -19.0 -16.2 -26.8 -25.5 +25.5	10, 4 10, 6 12, 6 6, 4 2, 5 12, 6 23, 9 16, 3 8, 6 10, 8
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H. Ex. 44--31

Continued, time -5 hours

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- 7, 8 - 4, 8 - 4, 9 - 5, 3 - 7, 4 - 7, 9 - 0, 5 - 13, 8 - 14, 2 - 20, 1 - 21, 1 - 22, 6 - 29, 5 - 7, 7, 7 - 7, 7 - 7, 7 - 7, 8 - 2, 9 - 2, 9 - 2, 9 - 7, 7 - 7, 9 - 9, 5 - 7, 7 - 7, 7 - 7, 7 - 7, 9 - 9, 5 - 7, 7 - 7,

 $\begin{array}{c} -3.6 \\ -3.3 \\ -10.0 \\ -12.0 \\ -19.2 \end{array}$ -11.0 + 9.5 -- 9.4 + 3.3 - 7.41

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13, 48

Table showing the temperature of the air at Uylaamie from October, 1881, to August, 1883—Continued.

(Height of the thermometer above the surface of the earth. Her	Washington mean time, 17 minutes	Correction to reduce to mean local time, $\sim 5\mathrm{hoors}$
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(Meight in	THE THEIR	HOME TO L	111111111111111111111111111111111111111	N.111 1414 (* 17)		17	minutes	1000	11,000			10 1110 1011 11	n at 11000,	- contribit
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166.														
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Jan. 4	4.0	= 1, 0 = 4, 0	4.3	- 1.7 - 4.4	- 4, 0	4.2	- 1.8	- 0.8	4.0	1.4 4.2	2 8	= 3.3 = 2.0	4. 4 2. 2	1
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Jan. 6 Jan. 7	7.9 11.7 16.5	$\frac{8.4}{15.5}$ = 16.5	16. 4	- 16, 9 - 16, 6	- 8, 4 - 17, 5 -10, 4	-17. 7 -13. 0	16 6	15. 9 13. 8	~ 15. 9 — 13. 6	-16.2 -13.2	-17, 3	18.2	16.9	11.3
Jan. 9	-13.9 -19.3	- 10. 8 - 20. 1	- 16, 9 - 18, 6	16. ¥ 15. 6	-15.7 $-15.6$	14. 9 16. 7	$-\frac{14.5}{17.7}$	-13. 2 -10. 3	14.6 - 14.8	-14.5 - 13.4	-45, 9 12, 5	16. 9 13. 4	17.5 -14.1	114
Jan. 11 Jan. 12	-17.5	- 17. 5	17. 5	-18.3	$\frac{-18.6}{-21.3}$	-20, 3 -23, 8	21.0 24.0	-21 4 -21 9	24. 3 26. 0	- 21. I 26. 0	21. 0	22 0	-22. 9 -27. 7	5.7
Jan. 11	-95. 0 -53. 6 -91. 5	-25, 8 -33, 6 -34, 9	- 25, 9 34, 1 30, 9	-25, 7 -34, 6 -70, 7	-34. 6 -30. 5	-34. 4 -30. 0	-34.0 -29.5	33.4 28.8	- 33, 3 - 28, 6	- 32, 8 27, 6	27 1 32.5 - 20.7	22 0 -27, 1 -22, 2 -25, 1	- 31. 9 - 24. 7	5.0
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Jan. 19 Jan. 19 Jan. 20	- 6. 2 -14. 7	- 15 4 25 7	- 7, 4 16, 5 23, 6	-17.0 $-25.4$	- 8.9 -17.7 -25.2	- 9, 5 -15, 2 25, 5	10, 1 = 18, 5 25, 5	11.0 18.6 25.3	11.7 19.4 24.8	-12. I 19. 3 24. 2	-19 8 -24. 6	19. G 22. 3	-10.8 -21.2	
Law tot	12 a	18.1	1 - 1	-18.1	-17.5	-16.8	16. 2	14. 9	14. 4	-12.9	11. 4	10.5	- 10 1	
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dan, 25	13.7	-11.1	11. 1	-13.3	5, 0 16, 6	$-\frac{3}{16}, \frac{2}{6}$	-10.4 -10.1	-17. 7	3. 1 - 18. 1	-18.8	10. 8 10. 8	- 21. 0	21. 2	~ G
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Meana	-10.52	-17.06		-1511	-11.01	- 10.00	4 (1, 11()							*** [ ] [ [9]
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						8 p. m.					Theller	Max.	Min.	Diff.
alate.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	' 8 p. m.	9 p. m.	<b>10</b> թ. ա.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Din:
Jate, Jan. 1Jan. 2Jan. 3	3 p. m.	4 p. m. 10.4 3.3 4.7	5 p. m. -10.2 - 3.4 - 4.7	6 p. m.	7 p. m. - 9.7 - 3.3 - 4.3	8 p. m. - 9.5 - 3.3 - 4.3	9 p. m. 9.5 3.7 5.2	- 8, 0 - 4, 6 - 5, 4	11 p. m. - 7. 8 - 3. 5 - 5. 3	12 p. m. - 6.3 - 0.7 - 4.5	Daily means.  -11.15 - 3.50 - 3.83	Max.	Min.	Diff.
alate.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m. - 9.5	9 p. m.	10 p. m.  - 8, 9 - 4, 6	11 p. m.	12 p. m. - 6. 3 - 0. 7	Daily means.	Max.	Min.	11 0 H d
Jate, Jan. 1	3 p. m. -11.0 - 3.7 - 5.0 - 2.9 -10.0	1 p. m. -10. 4 - 3. 3 - 4. 7 - 3. 8 - 8. 8	5 p. m.  -10, 2 -3, 4 -4, 7 -4, 4 -7, 8 -15, 6	6 p. m.  -10, 4 - 3, 0 - 4, 6 - 4, 8 - 7, 3 - 15, 6	7 p. m. - 9.7 - 3.3 - 4.3 - 5.6 - 7.1 - 16.7	8 p. m. - 9.5 - 3.3 - 4.3 - 6.7 - 6.9 - 16.8	9 p. m. - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9	10 p. m.  - 8. 0 - 4. 6 - 5. 4 - 6. 2 - 8. 6 - 15. 7	7.8 - 3.5 - 5.3 - 6.4 - 8.8	12 p. m. - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 14.5	Daily means.  -11.15 - 3.50 - 3.83 - 4.25 - 9.32 - 13.02	Max. 6.30.71.42.06.97.8	Min.  -18.2 -0.3 -8.2 -10.2 -15.3	11 9 8 6 6 8 8 2 K 4 12 9
184. Jan. 1. Jan. 2. Jan. 3. Jan. 4. Jan. 5. Jan. 6. Jan. 6. Jan. 7. Jan. 9. Jan. 9.	3 p. m. -11.0 - 3.7 - 5.0 - 2.9 -10.0 -16.4 - 14.8	4 p. m. -10. 4 - 3. 3 - 4. 7 - 3. 8 - 8. 8	5 p. m.  -10. 2 -3. 4 -4. 4 -7. 8 -15. 6 -17. 7 -12. 0 -20. 5	6 p. m.  -10.4 1 - 3.0 1 - 4.6 1 - 4.8 - 7.3 -15.6 -14.0 -11.7	7 p. m. - 9.7 - 3.3 - 4.3 - 5.6 - 7.1 - 16.7 - 14.0 - 12.4	8 p. m	9 p. m. - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 14.1 - 12.1 - 20.2	10 p. m. - 8, 0 - 4, 6 - 5, 4 - 6, 2 - 8, 6 - 15, 7 - 14, 0 - 14, 0	11 p. m. - 7.8 - 3.5 - 5.3 - 6.4 - 8.8 - 14.8 - 15.4 - 14.6	12 p. m. - 6. 3 - 0. 7 - 4. 5 - 6. 8 - 7. 3 - 14. 5 - 15. 5	Daily means.  -11, 15 -3, 50 -3, 83 -4, 25 -0, 52 -15, 90 -13, 75 -17, 65	Max.	Min.  -18. 2 - 9. 3 - 8. 2 -10. 2 -15. 3  -20. 7 -22. 0 -21. 2 -25. 2	Diff. 11.9 8.6 6.8 8.2 8.4
Jate.    1844.	3 p. m. -11.0 -3.7 -5.0 -2.9 -10.0 -16.4 -14.8 -13.5 -10.2 -14.7	4 p. m. -10, 4 - 3, 3 - 4, 7 - 3, 8 - 16, 2 - 11, 8 - 11, 8 - 12, 6 - 14, 7	5 p. m. -10, 2 - 3, 4 - 4, 4 - 7, 8 -15, 6 -17, 7 -12, 9 -20, 5 -15, 7	-10. 4 - 3. 0 - 4. 6 - 4. 8 - 7. 3 - 15. 6 - 14. 0 - 11. 7 - 20. 1 - 17. 3	7 p. m. - 9.7 - 3.3 - 4.3 - 5.6 - 7.1 - 16.7 - 14.9 - 10.9 - 17.6	8 p. m. - 9.5 - 3.3 - 4.3 - 6.7 - 6.9 - 16.8 - 12.8 - 19.5 - 17.6	9 p. m. - 9.5 - 3.7 - 5.7 - 7.5 - 15.9 - 14.1 - 12.1 - 20.2 - 17.9	- 8, 0 - 4, 6 - 5, 4 - 6, 2 - 8, 6 - 15, 7 - 14, 0 - 20, 6 - 17, 5	11 p. m. - 7. 8 - 3. 5 - 5. 4 - 8. 8 - 14. 8 - 15. 4 - 20. 7 - 17. 5	12 p. m. - 6. 3 - 0. 7 - 4. 5 - 6. 8 - 7. 3 - 14. 5 - 15. 1 - 20. 5 - 17. 5	Daily means.  -11, 15 - 3, 50 - 3, 80 - 3, 80 - 4, 25 - 9, 32 -15, 90 -13, 75 - 17, 65 - 16, 29	Max.  - 6.3  - 0.7  - 1.4  - 2.0  - 6.9  - 7.8  - 11.2  - 13.2  - 12.5	Min.  -18. 2 - 0. 3 - 8. 2 -10. 2 -15. 3  -20. 7 -22. 0 -21. 2 -25. 2 -24. 2	Dim. 11.9 8.6 8.2 8.4 12.9 8.2 10.0 12.0 11.7
Jate.    1844.     Jan. 1	3 p. m. -11. 0 -3. 7 -5. 0 -2. 9 -10. 0 -16. 4 -14. 5 -19. 2 -14. 7 -24. 5	4 p. m.  -10. 43. 8 -4. 73. 816. 213. 819. 614. 722. 928. 3	5 p. m. -10. 2 -3. 4 -4. 4 -7. 8 -15. 6 -17. 7 -20. 5 -24. 5 -20. 5	6 p. m. -10, 4 -3, 0 -4, 6 -4, 8 -7, 3 -15, 6 -14, 0 -11, 7 -20, 1 -17, 3 -21, 9 -30, 3	- 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 16, 7 - 12, 4 - 19, 9 - 17, 6 - 25, 0 - 31, 4	8 p. m. - 9.55 - 3.3 - 4.3 - 6.7 - 0.9 -14.8 -12.8 -12.8 -10.5 -17.6 -25.2 -25.2 -32.0	9 p. m. - 9. 5 - 3. 7 - 5. 2 - 6. 7 - 7. 5 - 15. 9 - 14. 1 - 20. 2 - 17. 9 - 25. 5 - 29. 4	- 8, 0 - 4, 6 - 5, 4 - 6, 2 - 8, 6 - 15, 7 - 14, 0 - 20, 6 - 17, 5 - 25, 5 - 32, 4	11 p. m. - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 14. 8 - 14. 6 - 20. 7 - 17. 2 - 25. 2 - 25. 2 - 25. 2	12 p. m. - 6. 3 - 0. 7 - 4. 5 - 6. 8 - 7. 3 - 14. 5 - 15. 5 - 15. 5 - 15. 5 - 20. 5 - 25. 1 - 23. 8	Daily means.  -11, 15 - 3, 50 - 3, 50 - 4, 25 - 9, 52 - 15, 90 - 17, 65 - 16, 29 - 22, 18 - 28, 17	Max.	Min.  -18.2 -0.3 -8.2 -10.2 -15.3 -20.7 -21.2 -25.2 -24.2 -30.3 -38.8	Diff.  11 9 8 6 6 8 2 8 4 12 9 8 12 9 11.7 12.0 11.7
Jate.	3 p. m. -11. 0 -3. 7 -5. 0 -10. 0 -16. 4 -14. 5 -19. 2 -14. 7 -24. 5 -29. 2 -32. 1	4 p. m. -10. 4 -3. 3 -4. 7 -3. 8 -13. 8 -11. 8 -14. 7 -20. 9 -20. 3 -31. 0 -27. 4	5 p. m.  -10, 2 -3, 4 -4, 4 -7, 8 -15, 6 -17, 7 -12, 0 -20, 5 -20, 5 -20, 5 -20, 4 -28, 1	6 p. m.  -10, 4 -3, 0 -4, 6 -4, 8 -7, 3 -15, 6 -14, 9 -11, 7 -20, 1 -21, 9 -30, 3 -31, 5 -20, 3	7 p. m. - 9.7 3 4.3 - 5.6 - 7.1 - 14.9 - 12.4 - 11.9 6 - 25.0 - 31.4 - 31.7 - 20.3	8 p. m. - 9.5 - 3.3 - 4.3 - 6.7 - 6.9 - 16.8 - 12.8 - 12.8 - 12.5 - 17.6 - 25.2 - 25.2 - 29.5 - 29.5	9 p. m. - 9. 5 - 3. 7 - 5. 2 - 0. 7 - 7. 5 - 15. 9 - 14. 1 - 20. 2 - 20. 7 - 20. 2 - 3. 2 - 3. 2 - 3. 2 - 3. 2 - 3. 2 - 4. 4 - 3. 2 - 3. 2 - 3. 2 - 4. 5 - 4. 5 - 5. 2 - 7. 5 - 7. 5 - 12. 1 - 20. 2 - 3. 2 - 4. 4 - 4. 5 - 5. 2 - 5. 2 - 5. 2 - 6. 7 - 7. 5 - 7. 5 - 12. 1 - 20. 2 - 20. 2 - 20. 5 - 20	- 8, 0 - 4, 0 - 5, 4 - 6, 2 - 8, 6 - 10, 7 - 14, 0 - 20, 6 - 17, 5 - 32, 4 - 31, 7 - 20, 5	11 p. m.  - 7. 8 - 3. 5. 3 - 6. 4 - 8. 8 - 14. 6 - 20. 7 - 17. 5 - 25. 2 - 31. 6 - 31. 7 - 20. 5	12 p. m. - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 15.5 - 15.1 - 20.5 - 25.1 - 33.8 - 30.0 - 20.3	Daily means.  -11, 15 -3, 50 -3, 50 -4, 25 -9, 32 -13, 02 -13, 75 -17, 05 -17, 05 -16, 29 -22, 18 -28, 17 -32, 50 -28, 60 -28, 60	Max.	Min.  -18. 2 - 9. 3 - 8. 2 -10. 2 -15. 3  -20. 7 -22. 0 -21. 2 -25. 2 -24. 2	Diff.  11.9 8.6 6.8 8.2 8.4 12.9 8.2 10.0 11.7
Jate.	3 p. m. -11. 0 -3. 7 -5. 0 -2. 9 -10. 0 -16. 4 -14. 8 -14. 8 -14. 8 -14. 7 -24. 5 -29. 2 -32. 1 -26. 4 -31. 6	4 p. m.  -10.4 -3.3 -4.7 -3.8 -16.2 -13.8 -11.8 -12.6 -14.7 -29.3 -31.9 -27.5 -6.9	5 p. m. -10.2 -3.4 -4.7 -4.8 -15.6 -17.7 -12.5 -15.7 -20.5 -20.5 -20.5 -20.5 -20.5 -20.5 -20.5 -20.5	6 p. m.	7 p. m.  - 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 16, 7 - 14, 9 - 12, 4 - 10, 9 - 17, 6 - 25, 0 - 31, 4 - 31, 7 - 29, 3 - 35, 0	8 p. m. - 9. 5 - 3. 3 - 6. 7 - 6. 9 - 14. 8 - 12. 8 - 17. 6 - 25. 2 - 3. 9 - 20. 5 - 20. 5 - 3. 3	9 p. m. - 9.5 - 3.7 - 5.2 - 0.7 - 7.5 - 15.9 - 12.1 - 20.2 - 17.9 - 25.5 - 29.5 - 29.5 - 29.5	10 p. m.  - 8, 0 - 4, 6 - 5, 4 - 6, 2 - 8, 6 - 15, 7 - 14, 0 - 20, 6 - 17, 5 - 32, 4 - 31, 7 - 20, 5 - 36, 0	11 p. m.  - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 15. 4 - 14. 6 - 20. 7 - 17. 5 - 23. 6 - 31. 7 - 20. 5 - 36. 8	12 p. m.  - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 14.5 - 15.1 - 20.5 - 17.5 - 25.1 - 33.8 - 33.6 - 20.3 - 20.3 - 20.3	Daily means.  -11, 15 -3, 50 -3, 83 -4, 25 -9, 32 -13, 90 -13, 75 -17, 65 -16, 29 -22, 18 -28, 19 -22, 28 -28, 60 -31, 96 -31, 96 -31, 96	Max.	Min.  -18.2 -9.3 -8.2 -10.2 -15.3 -20.7 -21.2 -25.2 -24.2 -30.3 -38.8 -30.2 -11.4 -40.6	11.9 9 8 8 8 2 10.0 11.7 12.8 15.0 7 11.5 10.5 1
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Jate, 1884, Jan. 1, Jan. 2, Jan. 3, Jan. 3, Jan. 4, Jan. 5, Jan. 6, Jan. 1, Jan. 9, Jan. 14, Jan. 12, Jan. 14, Jan. 12, Jan. 11, Jan. 12, Jan. 11, Jan. 16, Jan. 17, Jan. 11, Jan. 16, Jan. 17, Jan. 18, Jan. 18, Jan. 19, Jan. 10, Jan. 11, Jan. 16, Jan. 17, Jan. 18, Jan. 19,	3 p. m.  -11. 0 -3.7 -5.0 -2.9 -10.0 -14. 8 -14. 8 -14. 7 -24. 5 -25. 6 -20. 2 -32. 1 -32. 1 -9. 3 -15. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7 -12. 7	4 p. m.  -10. 4 - 3. 3 - 4. 7 - 3. 8 - 8. 8 -16. 2 -11. 8 -19. 6 -14. 7 -22. 9 -29. 3 -31. 0 -31. 0 -31. 0 -50. 5 - 6. 5 - 6. 5 - 6. 5	5 p. m.  -10.2 -3.4 -4.7 -4.4 -7.8 -15.6 -17.7 -20.5 -20.5 -20.5 -20.5 -30.4 -31.7 -5.8	6 p. m.  -10, 4 -3, 0 -4, 6 -4, 6 -7, 3 -15, 6 -14, 0 -11, 7 -20, 1 -17, 20, 3 -31, 3 -20, 3 -31, 5 -4, 3 -4, 6 -4, 6 -14, 0 -14	7 p. m. - 9.7 - 3.3 - 4.3 - 5.6 - 7.1 - 16.7 - 12.4 - 19.9 - 17.6 - 25.0 - 31.4 - 29.3 - 35.0 - 3.5 - 3.5	8 p. m. - 9.5 - 3.3 - 4.3 - 6.7 - 6.9 - 14.8 - 12.5 - 17.6 - 25.2 - 25.2 - 25.5 - 3.3 - 2.3	9 p. m. - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 14.1 - 20.2 - 25.5 - 32.4 - 31.5 - 32.4 - 31.5 - 32.4 - 31.5 - 32.4 - 31.5 - 33.7 - 34.5 - 35.2 - 35.2 - 35.5 -	10 p. m.  - 8. 0 - 4. 6 - 5. 4 - 6. 2 - 8. 6 - 15. 7 - 14. 0 - 20. 5 - 32. 4 - 32. 5 - 36. 0 - 4. 1	11 p. m.  - 7. 8	12 p. m. - 6. 3 - 0. 7 - 4. 5 - 6. 8 - 7. 3 - 14. 5 - 15. 1 - 20. 5 - 17. 5 - 25. 1 - 30. 8 - 30. 9 - 30. 6 - 20. 3 - 30. 6 - 4. 5 - 4. 5 - 5 - 5 - 5 - 6. 8 - 7. 3 - 10. 5 - 10.	Daily means.  -11, 15 -3, 50 -3, 83 -4, 25 -9, 32 -13, 90 -13, 70 -17, 65 -16, 29 -22, 18 -28, 17 -32, 50 -31, 96 -31, 96 -31, 96 -16, 18	Max.	Min.  -18.2 -9.3 -8.2 -10.2 -15.3 -20.7 -21.2 -25.2 -25.2 -30.3 -38.8 -30.2 -11.4 -40.6 -8.7	Diff.  11 9 86 6 82 8.4 12.9 8 2 10.0 11.7 12.8 15.0 15.7 11.5 11.7 12.8 15.5 11.8 12.5
Jate, 184, Jun. 1	3 p. m.  -11. 0 -3. 7 -5. 0 -2. 9 -10. 0 -16. 4 -14. 5 -19. 2 -14. 7 -29. 2 -32. 1 -32. 1 -32. 1 -9. 3 -12. 7 -12. 7 -10. 6 -5. 8	4 p. m.  -10. 4 -3. 3 -4. 7 -3. 8 -16. 2 -13. 8 -11. 8 -19. 6 -14. 7 -22. 9 -20. 3 -31. 9 -32. 5 -12. 7 -19. 5 -20. 9	5 p. m.  -10, 2 -3, 4, 7 -4, 7 -4, 1, 8 -15, 6 -17, 9 -12, 0 -20, 5 -20, 5 -20, 5 -20, 4 -28, 1 -28, 1 -28, 1 -28, 1 -28, 1 -28, 1 -28, 1 -28, 1 -28, 1 -38, 7 -5, 9 -19, 6 -19, 4 -11, 2 -4, 3	6 p. m.  -10, 4 -3, 0 -4, 6 -4, 6 -4, 6 -4, 7, 3 -15, 6 -14, 7 -20, 1 -20, 1 -30, 1 -30, 1 -30, 1 -4, 3 -1, 6 -13, 1 -17, 8 -11, 6 -3, 6 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	7 p. m.  - 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 16, 7 - 14, 9 - 10, 9 - 17, 6 - 25, 0 - 31, 4 - 31, 4 - 31, 3 - 35, 6 - 3, 1 - 13, 4 - 17, 5 - 12, 0 - 3, 3	8 p. m. - 9.5 1 - 3.3 1 - 4.3 1 - 6.7 9 - 14.8 1 - 12.8 1 - 17.6 1 - 25.5 2 - 35.5 1 - 33.3 1 - 20.5 1 - 18.0 1 - 18.0 1 - 18.0 1 - 18.0 1 - 2.1 1 - 18.0 1 - 2.1 1 - 3.3 1 - 2.3 1 - 18.0 1 - 2.3 1 - 18.0 1 - 2.3 1 - 18.0 1 - 2.3 1 - 3.3 1 - 3.3 1 - 3.3 1 - 18.0 1 - 2.3 1 - 18.0 1 - 2.3 1 - 18.0 1 - 2.3 1 - 3.3 1 -	9 p. m. - 9.5 - 3.7 - 0.7 - 0.7 - 0.7 - 15.9 - 14.1 - 20.5 - 20.5 - 33.0 - 20.5 - 34.5 - 20.5 - 35.0 - 34.5 - 35.0 - 34.6 - 35.0 - 34.6 - 35.0 - 34.6 - 35.0 - 34.6 - 35.0 - 34.6 - 35.0 -	10 p. m.  - 8. 0 - 4. 6 - 5. 4 - 6. 2 - 6. 6 - 15. 7 - 14. 0 - 20. 6 - 17. 5 - 25. 5 - 32. 4 - 31. 7 - 20. 5 - 4. 1 - 14. 0 - 21. 6 - 21. 7 - 21. 7 - 22. 5 - 22. 5 - 22. 6 - 4. 7 - 23. 7 - 24. 6 - 2	11 p. m.  - 7. 8 - 3. 5. 3 - 6. 4 - 15. 6. 4 - 15. 6 - 14. 8 - 15. 6 - 15. 6 - 20. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 - 25. 2 - 31. 7 -	12 p. m.  - 0.3 - 0.7 - 4.5 - 6.8 - 14.5 - 15.1 - 20.5 - 17.5 - 25.1 - 23.8 - 30.0 - 20.3 - 35.6 - 2.5 - 25.7 - 25	Daily means.  -11, 15 -3, 50 -3, 50 -4, 25 -15, 90 -15, 90 -16, 29 -22, 18 -28, 17 -32, 50 -31, 96 -16, 35 -0, 18 -11, 55 -17, 65 -17, 65 -17, 65 -17, 65 -18, 67 -19,	Max	Min.  -18. 2 -9. 8. 2 -8. 2 -10. 2 -15. 3 -20. 7 -21. 0 -25. 2 -30. 3 -38. 8 -30. 2 -31. 4 -40. 6 -8. 7 -18. 7 -20. 0 -20. 0 -20. 0 -20. 0	Diff.  11 9 8 8 8 12 9 8 2 10 0 0 12 7 11 12 8 12 12 12 12 12 12 12 12 12 12 12 12 12
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Jate, 1844, Jan. 1 1844, Jan. 1 1848, Jan. 1 1848, Jan. 2 1848, Jan. 2 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 1 1848, Jan. 2	3 p. m.  -11, 0 -3, 7 -5, 0 -10, 0 -10, 0 -16, 4 -14, 5 -14, 5 -14, 7 -24, 5 -24, 5 -31, 6 -31, 6 -9, 5 -19, 9 -20, 7 -10, 6 -5, 8 -9, 1 -9, 1 -9, 1 -9, 1 -9, 1 -9, 1 -9, 1 -9, 1	4 p. m.  -10, 4 -2, 9 -3, 7 -3, 8 -11, 8 -11, 8 -11, 7 -22, 9 -22, 9 -3, 10 -14, 7 -22, 9 -3, 10 -14, 7 -22, 9 -3, 10 -3,	5 p. m.  -10, 2 -3, 4 -4, 7 -4, 4 -7, 8 -15, 6 -17, 7 -12, 9 -20, 5 -16, 7 -20, 5 -30, 4 -20, 5 -31, 7 -31, 7 -31, 8 -12, 8 -12, 8 -13, 1 -23, 2 -13, 1 -23, 2 -23, 2	6 p. m.  -10, 4 -3, 0 -4, 6 -4, 6 -4, 6 -4, 7 -20, 1 -14, 0 -11, 7 -20, 1 -21, 9 -30, 5 -30, 5 -31, 5 -20, 3 -4, 3 -4, 3 -1, 6 -13, 1 -17, 8 -11, 6 -3, 6 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -4, 7 -20, 2 -20,	7 p. m.  - 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 14, 9 - 12, 4 - 11, 9 - 17, 6 - 25, 0 - 31, 4 - 31, 7 - 29, 3 - 35, 0 - 3, 5 - 12, 9 - 13, 4 - 17, 5 - 12, 9 - 14, 8 - 21, 9 - 2	S p. m. - 9. 5 - 3. 3 - 4. 3 - 4. 3 - 6. 9 - 14. 8 - 12. 8 - 17. 6 - 22. 0 - 22. 0 - 3. 3 - 22. 0 - 3. 3 - 22. 3 - 19. 4 - 19. 5 - 20. 6 - 20. 6 - 20. 6 - 3. 3 - 20. 6 - 20. 6 - 3. 3 - 20. 6 - 3. 5 - 3. 6 - 3. 6 - 3. 6 - 3. 6 - 3. 7 - 3. 8 - 3. 8 - 3. 9 - 3. 9	9 p. m. - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 14.1 - 12.2 - 17.5 - 20.2 - 17.5 - 20.2 - 17.5 - 20.5 -	10 p. m.  - 8. 0 - 4. 6 - 5. 4 - 6. 2 - 8. 6 - 15. 7 - 14. 0 - 20. 6 - 20. 5 - 32. 4 - 32. 7 - 20. 5 - 36. 0 - 4. 1 - 14. 0 - 17. 9 - 10. 2 - 6. 0 - 17. 9 - 10. 2 - 6. 0 - 17. 9 - 10. 2 - 6. 0 - 17. 9 - 10. 2 - 10. 2 - 10. 3 - 10. 4 - 10.	11 p. m.  - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 14. 6 - 15. 4 - 17. 5 - 20. 5 - 31. 6 - 31. 7 - 21. 6 - 17. 5 - 2. 5 - 4. 4 - 17. 5 - 2. 5 - 4. 6 - 6. 6 - 11. 5 - 25. 1	12 p. m.  - 0.3 - 0.7 - 4.5 - 6.8 - 7.3 - 15.5 - 15.5 - 15.5 - 17.5 - 17.5 - 20.5 - 17.7 - 20.3 - 20	Daily means.  -11, 15 -3, 50 -3, 81 -4, 25 -9, 32 -13, 92 -15, 90 -14, 75 -17, 65 -16, 29 -28, 17 -32, 50 -28, 60 -28, 60 -11, 65 -10, 18 -11, 55 -10, 17 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -11, 55 -10, 18 -10,	Max.	Min.  -18. 2 - 0. 3 - 0. 3 - 8. 2 - 10. 2 - 15. 3 - 20. 7 - 21. 2 - 25. 2 - 24. 2 - 30. 3 - 30. 2 - 31. 4 - 40. 6 - 8, 7 - 14. 7 - 25. 2 - 20. 0 - 21. 2 - 20.	Diff.  11 9 8 6 8 8 4 8 2 8 8 2 9 8 8 2 10,00 11, 7 12,80 11, 7 12,50 11, 7 12,50 11, 6 11
Jate, 1884, Jan. 1, 1884, Jan. 2, 1884, Jan. 1, 1884, Jan. 2, Jan. 3, Jan. 4, Jan. 5, Jan. 6, Jan. 7, Jan. 6, Jan. 9, Jan. 19, Jan. 11, Jan. 12, Jan. 11, Jan. 12, Jan. 11, Jan. 13, Jan. 23, Jan. 25, Jan. 27, Jan. 28, Jan. 27, Jan. 28, Jan. 29, Ja	3 p. m.  -11, 0 -3, 7 -5, 0 -10, 0 -10, 0 -11, 8 -11, 8 -11, 8 -11, 8 -11, 8 -12, 9 -13, 6 -12, 7 -24, 5 -29, 9 -30, 6 -9, 3 -9, 3 -9, 1 -20, 8 -9, 1 -22, 8 -9, 1 -22, 8 -30, 7 -30, 3 -30, 7 -30, 3	4 p. m.  -10. 4 -0. 3 -4. 7 -3. 8 -4. 7 -3. 8 -10. 8 -11. 8 -11. 8 -12. 9 -22. 9 -23. 3 -27. 4 -32. 5 -6. 5 -12. 7 -12. 8 -13. 6	5 p. m.  -10, 2 -3, 4 -4, 7 -4, 4 -7, 8 -15, 6 -17, 7 -12, 0 -17, 7 -12, 0 -18, 1 -20, 5 -20, 5 -20, 5 -20, 5 -20, 5 -20, 5 -21, 8 -12,	6 p. m.  -10, 4 1 - 3, 0 1 - 4, 6 1 - 4, 8 1 - 7, 3 -15, 6 -1, 1, 7 1 - 20, 1 1 - 11, 7 1 - 20, 3 1 - 31, 5 20, 3 1 - 31, 5 20, 3 1 - 1, 6 1 - 13, 1 1 - 17, 8 -11, 6 1 - 3, 7 1 - 3, 7	7 p. m.  - 9. 7 - 3. 3 - 4. 3 - 5. 6 - 7. 1 - 14. 9 - 12. 4 - 10. 9 - 17. 6 - 25. 0 - 31. 4 - 11. 5 - 21. 1 - 13. 4 - 17. 5 - 12. 0 - 3. 1 - 4. 4 - 17. 5 - 12. 0 - 3. 1 - 4. 4 - 17. 5 - 12. 0 - 3. 1 - 3. 4 - 17. 5 - 12. 0 - 3. 1 - 3. 4 - 17. 5 - 12. 0 - 3. 1 - 3. 4 - 17. 5 - 12. 0 - 3. 1	S p. m	9 p. m. - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 12.1 - 20.2 - 17.5 - 20.2 - 17.5 - 20.2 - 17.5 - 20.5 -	10 p. m.  - 8, 0 - 4, 6 - 5, 4 - 6, 2 - 8, 6 - 15, 7 - 20, 6 - 14, 0 - 14, 0 - 14, 0 - 20, 5 - 32, 4 - 20, 5 - 36, 0 - 4, 1 - 14, 0 - 21, 0 -	11 p. m.  - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 15. 4 - 20. 7 - 17. 5 - 31. 6 - 21. 5 - 21. 6 - 17. 5 - 21. 6 - 17. 5 - 21. 6 -	12 p. m.  - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 14.5 - 15.5 - 15.5 - 17.5 - 17.5 - 25.1 - 33.8 - 33.9 - 20.3 - 20.3 - 21.7 - 21	Daily means.  -11, 15 -3, 50 -3, 81 -4, 25 -9, 52 -13, 92 -13, 93 -17, 65 -17, 65 -17, 65 -28, 17 -32, 50 -28, 60 -21, 62 -11, 55 -11, 55 -11, 55 -11, 55 -11, 55 -21, 62 -13, 25 -21, 62 -20, 18 -21, 60 -20, 18 -21, 60 -20, 18 -21, 60 -20, 18	Max.	Min.  -18. 2 -0. 3 -8. 2 -10. 2 -15. 3 -20. 7 -20. 5 -20.	Diff.  11 9 0 6 8 2 8 4 9 8 7 9 11, 9 0 12, 0 0 11, 7 11, 12 11, 15 11,
Jate,  1844 Jan. 1. Jan. 2. Jan. 3. Jan. 3. Jan. 3. Jan. 4. Jan. 5. Jan. 6. Jan. 7. Jan. 8. Jan. 9. Jan. 14. Jan. 15. Jan. 14. Jan. 15. Jan. 16. Jan. 18. Jan. 18. Jan. 19. Jan. 20. Jan. 3. Jan. 20. Jan	3 p. m.  -11, 0 -3, 7 -5, 0 -10, 0 -16, 4 -11, 5 -11, 5 -11, 5 -24, 5 -24, 5 -24, 5 -24, 5 -24, 5 -27, 19, 9 -10, 6 -5, -9, 3 -0, 5 -12, 7 -19, 9 -10, 6 -5, -9, 8 -5, -9, 8 -5, -9, 8 -5, -9, 8 -5, -9, 8 -5, -9, 8 -5, -9, 8 -23, 6 -33, 6 -33, 6 -33, 6 -33, 7	4 p. m.  -10, 4 -10, 3 -4, 7 -3, 8 -8, 8 -11, 8 -11, 8 -12, 9 -20, 9 -20, 3 -27, 4 -32, 5 -10	5 p. m.  -10. 2 -3. 4 -4. 7 -4. 4 -7. 8 -15. 6 -17. 7 -12. 0 -20. 5 -20. 5 -20. 5 -20. 1 -34. 7 -34. 7 -34. 7 -35. 3 -0. 8 -19. 6 -19. 6 -19. 6 -11. 2 -35. 3 -20. 2 -33. 2 -33. 2 -33. 2 -33. 2 -33. 3	6 p. m.	7 p. m.  - 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 10, 9 - 12, 9 - 31, 4 - 25, 9 - 31, 4 - 19, 4 - 19, 4 - 19, 4 - 19, 4 - 19, 4 - 14, 9 - 3, 5 - 2, 1 - 12, 9 - 3, 5 - 2, 1 - 12, 9 - 3, 6 - 3, 6 - 24, 9 - 34, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 4 - 14, 9 - 31, 9	8 p. m. - 9. 5 - 3. 3 - 4. 3 - 4. 3 - 6. 9 - 14. 8 - 12. 8 - 12. 8 - 17. 6 - 22. 9 - 22. 9 - 3. 3 - 23. 9 - 3. 3 - 24. 9 - 25.	9 p. m.  - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 14.1 - 12.1 - 20.5 - 31.4		11 p. m.  - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 15. 4 - 15. 4 - 17. 5 - 20. 5 - 31. 6 - 31. 7 - 21. 6 - 17. 5 - 2. 5 - 4. 4 - 17. 5 - 2. 5 - 4. 6 - 6. 6 - 12.	12 p. m.  - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 11.5 - 15.5 - 15.5 - 17.5 - 20.5 - 20.2 - 30.8 - 30	Daily means.  -11, 15 -3, 50 -3, 81 -4, 25 -9, 32 -13, 92 -13, 93 -14, 75 -17, 65 -16, 29 -22, 18 -28, 17 -32, 50 -28, 60 -16, 35 -10,	Max.	Min.  -18. 2 -0. 3 -8. 2 -10. 2 -15. 3 -20. 7 -21. 2 -25. 2 -24. 2 -30. 3 -30. 2 -40. 6 -8. 7 -20. 5 -20. 5 -20. 5 -20. 5 -20. 5 -20. 6 -20. 7 -20. 6 -20. 7	Diff.  11.9  10.6  11.9  10.0  12.9  10.0  11.7  12.8  12.9  11.7  12.8  12.9  11.6  11.7  12.8  13.8  14.8
Jate,  1884, Jan. 1 Jan. 2 Jan. 3 Jan. 3 Jan. 3 Jan. 6 Jan. 6 Jan. 7 Jan. 8 Jan. 9 Jan. 19 Jan. 11 Jan. 11 Jan. 12 Jan. 13 Jan. 14 Jan. 18 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 19 Jan. 29 Jan. 20 Jan. 20 Jan. 20 Jan. 20 Jan. 20 Jan. 20 Jan. 20 Jan. 20.	3 p. m.  -11.0 -3.7 -5.0 -10.0 -11.2	4 p. m.  -10. 4 -0.3 -4.7 -0.8 -10. 8 -10. 8 -11. 8 -11. 8 -10. 6 -11. 7 -22. 9 -23. 5 -6. 0 -5. 5 -12. 7 -14. 8 -15. 8 -16. 8 -	5 p. m.  -10, 2 -3, 4 -4, 7 -4, 4 -7, 8 -17, 7 -12, 9 -20, 5 -20,	6 p. m.  -10, 4 -3, 0 -4, 6 -4, 6 -4, 6 -14, 0 -14, 0 -14, 0 -14, 0 -11, 7 -20, 1 -20, 5 -20, 5 -20, 5 -20, 5 -21, 6 -31, 1 -11, 6 -3, 6 -31, 1 -11, 6 -3, 7 -3, 7 -3, 1	7 p. m.  - 9, 7 - 3, 3 - 4, 3 - 5, 6 - 7, 1 - 14, 9 - 12, 4 - 10, 9 - 17, 6 - 25, 9 - 34, 7 - 34, 7 - 34, 7 - 12, 4 - 12, 4 - 12, 6 - 3, 3 - 4, 8 - 24, 9 - 34, 9 - 34, 9 - 32, 9 - 34, 9 - 34, 8 - 34, 9 - 34, 9 - 34, 9 - 34, 9 - 32, 9 - 34, 9 - 32	S p. m.   -9.5   -3.3   -4.3   -4.3   -4.3   -4.5   -10.5   -11.6   -11.6   -12.8   -10.5   -12.6   -13.5	9 p. m.  - 9.5 - 3.7 - 5.2 - 6.7 - 7.5 - 15.9 - 14.1 - 12.1 - 20.2 - 17.5 - 3.4 - 31.5 - 3.4 - 31.5 - 3.5 -		11 p. m.  - 7. 8 - 3. 5 - 5. 3 - 6. 4 - 8. 8 - 14. 8 - 15. 4 - 17. 5 - 20. 5 - 31. 6 - 31. 7 - 21. 6 - 11. 1 - 21. 6 - 11. 1 - 22. 7 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 1 - 23. 2 - 23. 3 -	12 p. m.  - 6.3 - 0.7 - 4.5 - 6.8 - 7.3 - 11.5 - 15.5 - 15.5 - 17.6 - 20.3 - 30.0 - 30.0 - 14.5 - 20.3 - 4.0 - 11.6 - 11.	Daily means.  -11, 15 - 3, 50 - 3, 83 - 4, 25 - 9, 32 - 13, 90 - 13, 75 - 17, 65 - 16, 29 - 22, 18 - 28, 17 - 32, 50 - 31, 65 - 6, 18 - 11, 55 - 10, 18 - 11, 55 - 10, 17 - 21, 62 - 23, 22 - 3, 25 - 31, 22 - 3, 27 - 20, 18 - 20, 18 - 21, 30 - 31, 32 - 30, 57 - 20, 18 - 20, 18 - 21, 30 - 31, 32 - 30, 57 - 20, 18 - 20, 18 - 21, 30 - 30, 57 - 20, 18 - 21, 30 - 30, 57 - 20, 18 - 21, 30 - 21,	Max.  -16.9 -1.4 -1.4 -1.8 -11.2 -12.8 -11.2 -12.8 -20.8 -20.7 -23.8 -20.7 -24.7 -25.6 -14.7 -17.7 -1.6 -1.6 -17.7 -1.6 -17.7 -1.6 -17.7 -	Min.  -18. 2 -0. 3 -8. 2 -10. 2 -15. 3 -20. 7 -21. 2 -25. 2 -24. 2 -36. 3 -30. 2 -40. 6 -8. 7 -26. 5 -30. 3	Diff.  11.9

<sup>\*</sup> Highest reading of standard thermomoter taken for maximum of day from January 1, 1883, to June 1, 1883.

ntinued.

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued, (Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean 1 end time. - 5 hours 17 minutes.)

								. ,						
Date.	1 a. m.	2 a. m.	3 n. m.	4 a. m.	5 n. m.	6 a. m.	3 n. m.	8 n. m.	' 9 a. m.	10 a. m.	Ha.m.	El m	I p. in.	2 p. m.
feb t . Feb t . Feb a .	- mr -1	6. 9 6. 5 12. 4	6, 7 7, 7 3, 0 13, 6	= 10. 3 - 7. 4 4. 7 13. 5	- 7. 4 - 7. 7 4. 8 12. 5	- 8, 2 - 6, 7 4, 2 10, 5	= 0.3 = 0.7 3.4 0.1	10, 2 6, 0 2, 1 8, 7	··11. 0 ·· 0. 0 1. 1 8. 0	11. 5 6. 9 1. 3 7. 7	- 11. ii - 0. ii 0. 1 7. 1	$\begin{array}{l} -11 & 5 \\ \pm & 5, 3 \\ \pm & 0, 4 \\ -0, 5 \end{array}$	11. 2 - 5. 1 - 0. 6 - 0 6	10. 8 4 A 2 3 6. 0
Peb. 5 Peb. 6 1 b 7 Peb. 8 1 cb 9	0, 1 7, 4	11.9 24.7 - 5 3 - 0.7 9.1	12. 0 23. 7 4. 2 2. 4 12. 5	12. 1 23. 3 - 2. 5 0. 7 15. 2	$-{11.5\atop -22.7\atop -1.7\atop 0.1\atop 16.8}$	11. 8 21. 7 0. 8 0. 5 17. 4	13.3 20.9 0.5 0.7 18.3	$\begin{array}{c} 13.9 \\ 18.8 \\ -2.5 \\ -0.7 \\ 19.3 \end{array}$	13. 9 14 9 -1. 0 19. 0	$\begin{array}{c} 14.0 \\ 10.0 \\ 5.2 \\ -0.7 \\ 18.0 \end{array}$	$\begin{array}{c} 10.0 \\ 7.2 \\ 8.2 \\ -0.0 \\ 24.4 \end{array}$	13. 0 3. 6 12. 1 -1. 0 21. 4	$- \begin{array}{c} 13.8 \\ - 0.2 \\ 15.3 \\ - 0.8 \\ 19.4 \end{array}$	-1.6 -1.6 -1.9 -0.5 18,0
Tob. 19 Leb. 11 Leb. 12 Leb. 15 Leb. 14	- 5.1 15.6 15.3 	0. 0 15. 6 14. 4 	-8.2 $-15.6$ $12.9$ $-3.2$ $-10.3$	9.5 15.5 11.9 0.4 10.5	$ \begin{array}{r} -11.2 \\ -15.6 \\ -11.0 \\ -16.7 \end{array} $	-12.8 -15.4 -10.0 - 3.0 -11.9	-14.1 -15.4 9.3 4.5 13.2	-14. 9 -15. 2 - 8. 4 - 5. 1 -14. 1	-15.5 $-13.0$ $-7.5$ $-5.2$ $-14.0$	$\begin{array}{c} -15.5 \\ -14.7 \\ -6.6 \\ -5.3 \\ 10.6 \end{array}$	-16. 6 -14. 7 - 5. 6 - 5. 6 -13. 1	16, 5 14, 4 4, 5 5, 8 12, 4	$ \begin{array}{r} -16.7 \\ -14.0 \\ 4.0 \\ -6.0 \\ -11.2 \end{array} $	-17 3 -13 8 -3 9 -6.0 -10.5
Feb. 15 Feb. 17 Feb. 15 Feb. 9	-11.2	- 6, 5 -14, 0 - 8, 6 -10, 4 7, 4	15, 8 7, 9 9, 5 7, 0	- 6.7 -15.6 - 8.4 - 9.5 6.4	- 6.8 -15.4 - 8.8 - 9.3 6.0	- 0.8 -14.7 - 8.7 - 8.2 5.3	7.1 -14.5 - 7.1 - 6.9 - 4.2	$\begin{array}{c} -8.0 \\ -14.5 \\ -5.3 \\ -5.1 \\ 3.2 \end{array}$	- 6.2 -14.6 - 4.4 - 3.8 - 2.5	$\begin{array}{c} -12.1 \\ 14.6 \\ -4.3 \\ -2.1 \\ 2.5 \end{array}$	13. 6 14. 5 4. 2 1. 1 4. 2	-14.0 -15.4 - 4.7 - 0.7 5.1	-13.8 -17.5 - 6.7 1.1 4.3	-13.1 -18.6 - 7.6 2.2 3.7
1	-10.8 -9.5 -20.0 -10.0	5 1 10, 9 10, 8 20, 9 18, 4	-11.5 $-12.3$ $-21.2$ $-20.0$	$\begin{bmatrix} -1.7 \\ -12.2 \\ -13.1 \\ -21.5 \\ -20.5 \end{bmatrix}$	$ \begin{array}{r} 0.1 \\ -12.9 \\ -14.3 \\ -21.2 \\ -21.2 \end{array} $	1.7 13.9 15.4 24.2 21.0	4, 5 13, 0 16, 6 16, 7 21, 4	$\begin{array}{c} -6.2 \\ -12.6 \\ -16.4 \\ -17.5 \\ -22.1 \end{array}$	- 7.7 -12.3 -16.9 -18.3 -22.8	-8.4 $-11.0$ $-18.2$ $-18.2$ $-18.2$ $-23.3$	- 8, 8 -11, 8 -18, 4 -18, 1 - 20, 6	$\begin{array}{l} -9.7 \\ -11.4 \\ -20.5 \\ -16.2 \\ -23.3 \end{array}$	-11. 1 -10. 7 -20. 3 -17. 5 -22. 9	-12.6 -10.3 -20.4 -17.7 -22 1
horson let 26 de let 25 de let 25 de	-22.1 -22.1 -17.5	-23, 4 -22, 4 -17, 8 -13, 1	-17. 1 -11. 0	-23, 8 -23, 8 -17, 7 - 0, 3	-23, 8 -24, 5 -18, 2 -10, 4 - 6, 10	22, 5 25, 3 19, 4 10, 4	-22. 4 -25. 7 -19. 1 - 8. 1	-21, 5 -26, 2 -19, 4 7, 0	- 20. 0 -26. 0 -20. 1 - 4. 9	$ \begin{array}{r} -20.5 \\ -27.1 \\ -21.0 \\ -3.5 \end{array} $	-18, 6 -27, 5 -20, 5 -2, 5 -2, 5 -6, (9	-18.8 -27.6 -20.7 -2.5	-19.2 $-29.8$ $-19.4$ $-4.2$ $-7.19$	- 19.4 -30.7 -19.2 - 4.4 - 7.21
			1											
ret	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Diff.
10d 185. 10b. 1 16b. 2 16b. 3	-10.7 - 4.0 1.3	10, 8 4, 2 5, 3	•	-10.3	10, 5	10.4	9 p. m.  -10.4 - 0.8 8.9 8.2	10 p. m. 10. 2 0. 2 12. 3 8. 9	11 p. m. 10, 2 0, 7 13, 9 0, 0	12 p. m. 0.5 1.6 11.3 0.9		Max.	Min15, 112, 31, 9 5, 0	н. а
1 So. Pelo 1 Leb. 2 Pelo 3	-10.7 -4.0 -1.3 -7.0		-10.4 -4.2 6.2	-10.3 -3.0 7.0 7.0	$ \begin{array}{r} -10.5 \\ -2.4 \\ 7.2 \\ 7.1 \end{array} $ $ \begin{array}{r} 10.1 \\ -4.0 \\ 14.1 \end{array} $	10.4	-10.4 -0.8 8.9 8.2 -16.2 -5.8	-10. 2 0. 2 12. 3	-10. 2 0. 7 13. 9	- 0.5 1.6 11.3	9, 69 4, 77 4, 99	6, 3 1, 6 14, 3	15, 1 12, 3 1, 9	8.8 13.9 16.2
1 So. Feb. 1 Feb. 2 Feb. 5 Feb. 6 Feb. 7 Feb. 7 Feb. 7 Feb. 8	$ \begin{array}{r} -10.7 \\ -4.0 \\ 4.3 \\ 7.0 \end{array} $ $ \begin{array}{r} 14.0 \\ -2.4 \\ 20.0 \\ 0.2 \\ 16.5 \end{array} $		10.4 -4.2 0.4 0.4 10.6 -4.2 13.0 3.2	-10, 3 - 3, 0 7, 0 7, 0 - 15, 8 - 4, 2 - 16, 8 - 16, 7 - 13, 4 - 15, 8	$ \begin{array}{c} -10.5 \\ -2.4 \\ 7.2 \\ 7.1 \end{array} $ $ \begin{array}{c} 10.1 \\ -4.0 \\ 14.1 \\ 3.6 \end{array} $	$ \begin{array}{c} -10.4 \\ -1.7 \\ 7.6 \\ 7.5 \\ -4.7 \\ -15.2 \\ 4.2 \end{array} $	-10.4 -0.8 8.9 8.2 -16.2 -5.8 -13.6 4.2	$ \begin{array}{c} -10.2 \\ 0.2 \\ 12.3 \\ 8.9 \\ -7.3 \\ -11.0 \\ 4.3 \end{array} $	$\begin{array}{c} -10.2 \\ 0.7 \\ 13.9 \\ 0.0 \\ \end{array}$ $\begin{array}{c} 23.2 \\ -7.4 \\ 6.6 \\ 4.8 \end{array}$	- 0.5 1.6 11.3 0.9 22.7 - 6.6 3.5 5.8	= 9, 69 = 4, 77 4, 99 8, 92 15, 65 6, 84 7, 55	6, 3 1, 6 14, 3 13, 6 23, 2 23, 7 20, 1 5, 8	-15, 1 -12, 3 1, 9 5, 0 2 9, 0 8, 2 4, 8	8, 8 13, 9 16, 2 8, 6 14, 0 (3), 6 28, 3 10, 6
1 80. 1 (b. 1 1 (b. 2 1 (b. 2 1 (b. 3 1 (b. 4 1 (b. 5 1 (b. 5 1 (b. 5 1 (b. 6 1 (b. 7	-10, 7 - 4, 9 4, 3 7, 9 14, 9 -2, 4 20, 9 0, 2 16, 5 -17, 5 -15, 5 -17, 6 -9, 7 -12, 1 -17, 6 -17, 6 -17, 6 -17, 6 -17, 7 -17, 7 -17, 6 -17, 7 -17, 7 -	10.8 4.2 5.3 6.9 15.6 2.4 20.1 25.1 15.2 17.0 13.6 0.4 7.4	10.4 -4.2 0.4 10.6 -4.2 19.0 3.2 17.2 -16.9 -13.4 1.2 -1.3	-10, 3 - 3, 0 7, 0 7, 0 - 15, 8 - 4, 2 - 16, 8 - 16, 7 - 13, 4 - 15, 8	-10, 5 -2, 4 7, 2 7, 1 10, 1 -4, 0 14, 1 3, 6 14, 5 -16, 2 -13, 8 -13, 8	-10.4 -1.7 7.6 7.5 -15.6 -4.7 -15.2 4.2 10.8 -15.7 -14.3 -10.8	-10.4 - 0.8 8.9 8.2 -16.2 -5.8 4.2 7.0 -15.4 -16.5 5.3 -11.5	-10. 2 0. 2 12. 3 8. 9 -7. 3 11. 0 4. 3 4. 4 -15. 7 -16. 8 6. 9 -10. 6	-10, 2 0, 7 13, 9 9, 0 23, 2 -7, 4 6, 6 4, 8 1, 7 -16, 0 -16, 2 -7, 3 -10, 2	- 9.5 1.6 14.3 9.9 22.7 - 6.6 3.5 5.8 1.4 - 15.6 - 16.0 6.9	means	6.3 1.6 14.3 13.6 23.2 23.7 20.1 25.8 24.4 5.1 13.4 7.0	-15, 1 -12, 3 -1, 0 5, 0 -1, 0 -2, 2 -9, 0 -8, 0 -4, 8 -5, 2 -21, 8 -20, 6 -10, 2 -13, 8	8. A 13.9 16.2 8. 6 14. 0 23. 6 28. 3 10. 6 20. 6 7 7. 2 26. 5 20. 8
1 5 0 1 cb, 2 1 cb, 2 1 cb, 3 1 cb, 5 1 cb, 5 1 cb, 5 1 cb, 5 1 cb, 5 1 cb, 8 1 cb, 8 1 cb, 9 1 cb, 12 1 cb, 14 1 cb, 14 1 cb, 14 1 cb, 14 1 cb, 14 1 cb, 14 1 cb, 15 1 cb, 17 1 cb, 18 1 cb, 17 1 cb, 18 1 cb,	-10.7 -4.9 -4.9 -4.3 -1.3 -1.4.9 -2.4 -20.0 -1.5 -1.5 -1.5 -1.5 -1.5 -1.1 -1.6 -1.1 -1.1 -1.1 -1.1 -1.1 -1.1	-10.8 -4.2 -6.9 -15.6 -2.4 -20.1 -2.5 -15.2 -17.3 -0.4 -7.9 -10.6 -16.6 -11.0	-10.4	-10, 3 -3, 0 7, 0 7, 0 7, 0 15, 8 -4, 2 16, 8 3, 4 15, 8 -16, 7 -13, 4 -10, 5 -10, 6 -10, 5 -10, 9 -10, 1	-10.5 -2.4 -7.2 -7.2 -7.1 -14.1 -3.6 -14.5 -16.2 -13.4 -9.3 -9.3 -14.3 -14.3 -14.3	-10.4 -1.7 7.6 7.6 15.6 -4.7 15.2 4.2 10.8 -15.7 -11.8 -11.2 -14.0 -15.7	-10.4 -0.8 8.9 8.2 -5.8 -13.6 4.2 -7.0 -15.4 -16.5 -11.9 -13.6 -10.6 -10.6	$\begin{array}{c} -10.2 \\ 0.2 \\ 12.3 \\ 12.3 \\ -7.3 \\ -11.0 \\ 14.3 \\ -4.4 \\ -15.7 \\ -16.9 \\ -10.6 \\ -8.3 \\ -13.1 \\ -11.5 \\ \end{array}$	-10, 2 0, 7 13, 9 9, 0 27, 2 - 7, 4 - 46, 6 4, 8 1, 7 - 10, 0 - 10, 2 - 7, 7 - 11, 0 - 12, 2 - 7, 7 - 14, 0 - 10, 2 - 7, 7 - 10, 0 - 10, 2 - 7, 7 - 10, 0 - 10, 2 - 10, 2	- 0.5 1.6 14.3 9.9 22.7 - 6.6 3.5 5.5 5.1.4 15.6 10.1 7.0 11.0 11.0 12.7	means,	6, 3 1, 6 14, 3 13, 6 23, 2 23, 7 20, 1 5, 8 24, 4 5, 1 13, 4 7, 0 7, 0 6, 2 11, 0 4, 2	-15, 1 -12, 3 -1, 9 5, 0 -8, 2 -9, 9 -8, 2 -4, 8 -20, 6 -13, 8 -17, 9 -12, 6 -14, 9 -14, 9	8. A 4 11. 9 16. 2
1 So.   1 Co.   1 Co	-10, 7 -4, 0 14, 0 13, 0 -2, 4 20, 0 0, 2 16, 5 -13, 7 -1, 5 -0, 7 -1, 17, 6 -9, 4 -20, 0 -20		-10.4	. —10, 0 — 3, 0 — 7, 0 — 7, 0 — 7, 0 — 15, 8 — 16, 7 — 13, 4 — 15, 8 — 16, 7 — 13, 4 — 15, 8 — 16, 7 — 10, 4 — 11, 9 — 11, 9 — 11, 9 — 14, 9 —	-10.5 -2.2 -7.1 -4.0 -14.1 -4.0 -14.1 -3.6 -14.3 -10.6 -13.4 -9.3 -10.6 -14.8 -10.8 -10.9 -17.7 -21.0 -17.7 -21.0 -17.7 -22.2 -16.2	-10, 4 -1, 7, 6 -7, 6 -7, 6 -15, 6 -4, 7 -15, 6 -4, 7 -14, 2 -14, 2 -14, 3 -15, 7 -11, 3 -14, 3 -14, 3 -15, 7 -10, 4 -10, 4 -10, 4 -10, 4 -10, 4 -11, 2 -11, 3 -11, 3	-10.4 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8	-10, 2 -10, 2 -12, 3 -7, 3 -11, 0 -11, 0 -14, 4 -15, 7 -16, 8 -10, 6 -8, 3 -13, 2 -13, 1 -14, 8 -15, 8 -17, 9 -10, 8 -17, 9 -10, 8	-10, 2 0, 7 13, 9 9, 0 27, 2 -7, 4 6, 6, 8 4, 8 16, 0 -16, 2 -16, 2	- 0.5 1.6 14.0 9.9 22.7 - 6.6 3.5 5.5 5.8 1.4 -15.6 -16.0 -10.1 -7.0 -14.0 -12.0 -14.0 -18.9 -20.0 -8.9 -20.0	means,  - 9, 69     4, 77     4, 99     8, 92     15, 05     16, 05     1, 05     14, 31     -11, 30     -14, 92     -3, 66     -8, 59     -10, 65     -10, 22     -17, 25     -10, 22     -17, 24     -17, 67     21, 57     -20, 48     -24, 86     -18, 27     -29, 48     -24, 86		-15.1 -12.3 -1.9 5.0 -8.2 -8.2 -4.8 -10.2 -11.8 -10.2 -11.7 -17.9 -14.9 -15.2 -11.4 -17.7 -17.9	8. A 4 11. 9 16. 2 8. 6 11. 9 16. 2 8. 6 12. 6 1

Table showing the temperature of the air at Uglaamse from October, 1881, to August, 1883—Continued. [Reight of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time,—5 hours 17 minutes.]

						17 m	inutes. }							
Date.	1 a. m.	2 a. m.	: 8 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	tt a. m.	12 m.	1 p. m.	2 p. m.
-												-	-	- 10 1111
1883. Mor. 1	11.4	~11.2	- 9.4	-14.3	16.5	19. 4	- 20, 5		-23.7	-25, 0	24.7	21. t	25.8	25.9
Mar. 2 Mar. 4 Mar. 5 Mar. 6	- 'i 9 - 10, 5 - 15, 7	$\begin{array}{c} 33.1 \\ -24.0 \\ -17.5 \\ -16.6 \\ -16.7 \end{array}$	= 34, 4 : 25, 8 :19, 4 :17, 7 :18, 2	33, 6 25, 9 18, 4 11, 9 19, 1	-36, 8 -26, 1 -19, 0 -14, 7 -15, 6	-38, 4 -26, 9 -19, 4 -18, 0 -19, 4	$\begin{bmatrix} 37.8 \\ -27.4 \\ -18.2 \\ -17.5 \\ -22.9 \end{bmatrix}$	-39, 2 -26, 9 -17, 7 14, 9 -24, 9	$\begin{array}{l} -40, 4 \\ -27, 5 \\ -17, 7 \\ -13, 1 \\ -25, 2 \end{array}$	$ \begin{array}{r} -10.3 \\ -27.6 \\ -19.6 \\ -9.7 \\ -27.0 \end{array} $	$ \begin{array}{r} -39.2 \\ -27.8 \\ -18.7 \\ -7.4 \\ -28.8 \end{array} $	-37.4 +26.8 -24.2 -5.1 +30.6	-05,3 -26,0 -12,1 -13,1 -3,7	-23, 6 -25, 7 -23, 3 -3, 5 -3, 8
Mar. 7 Mar. 8 Mar. 9 Mar. 10 Mar. 11	27.5	$\begin{array}{c} -24.6 \\ -21.2 \\ -37.3 \\ -38.5 \\ -36.3 \end{array}$	-24.2 $-20.5$ $-37.2$ $-40.6$ $-36.7$	-25.9 -23.1 -37.7 -40.3 -31.9	-26.1 -24.9 38.4 -40.2 -37.3	$\begin{array}{c} 26.3 \\ -25.2 \\ -39.6 \\ -40.4 \\ -36.7 \end{array}$	-25.7 -28.1 -40.3 -39.6 -36.9	-27. 8 -25. 9 -41. 6 -39. 4 -36. 8	$\begin{array}{c} -29 & 6 \\ -27. & 7 \\ -43. & 3 \\ -39. & 4 \\ -36. & 0 \end{array}$	$\begin{array}{c} -31.5 \\ -28.3 \\ -46.3 \\ -40.3 \\ -37.4 \end{array}$	-32. 2 -27. 0 -46. 4 - 10. 6 -38. 5	52.7 28.2 13.3 40.9 37.1	31 7 -42.5 -40.1 -20.2	- 20,7 33,8 - 40,4 - 39,0 - 28,4
Mar. 12 Mar. 13 Mar. 14 Mar. 15 Mar. 16	-20.0 $-27.5$ $-26.7$	$ \begin{array}{r} -25.8 \\ -21.1 \\ -26.7 \\ -29.8 \\ -21.1 \end{array} $	-25.1 -19.5 -28.8 -31.8 -21.8	$\begin{array}{c} -23.2 \\ -20.3 \\ -30.5 \\ -31.5 \\ -21.2 \end{array}$	$ \begin{array}{r} -21.0 \\ -23.8 \\ -27.9 \\ -33.6 \\ -21.5 \end{array} $	-23, 1 -25, 7 -99, 3 -33, 9 -20, 6	-22, 1 -26, 9 -29, 3 -34, 3 -18, 4	21. 3 -25. 9 -28. 9 -35. 5 -17. 9	-19, 2 -25, 9 -20, 6 -35, 6 -18, 2	$\begin{array}{c} -21.4 \\ -25.9 \\ -29.5 \\ -34.6 \\ -18.2 \end{array}$	-20, 6 -25, 4 -28, 9 -45, 7 -18, 2	-21. 0 -24. 3 -28. 6 -13. 9 -17. 4	-19 1 -26, 6 -28, 5 -52, 4 16, 6	$\begin{array}{c} 18.2 \\ -25.7 \\ -25.9 \\ -30.3 \\ -11.0 \end{array}$
Mar. 17 Mar. 18 Mar. 19 Mar. 20 Mar. 21	-13. 2 -17. 7 -22. 5	-15.8 -14.0 -18.4 -23.0 -17.0	$\begin{vmatrix} -15.8 \\ -16.6 \\ -18.7 \\ -24.8 \\ -19.7 \end{vmatrix}$	15, 8 20, 1 18, 4 24, 2 20, 5	$\begin{array}{c} -15.9 \\ -20.5 \\ -18.0 \\ -24.7 \\ -20.3 \end{array}$	$\begin{vmatrix} -15.7 \\ -20.1 \\ -20.5 \\ -26.9 \\ -18.2 \end{vmatrix}$	-15. 6 -20. 3 -20. 5 -22. 7 -16. 4	-15, 6 -23, 8 -20, 3 -23, 8 -16, 4	-16, 2 -22, 0 -20, 9 20, 7 -16, 1	-16.6 $-24.3$ $-21.5$ $-12.2$ $-15.9$	-16, 6 21, 2 -22 d -22 d -15, 6	-17.0 -20.3 -23.6 -14.0 -14.8	$\begin{array}{c} -16.7 \\ -20.4 \\ -23.3 \\ -22.9 \\ -13.5 \end{array}$	16 3 19 6 22 6 23 0 12 1
Mar. 23 Mar. 23 Mar. 24 Mar. 25 Mar. 26	- 2.9 13.3	- 5.2 - 8.8 - 4.1 15.8 5.3	$\begin{array}{c} -5.6 \\ -7.1 \\ -4.5 \\ 18.7 \\ 4.0 \end{array}$	$\begin{array}{c} -6.1 \\ -3.8 \\ -1.2 \\ 19.8 \\ 4.0 \end{array}$	$= \frac{6.2}{0.5}$ $= \frac{0.6}{0.6}$ $= \frac{0.7}{5.3}$	$ \begin{vmatrix}                                    $	- 5. 9 - 1. 7 - 0. 7 - 3. 0 5. 7	$\begin{vmatrix} -5.8 \\ -4.7 \\ -1.2 \\ -23.0 \\ 7.4 \end{vmatrix}$	- 6. 0 7. 5 - 1. 3 19. 8 7. 0	$\begin{array}{c} -6.3 \\ -11.2 \\ -2.1 \\ -2.1 \\ 18.5 \\ 6.8 \end{array}$	0.7 -11.2 -0.6 10.8 -0.1	- 6.3 -12.4 -3.0 18.0 10.8	- 6, 6 -11, 8 -1, 1 19 9 12, 6	10,7 10,7 11,3 11,4
Mar. 27 Mar. 28 Mar. 29 Mar. 30 Mar. 31	25, 6 5, 3 19, 0 14, 1 9, 1	25. 7 3. 2 20. 5 7. 8 16. 4	25. 1 0. 6 21. 3 5. 3 10. 9	- 3.0 18.8 8.9 10.5	23. 7 - 3. 8 18. 8 9. 5 10. 8	22. 9 - 5. 8 19. 1 10. 0 11. 0	20. 8 6. 7 16. 8 8. 9 9. 8	21. 3 6. 7 10. 3 2. 9 8. 0	$\begin{bmatrix} 20, 5 \\ -7, 7 \\ 12, 9 \\ -0, 7 \\ 3, 4 \end{bmatrix}$	$ \begin{array}{r r}  & 19.7 \\  & 7.1 \\  & 14.7 \\  & -1.5 \\  & 3.4 \end{array} $	$\begin{bmatrix} -8.7 \\ -8.7 \\ 15.7 \\ -0.7 \\ 4.1 \end{bmatrix}$	$^{21.1}_{-6.3}$ $^{10.9}_{-1.2}$ $^{-1.2}_{-6.1}$	21. 1 - 2. 6 17. 8 2. 5 4. 3	1, 4 19, 7 3, 4 4, 2
		40.54	4	44.40	14.45	27.01	-15, 21	35 00	10.55	38 0.3			4 5 711	-14.37
Means	-12.97	13. 54	-14. 13	-14.18	-14.45	15. 04	-13.21	-15, 62	16, 55	17, 08	-17.6E	-16.32	-15, 91	-14
Means	3 p. m.	4 p. m.	ł I	6 p. m.	,	8 p. ni.	1	10 p. m.	1	1 1	Daily	-16, 32 Max.	Min.	Dis.
Date.		1	ł I	1	,	!	1	l I	1	1 1			!	
Date. - 1883. Mar. 1	3 p. m.	1	ł j	1	,	!	1	l I	1	1 1	Daily		!	
Date.	3 p. m. -26. 7 -32. 3 -24. 3 -24. 5 -5. 3	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. nı.	0 p. m.	10 p. m.	ff p. m.	12 p. m.	Daily mean	Max.	Min.	Dit.
Date.  1883. Mar. 1  Mar. 2 Mar. 3 Mar. 4 Mar. 5	3 p. m. -26. 7 -32. 3 -24. 3 -24. 5 -5. 3 -29. 9 -29. 5 -34. 9 -39. 6 -37. 7	4 p. m. -26. 8 -30. 3 -22. 1 -23. 4 - 8. 6	5 p. m. -27, 5 -28, 2 -20, 5 -10, 2	6 p. m. 25. 8 24. 7 - 18. 2 - 20. 5 - 11. 7	7 p. m. 26. 2 -23. 3 -16. 8 -17. 0 -12. 8	8 p. m. -27. 6 -22. 9 -15. 9 -17. 3 -13. 0	9 p. m. -28, 3 -22, 1 -16, 0 -18, 0 -13, 4	10 p. m.   -30, 9   -23, 4   -15, 2   -16, 9   -13, 4	-33. 6 -24. 7 -15. 0 -13. 2	12 p. m. -33, 4 -24, 3 -15, 4 -1, 8 -13, 6	Daily mean	Max 9.4 9.5 15.2 15.0 3.3	Min57, 2 -45, 2 -32, 2 -23, 3 -23, 3	100.
Date.  1883. Mar. 1  Mar. 2  Mar. 3  Mar. 4  Mar. 5  Mar. 6  Mar. 7  4ar. 8  Mar. 9  Mar. 10	3 p. m. -26. 7 -32. 3 -24. 5 -5. 3 -29. 9 -29. 5 -34. 9 -37. 7 -30. 6 -16. 7 -25. 9 -25. 5 -25. 5 -25. 5 -25. 5	-26. 8 -30. 3 -22. 1 -23. 4 -8. 6 -29. 4 -36. 3 -36. 5 -37. 1	5 p. m. -27, 5 -28, 2 -20, 5 -20, 5 -20, 3 -10, 2 -36, 7 -34, 9 -34, 9	5 p. m.  25. 8  24. 7  - 18. 2  - 20. 5  - 11. 7  - 20. 9  - 33. 4  - 20. 9  - 34. 2  - 21. 2  - 21. 2  - 21. 5  - 21. 5	7 p. m. 26. 2 -23. 3 -16. 8 -12. 0 -12. 8 -19. 7 -17. 5 -37. 3 -32. 9 -31. 0	8 p. m. -27, 6 -22, 9 -15, 9 -17, 3 -18, 0 19, 5 -17, 5 -35, 3 -32, 1 -30, 5	9 p. m. -28, 3 -22, 7 -16, 0 -18, 0 -13, 4 -20, 5 -30, 7 -32, 4 -30, 7	10 p. m.   -30, 9   -23, 4   -15, 2   -16, 9   -13, c   -23, 0   -24, 5   -37, 3   -22, 3   -31, 9	-03. 6 -24. 7 +15. 4 -15. 2 -23. 3 -23. 1 -37. 7 -33. 8 -35. 9	-33, 4 -24, 3 -15, 4 -1, 8 -10, 6 -24, 2 -38, 3 -35, 6	Daily mean	Max. 9.415.215.015.015.617.120.530.325.612.519.519.6	Min	D64.
Date.  1883. Mar. 1  Mar. 2  Mar. 3  Mar. 3  Mar. 4  Mar. 6  Mar. 6  Mar. 10  Mar. 11  Mar. 12  Mar. 13  Mar. 13  Mar. 14  Mar. 14  Mar. 14  Mar. 14  Mar. 14	3 p. m.  -26, 7  -32, 3  -24, 3  -24, 3  -24, 5  -5, 3  -29, 9  -39, 6  -36, 6  -46, 7  -25, 1  -27, 1  -27, 1  -41, 7	4 p. m. -26. 8 -30. 3 -22. 1 -23. 4 -8. 6 -20. 4 -20. 4 -36. 6 -37. 1 -34. 6 -15. 4 -24. 7 -23. 1 -24. 7 -23. 1 -24. 7 -23. 1	5 p. m. -27. 5 -28. 2 -20. 5 -20. 3 -10. 2 -36. 9 -34. 9 -34. 9 -34. 9 -22. 9 -23. 7 -32. 6 -23. 5 -23. 7 -32. 9 -33. 7 -32. 9 -34. 9 -35. 7 -32. 9 -35. 7 -32. 9 -36. 7 -36. 9 -36.	5 p. m.  25. 8  24. 7  - 18. 2  - 20. 5  - 11. 7  - 20. 9  - 33. 4  - 20. 9  - 34. 2  - 21. 2  - 21. 2  - 21. 5  - 21. 5	7 p. m.  26, 2  -23, 3 -16, 8 -12, 0 -12, 8 -19, 7  -17, 5 -37, 9 -31, 0 -28, 9 -12, 3 -12, 3 -20, 4 -20, 3	8 p. m. -27. 6 -22. 9 -15. 9 -17. 3 -18. 5 -35. 3 -32. 1 -30. 5 -17. 5 -32. 1 -30. 5 -17. 5 -32. 1 -30. 5 -17. 9 -32. 1 -30. 5 -17. 9 -32. 1 -30. 5 -17. 3 -30. 5 -17. 3 -30. 5 -17. 3 -30. 5 -17. 5 -30. 5 -17.	0 p. m. -28, 3 -22, 1 -16, 0 -18, 0 -18, 0 -19, 5 -30, 7 -30, 7 -27, 1 -14, 3 -21, 1 -22, 5 -21, 1 -22, 5 -21, 1 -21, 1 -22, 1 -23, 1 -24, 1 -24, 1 -25, 1 -26, 1 -27,	10 p. m.   -30, 9   -23, 4   -15, 2   -16, 9   -13, 5   -23, 3   -21, 5   -37, 3   -22, 9   -31, 9   -22, 9   -19, 6	H p. m.   -33, 6   -24, 7   -15, 9   -13, 2   -23, 3   -37, 7   -35, 9   -27, 6   -26, 6   -21, 5   -20, 6   -21, 5   -20, 6	12 p. m. -33, 4 -24, 3 -15, 4 -1, 8 -13, 6 -10, 6 -24, 2 -38, 2 -35, 3 -35, 6 -29, 5 -20, 5 -20, 5 -22, 8 -22, 8 -23, 8 -24,	Daily mean	Max. 9.415.215.015.015.617.120.530.325.612.519.519.6	Min.   -07. 2   -45. 2   -28. 0   -28. 0   -28. 0   -30. 7   -30. 7   -40. 7   -40. 7   -40. 7   -40. 7   -30.	Dit. 27 8 22 17 0 10 1 17 0 1 17 0 1 17 0 17 1 17 1
Date.  1883. Mar. 1 Mar. 2 Mar. 2 Mar. 3 Mar. 4 Mar. 3 Mar. 4 Mar. 6 Mar. 7 Mar. 6 Mar. 10 Mar. 10 Mar. 10 Mar. 11 Mar. 12 Mar. 13 Mar. 14 Mar. 15 Mar. 14 Mar. 15 Mar. 16 Mar. 17 Mar. 19 Mar	3 p. m.  -26, 7  -22, 3  -24, 5  -24, 5  -29, 9  -29, 5  -39, 6  -30, 6  -46, 7  -25, 1  -25, 1  -27, 1  -11, 4  -21, 3  -21,	4 p. m.  -26. 8  -30. 3 -22. 1 -23. 4 -28. 6 -20. 4 -36. 3 -37. 1 -34. 6 -15. 4 -11. 8 -11. 8 -19. 6 -19. 1 -21. 7 -21. 7 -21. 1 -21. 7	5 p. m.  -27, 5  -28, 2  -20, 5  -20, 5  -10, 2  -36, 7  -34, 7  -32, 1  -12, 9  -23, 7  -24, 6  -10, 4  -10, 5  -10, 6  -10, 6  -10, 6  -10, 6  -10, 6  -10, 6  -10, 6  -10, 6  -10, 6  -14, 6	6 p. m.  25. 8  24. 7  -18.25  -20.7  -20.7  -20.8  -30.9  -30.4  -20.9  -30.4  -20.9  -30.4  -30.4  -30.7  -41.4  -20.5  -30.4  -41.4	7 p. m.  26, 2  -23, 3  -16, 8  -12, 8  -12, 8  -17, 5  -37, 3  -32, 9  -12, 3  -20, 4  -20, 3  -9, 6  -10, 8  -9, 1  11, 3  -13, 9  -13, 9	8 p. m. -27, 6 -29, 9 -15, 9 -17, 3 -18, 0 19, 5 -35, 3 -30, 5 -37, 8 -11, 0 -21, 0 -21, 0 -21, 2 -19, 4 -19, 8 -11, 8 -11, 8 -11, 8 -11, 8 -11, 8 -11, 8 -11, 8 -11, 8 -11, 1 -11, 1	9 p. m.  -28, 3  -22, I -16, 6 -18, 0 -13, 4 -20, 5 -30, 7 -30, 7 -27, I -14, 5 -10, 6 -11, 6	10 p. m.   -30, 9   -23, 4   -15, 5   -15, 9   -15, 19   -13, 2   -23, 5   -37, 3   -22, 4   -15, 6   -12, 9   -19, 6   -14, 6   -14, 9   -15, 1   -12, 5   -14, 9   -15, 1	-33, 6 -24, 7 1-15, 4 -15, 6 -13, 2 -23, 1 -37, 7 -35, 9 -27, 0 -26, 6 -21, 5 -20, 0 -16, 6 -12, 4 -13, 14 -14, 13, 15 -14, 16	12 p. m.  -33, 4 -24, 3 -15, 4 -17, 4 -18, 8 -19, 6 -24, 9 -35, 3 -35, 6 -29, 7 -20, 5 -21, 1 -16, 7 -12, 0 -12, 0 -11, 0 -11, 0	Daily mean	Max.	Min.   -07.2   -45.2   -32.2   -32.2   -32.3   -36.5   -36.5   -46.8   -46.7   -46.7   -46.7   -36.7	Dit. 27 8 22 17 0 17 0 17 0 17 0 17 0 17 0 17 0 1
Date.  1883, Mar. 1 Mar. 2 Mar. 1 Mar. 2 Mar. 3 Mar. 4 Mar. 5 Mar. 6 Mar. 7 4ar. 8 Mar. 6 Mar. 7 Mar. 1 Mar. 10 Mar. 11 Mar. 12 Mar. 13 Mar. 14 Mar. 15 Mar. 14 Mar. 15 Mar. 17 Mar. 18 Mar. 10 Mar. 17 Mar. 18 Mar. 10 Mar. 10 Mar. 17 Mar. 18 Mar. 10 Mar. 10 Mar. 17 Mar. 18 Mar. 10 Mar. 17 Mar. 18 Mar. 19 Mar. 10 Mar. 10 Mar. 10 Mar. 10 Mar. 10 Mar. 10 Mar. 11 Mar. 12 Mar. 1	3 p. m.  -20, 7  -32, 3  -24, 5  -5, 3  -29, 9  -29, 5  -30, 6  -30, 7  -30, 6  -30, 7  -30, 6  -20, 7  -20, 9  -40, 7  -40, 9	4 p. m.  -26, 8 -30, 3 -22, 1 -23, 4 -23, 4 -36, 3 -36, 1 -36, 5 -37, 1 -34, 6 -24, 7 -34, 6 -36, 4 -37, 1 -38, 6 -38, 6 -38, 7 -38, 7 -38, 7 -38, 6 -38, 7 -38, 6 -38, 7	5 p. m.  -27, 5 -28, 25 -20, 5 -20, 5 -20, 7 -30, 7 -30, 7 -31, 7 -31, 7 -31, 7 -31, 6	6 p. m.  25. 8  24. 7  - 18. 2  - 20. 5  - 11. 3  - 20. 4  - 21. 5  - 20. 8  - 21. 5  - 20. 8  - 9. 7  - 11. 3  - 9. 7  - 12. 9  - 7. 0  - 7.	7 p. m.  26. 2  -23. 6  -16. 8  -17. 0  -19. 7  -37. 5  -37. 5  -37. 5  -37. 5  -37. 5  -37. 6  -20. 4  -20. 4  -20. 3  -20. 4  -20. 3  -3. 6  -4. 6  -4. 6  -4. 6  -4. 6  -4. 7  -4. 8	8 p. m.  -27, 6 -22, 9 -17, 3 -11, 0 -18, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 5 -17, 7	0 p. m.  -28. 3  -22. I -16. 0 -18. 0 -18. 0 -19. 5 -20. 5 -20. 1 -20. 5 -20. 1 -20. 5 -20. 1 -20. 5 -20. 1 -20. 5 -20. 1 -20. 5 -20. 1 -20. 6 -20. 8	10 p. m.   -50, 9   -23, 4   -16, 9   -23, 4   -16, 9   -13, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -24, 5   -19, 6   -19, 6   -19, 6   -19, 5   -14, 6   -14, 5   -14, 5   -14, 5   -14, 5   -14, 5   -15, 6   -24, 5   -3, 6   -24, 5   -3, 6   -3,	-03. 6 -24. 7 -15. 0 -13. 2 -23. 3 -23. 1 -37. 7 -33. 8 -27. 1 -37. 7 -38. 9 -27. 0 -20. 0 -20. 0 -15. 0 -15. 0 -15. 0 -15. 0 -15. 0 -15. 0 -15. 9	12 p. m.  -33, 4 -24, 3 -15, 4 -16, 8 -13, 6 -19, 6 -29, 7 -36, 6 -29, 7 -26, 8 -21, 3 -10, 0 -10, 1 -21, 0 -16, 3 -24, 0 -10, 1 -24, 0 -10, 0 -10, 1 -24, 0 -10, 0 -10, 1 -24, 0 -10, 0 -10, 1 -24, 0 -10, 0 -10, 1 -24, 0 -10, 0	Daily mean -23, 28 -31, 62 -22, 17 -19, 35 -11, 83 -23, 15 -23, 15 -34, 17 -34, 19 -34	Max.	Min.  -07. 2  -45. 2  -28. 0  -28. 0  -30. 7  -30. 7  -40. 8  -30. 7  -40. 8  -30. 7  -40. 1  -30. 7  -40. 1  -30. 7  -40. 1  -30. 7  -40. 7  -30. 7  -40. 7  -30. 7	Dit. 27 8 22 22 22 22 22 22 22 22 22 22 22 22 2
Date.  D863. Mar. 1.  Min. 2.  Min. 2.  Min. 3.  Min. 4.  Min. 3.  Min. 4.  Min. 6.  Min. 6.  Min. 6.  Min. 7.  Min. 7.  Min. 10.  Min. 20.	\$ p. m.  -20, 7  -32, 3  -24, 3  -24, 3  -24, 5  -34, 9  -39, 6  -37, 7  -39, 6  -36, 7  -25, 1  -27, 1  -27, 1  -11, 4  -21, 3  -21, 3  -11, 6  -30, 6  -4  -4  -4  -4  -4  -4  -4  -4  -4  -	4 p. m.  -26.8 -30.3 -22.1 -23.4 -26.8 -30.6 -37.6 -37.6 -37.6 -37.7 -21	5 p. m.  -27, 5  -28, 2  -20, 5, 5  -20, 5, 7  -34, 9  -27, 5  -10, 4  -12, 9  -27, 5  -10, 4  -14, 6  -7, 8  21, 6  -7, 8  21, 6  -7, 8  -7,	6 p. m.  25.8  24.7  -18.22  -20.1  -20.5  -20.4  -20.4  -20.5  -20.5  -10.7  -10.4  -20.5  -	7 p. m.  26, 2  —23, 3 —16, 8 —12, 0 —16, 8 —12, 0 —17, 5 —37, 9 —31, 0 —12, 3 —9, 6 —10, 8 —11, 9 —1, 7 —4, 6 —10, 8 —11, 9 —1, 7 —4, 6 —12, 9 —12, 9 —12, 9 —12, 9 —12, 9 —12, 9 —13, 9 —14, 6 —14, 6 —14, 6 —14, 7 —14, 6 —12, 9 —15, 7 —14, 6 —15, 9 —15, 9 —15, 10 —15, 1	8 p. m.  -27, 6 -22, 9 -17, 3 -17, 5 -35, 3 -17, 5 -35, 3 -30, 5 -21, 0 -21, 0 -21, 0 -21, 2 -19, 4 -19, 8 -11, 0 -14, 7 -6, 6 -4, 7 -7, 6 -4, 7 -7, 6 -4, 7 -7, 7	0 p. m.  -28, 3 -22, 7 -16, 6 -13, 0 -13, 0 -13, 0 -13, 0 -13, 0 -13, 0 -14, 3 -20, 1 -14, 3 -21, 1 -14, 3 -12, 6 -10, 5 -21, 1 -14, 5 -21, 1 -14, 6 -6, 0 -7, 1 -14, 6 -7, 1 -7,	10 p. m.   -30, 9   -23, 4   -15, 2   -16, 5   -16, 5   -21, 5   -37, 3   -31, 9   -10, 6   -10, 5   -14, 6   -11, 5   -14, 6   -11, 5   -14, 5	-00. 6 -24.7 -15.4 -15.0 -23.3 -23.3 -23.7 -23.5 -27.0 -10.6 -21.5	12 p. m.  -33, 4  -24, 3  -15, 4  -14, 6  -13, 6  -12, 6  -23, 5  -35, 6  -22, 7  -20, 5  -22, 8  -16, 7  -12, 3  -16, 7  -12, 3  -16, 7  -12, 3  -16, 7  -12, 3  -16, 7  -17, 9  -17, 9  -17, 9  -17, 9  -17, 9	Daily mean	Max.  - 9, 4 - 15, 2 9 - 15, 2 9 - 15, 2 9 - 17, 1 - 20, 5 - 32, 1 - 30, 3 - 12, 3 - 19, 6 - 19, 9 - 10, 1 - 1	Min.  -45, 2  -45, 2  -28, 3  -30, 2  -30, 3  -46, 8  -46, 8  -51, 1  -46, 7  -40, 1  -30, 7	10d.   17 8   27 8   17 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

<sup>\*</sup> Interpolacid.

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.

[Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes.]

Date	ta.m.	2 a. m.	3 a. m.	4 a. m.	3 a. m.	6 a. m.	7 n. m.	8 n. m.	9 8	10 a. m.	11 a. m.	12 m.	t p. m	2 p. m.
Apr. 2		- 4. 1 -13. 0 -13. 9 -13. 3 - 8. 9	- 6, 3 -13, 1 -14, 1 -15, 8 - 8, 2	- 9, 3 - 14, 0 - 14, 9 - 14, 7 - 7, 9	-10, 3 -15, 4 -15, 6 -15, 6 -7, 5	-11. 0 -15. 3 -16. 4 -15. 6 - 7. 3	-11. 9 -16. 6 -17. 1 -17. 3 - 6. 9	-11. 9 -17. 4 -17. 7 -18. 4 - 6. 9	-13.8 -17.3 -17.9 -19.2 -6.9	-16, 8 - 18, 6 -18, 2 - 19, 7 6, 8	18, 2 19, 4 18, 4 21, 0 0, 0	16, 4 16, 3 18, 8 20, 5 5, 2	17, 4 16, 2 16, 5 19, 6 1, 1	16, 9 - 14, 2 15, 0 16, 9 3, 2
Apr. 6 Apr. 7 Apr. 8 Apr. 9 Apt. 10	- 3.4 -13.8 -18.6 -11.9	$\begin{array}{c} -5.3 \\ -15.6 \\ -20.3 \\ -14.3 \\ -0.7 \end{array}$	- 6. 0 19. 2 -21. 2 -15. 4 - 1. 1	- 6, 0 18, 6 22, 4 15, 6 2, 0	-6.0 $-18.4$ $-23.1$ $-14.1$ $-2.5$	$\begin{array}{c} -6.2 \\ -17.3 \\ -24.2 \\ -13.2 \\ -3.4 \end{array}$	$ \begin{array}{r} -6.7 \\ -16.6 \\ -24.7 \\ -15.2 \\ -4.2 \end{array} $	- 6, 5 -15, 4 -24, 5 -16, 6 - 4, 9	- 6. 0 -14. 7 -23. 8 -16. 9 - 6. 0		- 0 0 - 11, 2 24, 1 13, 9 7, 0	$\begin{array}{l} -5.2 \\ -9.5 \\ -21.1 \\ -10.5 \\ -6.1 \end{array}$	5, 1 9, 0 15, 7 9, 5 5, 0	- 4, 0 - 7, a - 12, 1 - 6, 8 - 6, 2
Apr. 11 Apr. 12 Apr. 13 Apr. 14 Apr. 15	$\begin{array}{c} = 3.5 \\ = 2.5 \\ 1.7 \\ 1.7 \\ 3.5 \end{array}$	$\begin{array}{c} = 4.8 \\ = 5.1 \\ = 0.7 \\ = 2.2 \\ 1.6 \end{array}$	- 9, 1 5, 0 0, 0 - 4, 2 0, 8	- 5.7 - 4.5 - 1.4 - 4.1 - 1.2	- 5.3 - 6.0 - 2.8 - 4.5 - 1.3	- 2 3 - 7.5 - 4.0 - 4.5 - 1.2	$ \begin{vmatrix} -6.1 \\ -9.5 \\ -4.0 \\ -7.3 \\ -1.0 \end{vmatrix} $	- 6.0 - 9.8 - 5.1 - 6.9 - 2.1	$\begin{array}{r} -6.2 \\ -7.3 \\ -7.0 \\ -5.0 \\ -2.5 \end{array}$	$\begin{array}{c} -6.1 \\ -4.9 \\ -6.4 \\ -1.9 \\ -2.1 \end{array}$	-5.8 $-2.6$ $-4.1$ $-3.2$ $-2.6$	- 5, 0 - 0, 7 - 4, 5 - 0, 5 - 1, 9	- 4.2 1.8 - 3.5 1.9 - 0.0	$\begin{array}{c} 3.1 \\ 3.7 \\ -1.9 \\ 2.9 \\ -1.8 \end{array}$
Apr. 16 Apr. 17 Apr. 18 Apr. 19 Apr. 20	-13.6 $-17.5$	$\begin{array}{c} -11.2 \\ -16.4 \\ -19.6 \\ -7.2 \\ 6.1 \end{array}$	-9.4 $-18.1$ $-21.2$ $-7.3$ $-5.3$	$ \begin{array}{r} -88 \\ -18.4 \\ -21.0 \\ -7.7 \\ 4.9 \end{array} $	-10.6 -19.2 -25.2 - 9.4 4.9	-13.6 $-19.2$ $-26.7$ $-8.6$ $-6.2$	$\begin{array}{c} -18.4 \\ -19.0 \\ -26.7 \\ -8.9 \\ 5.7 \end{array}$	-21. 0 -21. 7 -27. 8 - 8. 7 5. 1	-24. 0 -24. 3 -28. 8 - 8. 9 - 6. 7	$\begin{array}{c} -93.2 \\ -24.2 \\ -30.8 \\ -8.6 \\ -6.9 \end{array}$	$-\frac{29}{29}, 0$ $-\frac{29}{29}, 0$ $-\frac{29}{7}, 6$ $-\frac{7}{7}, \frac{9}{2}$	$\begin{array}{c} +20.2 \\ -21.6 \\ -27.0 \\ -6.8 \\ 7.2 \end{array}$	$\begin{array}{c} -17.6 \\ -19.7 \\ -21.7 \\ -25.3 \\ -8.3 \end{array}$	= 14.7 =10.0 = 15.8 = 3.7
Apr. 21 Apr. 22	$\begin{array}{c} 15.1 \\ -0.7 \\ -3.4 \\ -6.4 \\ 10.3 \end{array}$	$\begin{array}{c} -14.2 \\ -1.3 \\ -3.0 \\ -5.7 \\ 10.1 \end{array}$	13.6 - 1.7 - 4.7 4.0 9.1	$\begin{array}{c} -\frac{12.8}{2.2} \\ -\frac{5.3}{5.0} \\ 0.6 \end{array}$	$ \begin{array}{r} 12.0 \\ -2.1 \\ -5.1 \\ 1.6 \\ 8.9 \end{array} $	$-{2.5\atop -2.5\atop -1.7\atop 1.3\atop 8.2}$	$ \begin{array}{r} 10.8 \\ -2.8 \\ -3.2 \\ -0.5 \\ 0.1 \end{array} $	$\begin{array}{c} 9.5 \\ -3.0 \\ -6.7 \\ -0.3 \\ 0.1 \end{array}$	$\begin{array}{r} -5.6 \\ -2.4 \\ -7.0 \\ 4.5 \\ 9.3 \end{array}$	$\begin{array}{c} -\frac{6.2}{1.4} \\ -\frac{7.0}{7.0} \\ -\frac{3.2}{10.1} \end{array}$	$\begin{array}{c} -4.1 \\ -0.3 \\ -6.7 \\ 5.1 \\ 10.5 \end{array}$	$-{\begin{smallmatrix} 2.6\\ 0.7\\ -2.3\\ 0.9\\ 11.2\end{smallmatrix}}$	1. 6 2. 8 1. 8 7. 2 12. 0	0, 5 3, 2 5, 0 7, 4 11, 6
Apr. 26 Apr. 27 Apr. 28 Apr. 29 Apr. 30	11. 1 4. 8 10. 4 10. 1 8. 5	11.4 3.7 7.6 9.2 7.5	10. 8 1. 7 7. 7 8. 5 5. 5	$-{}^{10.6}_{\substack{1.1\\7.2\\7.8\\4.2}}$	9, 8 0, 8 7, 4 7, 2 3, 2	8, 2 3, 2 7, 2 7, 2 3, 4	7. 4 3. 2 7. 7 6. 9 4. 2	8. 9 3. 4 5. 6 6. 4 3. 6	8.7 4.2 5.4 7.5 1.8	8, 1 4, 1 6, 8 6, 9 1, 4	7, 7 5, 0 7, 9 8, 1 1, 0	6, 9 6, 5 9, 5 8 7 1, 7	7. 4 8. 2 11. 0 8. 9 2. 9	7, 5 9, 9 13, 3 10, 2 5, 1
Means	- 1, 91	- 3.44	4.40	5.02	- 5.47	5, 66	- 6,32	- 6.86	7.10	- 7.07	- 6.52	5, 27	- 3, 90	2.30
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Diff.
1883. Apr. 1	-15, 6 -13, 1 -13, 0 -14, 9	4 p. m.	5 p. m. -12.7 -10.0 -11.2 -11.4 -0.9	6 p. m. -10.9 - 9.7 -10.5 -10.4 - 0.7	7 p. m. -10. 2 - 8. 7 -10. 2 - 9. 0 - 0. 5	8 p. m. 9.3 8.2 9.3 8.2 0.4	9 p. m. - 8.9 - 8.8 - 8.9 - 7.9 - 0.8	7.8 - 9.5 - 8.5 - 7.8 - 0.9	= 8.6 = 9.2	- 3.6 - 0.1 -40.4		- 2.2	Min. -21.9 -24.8 -23.0 -26.7 -11.3	Diff.  19. 7 16. 6 14. 5 19. 1 13. 9
1883. Apr. 1 Apr. 2 Apr. 3 Apr. 4	-15, 6 -13, 1 -13, 0 -14, 9 -2, 4 -2, 6 -6, 9 -10, 2 -6, 7	-13.8 -10.6 -11.9 -13.0	-12.7 -10.0 -11.2 -11.4	-10.9 - 9.7 -10.5 -10.4	-10. 2 - 8. 7 -10. 2 - 9. 0	- 9.3 - 8.2 - 9.3 - 8.2	- 8.9 - 8.8 - 8.9 - 7.9	- 7.8 - 9.5 - 8.5 - 7.8	$ \begin{array}{r} -8.6 \\ -9.2 \\ -10.5 \\ -7.6 \end{array} $	- 3.6 - 6.1 - 40.4 - 9.5	-11, 37 -13, 09 -13, 75	- 2.2 - 8.2 - 8.5 - 7.6	-21. 9   -24. 8   -23. 0   -26. 7	19, 7 16, 6 14, 5 19, 1
1883. Apr. 1 Apr. 2 Apr. 3 Apr. 4 Apr. 5 Apr. 6 Apr. 7 Apr. 9	-15, 6 -13, 1 -13, 0 -14, 9 -2, 4 -2, 6 -6, 9 -10, 2 -6, 7 -2, 9	-13.8 -10.6 -11.9 -13.0 -2.0 -2.5 -5.3 -7.8 -5.9	-12.7 -10.0 -11.2 -11.4 -0.9 -3.1 -7.6 -6.0 -4.7	-10.9 -9.7 -1.5 -1.4 -0.7 -2.0 -8.6 -4.9 -2.3	-10. 2 - 8. 7 -10. 2 - 9. 0 - 0. 5 - 2. 1 - 9. 2 - 4. 5 - 0. 6	- 9.3 - 8.2 - 9.3 - 8.2 - 0.4 - 2.3 - 8.5 - 4.3 - 0.6	- 8.9 - 8.8 - 8.9 - 7.9 - 0.8 - 3.0 - 0.7 - 4.7 - 1.0	- 7. 8 - 9. 5 - 8. 5 - 7. 8 - 0. 9 - 3. 7 -10. 2 - 5. 5 - 1. 1	$\begin{array}{c} -8.6 \\ -9.2 \\ -10.5 \\ -7.6 \\ -2.2 \\ -4.9 \\ -12.6 \\ -7.2 \\ -1.3 \end{array}$	- 3.6 -6.1 -40.4 - 9.5 - 3.2 - 7.7 -15.2 - 8.8 - 1.1	=11, 37 =13, 99 =13, 75 =14, 91 = 4, 70 =12, 24 =15, 15 = 8, 99	- 2.2 - 8.2 - 8.5 - 8.5 - 0.4 - 2.0 - 5.3 - 4.3 - 0.6	-21.9  -24.8  -29.6  -26.7  -11.3  -11.3  -23.0  -20.0  -20.4	19, 7 16, 6 14, 5 19, 4 13, 9 9, 3 17, 7 24, 7
1883. Apr. 1. Apr. 2. Apr. 3. Apr. 4. Apr. 5. Apr. 6. Apr. 6. Apr. 7. Apr. 9. Apr. 10. Apr. 11. Apr. 12. Apr. 13.	-15, 6 -13, 1 -13, 0 -14, 9 -2, 4 -2, 6 -6, 9 -3, 2 -6, 7 -2, 9 -3, 2 4, 9 0, 4 5, 5 0, 1 -14, 4 -14, 4 -14, 9	-13.8 -10.6 -11.9 -13.0 -2.0 -2.5 -5.3 -7.8 -5.9 -2.2 -2.6 -5.4 1.6 5.8	-12.7 -10.0 -11.2 -11.4 -0.9 -3.1 -7.6 -4.7 -1.6 -1.2 -5.5 3.8 6.3	-10.97 -9.75 -1.55 -0.77 -2.0 -8.6 -4.9 -2.3 -1.2 -0.4 5.7 5.7 5.7	-10. 2 - 8. 7 -10. 2 - 9. 0 - 0. 5 - 2. 1 - 9. 2 - 4. 5 - 0. 6 - 0. 7 0. 8 5. 6 6. 2 7. 3	- 9.3 - 9.3 - 9.3 - 9.4 - 2.3 - 8.5 - 4.3 - 0.7 1.3 5.1 6.7	- 8.9 - 8.8 - 8.9 - 7.9 - 0.8 - 3.0 - 9.7 - 1.0 - 1.2 - 0.1 - 4.2 - 6.8 - 7.5	- 7, 8 - 9, 5 - 8, 5 - 7, 8 - 0, 9 - 3, 7 - 10, 2 - 5, 5 - 1, 1 - 1, 7 - 0, 0 3, 6 6, 2	- 8.6 - 9.2 -10.5 - 7.6 - 2.2 - 4.9 -12.6 - 7.2 - 1.3 - 2.4 - 1.9 - 3.1 - 4.5 - 5.7	- 3.6 - 6.1 - 10.4 - 9.5 - 3.2 - 7.7 - 15.2 - 8.8 - 1.1 - 1.1 - 2.9 - 1.1 - 2.2 - 3.1 - 4.4	means.  -11, 37  -13, 09  -13, 75  -14, 01  -4, 55  -12, 24  -15, 15  -2, 09  -3, 53  -0, 61  -0, 10  -0, 93	- 2.2 - 8.2 - 8.5 - 7.6 - 0.4 - 5.3 - 4.6 - 0.7 - 1.3 5.7 6.7 - 7.5	-21.9 -24.8 -23.6 -26.7 -11.3 -23.6 -29.0 -20.1 -0.9 -13.6 -10.6 -10.9	19, 7 16, 6 14, 5 19, 1 13, 9 9, 3 17, 7 24, 7 19, 8 9, 2 (3, 3) 19, 3 19, 3 17, 4
1883. Apr. 1 Apr. 2 Apr. 3 Apr. 4 Apr. 3 Apr. 4 Apr. 5 Apr. 6 Apr. 7 Apr. 8 Apr. 10 Apr. 10 Apr. 11 Apr. 13 Apr. 15 Apr. 15 Apr. 15 Apr. 16 Apr. 17 Apr. 18 Apr. 16 Apr. 17 Apr. 18 Apr. 16 Apr. 18 Apr. 18	-15, 6 -13, 1 -13, 0 -14, 9 -2, 4 -2, 6 -6, 9 -10, 2 -6, 7 -2, 9 -3, 2 0, 4 5, 5 0, 1 -14, 4 -14, 4 -11, 6	-13.8 -10.6 -11.0 -13.0 -2.0 -2.5.3 -5.3 -5.4 -5.4 1.6 5.8 -13.1 -9.1	-12.7 -10.0 -11.2 -11.4 -0.9 -3.1 -7.6 -6.0 -4.7 -1.2 -5.5 3.8 -6.3 -0.2 -11.3 -6.7	-10.9 -9.7 -11.5 -11.7 -2.0 -4.9 -2.3 -7.0 -1.7 -11.0 -5.5 -5.5 -1.0 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5.5 -5	-10.2 -8.7 -10.2 -9.0 -0.5 -2.1 -0.6 -0.7 -0.8 -0.8 -0.8 -0.2 -13.7 -10.5 -13.7 -10.5 -13.2	- 9.3 - 8.2 - 9.3 - 8.2 - 0.4 - 2.3 - 8.5 - 4.3 - 0.7 1.3 6.8 7.35 - 13.9 - 9.6 - 5.1	- 8.9 - 8.8 - 8.9 - 7.9 - 0.8 - 3.0 - 9.7 - 1.0	- 7. 8 - 9. 5 - 8. 5 - 9. 9 - 3. 7 - 10. 2 - 1. 1 7 - 1.	- 8.6   - 9.2   - 10.5   - 7.6   - 2.2   - 1.9   - 1.3   - 1.4   - 1.9   - 1.5   - 7.7   - 4.1   - 11.9   - 7.6   - 5.9   - 7.6   - 5.9   - 7.6   - 5.9   - 7.6   - 7.	- 3.6 - 0.1 - 9.5 - 9.5 - 3.2 - 7.7 - 15.2 - 8.8 - 1.1 - 2.9 - 1.1 - 2.1 - 4.4 - 6.7 - 13.8 - 14.3 - 7.0 - 7.7	means.	2.2 8.2 2.8,5 - 7.0 - 0.4 - 2.0 - 4.3 - 0.6 - 0.7 - 0.7 - 0.8 - 0.7 - 0.8 - 0.8	-24. 9 -24. 8 -23. 0 -26. 7 -14. 3 -11. 9 -20. 0 -20. 0 -20. 0 -10. 6 -10. 9 -27. 7 -28. 9 -28. 9 -28. 9 -29. 0 -10. 6 -10. 9 -27. 7 -28. 9 -28. 9	19, 7 16, 6 14, 5 19, 1 13, 9 9, 3 17, 7 19, 8 19, 3 19, 3 17, 4 18, 4 18, 2 24, 7 19, 8 19, 8 19, 9 19, 9 1
1883. Apr. 1. Apr. 2. Apr. 2. Apr. 3. Apr. 4. Apr. 6. Apr. 6. Apr. 6. Apr. 10. Apr. 10. Apr. 10. Apr. 10. Apr. 11. Apr. 13. Apr. 14. Apr. 15. Apr. 16. Apr. 17. Apr. 18. Apr. 19. Apr. 14. Apr. 18. Apr. 19. Apr. 18. Apr. 19. Apr. 19. Apr. 21. Apr. 23. Apr. 23. Apr. 24. Apr. 23. Apr. 24. Apr. 23. Apr. 24. Apr. 24. Apr. 25. Apr. 26. Apr. 27. Apr. 28. Apr. 29. Apr. 21. Apr. 21. Apr. 23. Apr. 23. Apr. 23. Apr. 24.	-15.6 -13.1 -13.0 -14.9 -2.6 -6.9 -2.6 -6.9 -3.2 -6.9 -3.2 -4.9 -5.5 -14.4 -14.4 -14.9 -1.0 -1.6 -7.3 -7.3 -7.3 -7.3 -7.3 -7.3 -7.3 -7.3	-13. 8 -10. 6 -10. 6 -13. 0 -2. 5 -5. 3 -7. 8 -5. 9 -2. 2 -2. 6 -1. 8 -1. 2 -13. 8 -1. 2 -13. 8 -1. 3 -1. 3 -0. 7 -11. 3 -	-12.7 -10.0 -11.2 -11.4 -0.9 -3.1 -7.6 -6.7 -1.6 -1.2 -1.8 -0.2 -11.8 -6.7 -1.6 -1.2 -1.8 -1.7 -1.8 -1.8 -1.7 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8	-10.9 -9 -9.7 -10.1 -10.	-10. 2 -8.7 -10. 2 -9.0 -2. 1 -0. 2 -4.5 -0. 6 -0. 7 -0. 8 -0. 8 -0. 3 -10. 5 -10. 5 -10. 5 -10. 7 -10. 5 -10. 7 -10.  - 9.3 - 8.2 - 9.3 - 8.2 - 0.8 - 2.3 - 8.5 - 4.5 - 0.6 - 0.7 1.3 - 2.5 - 2.5 - 5.2 - 5.2 - 1.5, 4 0.6 7.3 1.5, 4	- 8.9 - 8.9	- 7. 8 - 0.5 - 8.5 - 7. 8 - 0.0 - 10.2 - 1. 1 - 1. 7 - 0.9 - 3. 6 - 6. 2 - 4. 6 - 2 - 4. 6 - 10. 8 - 1	- 8.6	- 3.6 - 6.1 - 20.5 - 9.5 - 7.7 - 15.2 - 8.1 - 1.1 - 2.2 - 3.1 - 4.4 - 6.7 - 13.3 - 7.0 - 5.7 - 7.0 - 7.0 - 7.7 - 14.7	means.   -11, 37   -13, 09   -13, 75   -14, 01   -14, 01   -14, 01   -12, 24   -15, 15   -2, 99   -2, 5, 53   -1, 63	- 2.2 - 8.25 - 8.76 - 0.4 - 0.2 - 0.6 - 0.7 - 0.8 - 0.7 - 0.8 - 0.7 - 0.8 - 0.8	-21.9	19, 7 16, 6 14, 5 19, 11 13, 9 9, 0 17, 7 24, 7 19, 3 17, 4 13, 2 14, 7 19, 3 29, 8 17, 4 18, 2 19, 3 19, 3 11, 4 11, 2 11, 2	
1883. Apr. 1 Apr. 2 Apr. 3 Apr. 4 Apr. 3 Apr. 4 Apr. 6 Apr. 6 Apr. 6 Apr. 10 Apr. 10 Apr. 10 Apr. 10 Apr. 11 Apr. 13 Apr. 10 Apr. 11 Apr. 13 Apr. 14 Apr. 15 Apr. 15 Apr. 16 Apr. 17 Apr. 18 Apr. 19 Apr. 18 Apr. 19 Apr. 23 Apr. 24 Apr. 23 Apr. 24 Apr. 23 Apr. 24 Apr. 25 Apr. 24 Apr. 25 Apr. 24 Apr. 25 Apr. 26 Apr. 27 Apr. 28 Apr. 28 Apr. 28 Apr. 28 Apr. 28 Apr. 28	-15. 6 -13. 1 -13. 1 -14. 9 -2. 4 -2. 6 -6. 2 -6. 2 -6. 5 -1. 1 -14. 4 -14. 4 -14. 6 -1.  -13.8	-12.7 -10.9 -11.2 -11.0 -10.9 -3.1 -3.6 -6.0 -4.7 -1.6 -1.5 -3.83 -0.2 -11.3 -6.7 -1.3 -1.3 -1.3 -1.3 -1.3 -1.3 -1.3 -1.3	-10.97 -9.75 -10.47 -0.77 -2.06 -4.99 -1.2 -0.47 -1.0 -5.47 -1.0 -5.47 -1.7 -1.0 -5.87 -1.7 -1.0 -5.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80 -1.80	-10.2 -8.7 -9.5 -2.1 -9.5 -0.7 -0.6 -0.7 -0.8 -0.7 -10.5 -10.6	- 9.3 - 8.2 - 9.3 - 8.2 - 0.4 - 2.3 - 4.5 - 0.6 - 1.3 - 5.1 - 2.5 - 13.9 - 5.2 -	- 8.9 - 8.8 - 7.9 - 8.8 - 7.9 - 8.7 - 7.9 - 1.0 - 1.2 - 1.2 - 6.8 - 7.5	- 7. 8 - 9. 5 - 7. 8 - 7. 8 - 10. 9 - 3. 7 - 10. 2 - 5. 5 - 1. 7 - 10. 8 - 10. 10. 8 - 10. 10. 8 - 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.	- 8.6 - 9.2 - 10.5 - 7.6 - 7.2 - 1.2 - 1.3 - 2.4 - 1.3 - 2.4 - 1.5 - 3.1 - 4.1 - 11.9 - 7.6 - 7.5 - 4.1 - 11.9 - 7.6 - 7.8 - 11.9 - 7.9 - 7.9 - 15.9 - 15.9	- 3, 6 - 6, 1 - 40, 4 - 9, 5 - 7, 2 - 8, 8 - 1, 1 - 2, 9 - 1, 2 - 3, 4 - 4, 3 - 7, 0 - 7, 2 - 13, 8 - 14, 3 - 7, 0 - 7, 2 - 11, 5 - 11, 5 - 9, 9	means.	- 2.2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	-24. 9 -24. 8 -24. 8 -24. 8 -24. 7 -24. 8 -24. 7 -24. 7 -24. 7 -24. 7 -24. 7 -24. 7 -24. 7 -25. 6 -10. 6 -1	19, 7 16, 6 14, 5 19, 1 13, 9 9, 0 17, 7 19, 8 9, 2 0, 3 17, 4 18, 4 18, 2 19, 3 19, 3 17, 7 18, 4 18, 5 19, 1 18, 5 18, 1 18,	

ontinued.

me,--5 hours n. **2** p. m.

8 -25 9 3 23.6 0 -25.7 1 -23.3 3.5 3.5

7 - 00 5 - 40, 1 - 00 2 - 08, 1 - 18, 6 - 25, 6 - 25, 4 - 30, 6 - 11

.2 27.8 .2 22 .2 22 .2 23 .2 24 .2 24 .2 25 .2 2

1089999

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, —3 hours 17 minutes.]

						17	minutes.	1						
Date.	1 a. m.	2 a. m.	2 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 р. ю.
1883. May 1 May 2 May 3 May 4 May 5	2. 3 7. 0 7. 1	= 0.3 $= 0.5$ $= 0.5$ $= 0.5$ $= 0.3$ $= 0.$	$= \frac{3.8}{3.4}$ $= \frac{3.8}{4.0}$ $= \frac{3.8}{5.0}$ $= \frac{3.8}{15.9}$	$\begin{array}{c} -3.2 \\ -5.3 \\ 1.7 \\ 2.5 \\ 15.5 \end{array}$	$ \begin{array}{r}     -7.0 \\     -6.9 \\     -1.2 \\     1.6 \\     14.8 \end{array} $	$\begin{array}{c} -7.6 \\ -7.2 \\ -3.5 \\ 0.2 \\ 15.4 \end{array}$	-11.0 - 7.7 - 4.0 - 0.3 - 8.0	-10.4 $-7.5$ $-3.8$ $1.1$ $16.6$	10, 2 6, 4 3, 4 1, 9 16, 8	9.3 - 5.1 - 2.8 2.8 17.0	- 8.4 - 4.5 - 3.4 - 3.5 - 17.7	$\begin{array}{c} -7.2 \\ -2.2 \\ -1.0 \\ -3.3 \\ 20.0 \end{array}$	$\begin{array}{c} -5.1 \\ -0.5 \\ 0.8 \\ 6.3 \\ 21.1 \end{array}$	- 1.0 1.6 2.7 7.8 23.2
May 6 May 7 May 8 May 9 May 10	15. 0 26. 3 22. 8	31. 9 14. 4 24. 7 22. 7 23. 5	27. 2 14. 1 23. 7 22. 7	28. 3 14. 3 23. 5 23. 2 21. 7	26, 6 13, 9 21, 7 22, 3 20, 0	27, 1 14, 7 20, 5 21, 9 18, 7	29, 4 14, 7 19, 0 21, 5 18, 8	29, 8 15, 3 18, 3 20, 7 19, 6	29. 6 15. 8 18. 7 20. 4 19. 7	27. 1 15. 7 17. 7 20. 4 21. 2	25, 7 17, 1 15, 8 20, 5 21, 0	23, 2 18, 3 15, 4 21, 0 21, 2	21. 0 19. 0 17. 8 20. 9 23. 0	19, 2 20, 5 48, 8 21, 0 25, 6
May 11 May 12 May 13 May 14 May 15	24. 9 25. 6 24. 7	27. 6 24. 7 25. 3 24. 3 25. 4	27. 3 24. 4 24. 8 23. 9 24. 0	26. 8 24. 3 22. 8 24. 1 23. 3	26. 4 29. 5 21. 7 23. 3 22. 5	25, 6 22, 3 21, 5 23, 5 21, 9	24. 9 20. 5 20. 3 23. 2 21. 6	24. 7 17. 8 20. 5 22. 8 21. 2	24, 8 14, 7 20, 3 23, 0 20, 9	24. 6 15. 7 20. 7 23. 4 20. 7	25, 5 15, 6 21, 7 23, 8 20, 6	25, 7 15, 8 22, 6 25, 4 26, 3	20, 3 17, 7 23, 4 25, 5 20, 4	25, 8 18, 0 23, 7 29, 6 21, 7
May 16 May 17 May 18 May 19 May 10	29, 0 23, 8 24, 7	26, 2 28, 2 23, 5 23, 5 26, 5	26. 3 27. 3 23. 4 19. 9 24. 7	26, 9 27, 2 22, 7 15, 9 22, 1	26. 6 26. 8 21. 9 12. 9 17. 0	26, 4 26, 6 22, 0 10, 9 11, 0	26. 8 26. 1 21. 7 9. 5 12. 6	26, 8 25, 6 21, 5 11, 8 13, 7	26, 9 25, 3 21, 3 14, 6 13, 8	27. 5 25. 3 21. 2 16. 7 12. 6	28, 5 25, 1 21, 9 10, 8 14, 7	20, 8 25, 4 23, 2 22, 6 17, 1	30, 4 25, 5 23, 9 25, 1 19, 2	91, 2 24, 3 25, 1 25, 8 22, 8
May 21 May 22 May 23 May 24 May 25	23.1	25, 4 22, 3 24, 9 26, 7 33, 7	22. 8 21. 8 24. 5 23. 2 33. 5	20, 4 21, 5 24, 5 29, 7 32, 1	19. 0 20. 5 24. 2 23. 9 31. 0	17. 6 20. 7 24. 1 23. 1 30. 8	14.7 20.9 24.1 22.2 30.3	14. 4 20. 0 24. 5 20. 7 29. 9	16, 2 20, 8 25, 0 23, 4 30, 7	16, 7 21, 4 25, 4 24, 7 31, 2	17, 9 21, 4 26, 3 26, 6 32, 3	17. 8 22. 4 27. 8 28. 1 33. 3	18.8 24.3 27.5 31.3 34.7	10.7 24.8 29.4 33.5 35.8
May 20 May 27 May 28 May 29 May 70	32. 7	33, 5 29, 3 31, 1 30, 7 33, 9	32. 6 28. 7 30. 3 29. 6 33. 1	32, 2 28, 6 29, 4 28, 2 33, 2	31, 5 27, 6 28, 2 27, 8 32, 2	31. 7 26. 7 27. 6 27. 6 32. 0	31, 3 24, 9 25, 4 30, 1 31, 7	30. 9 25. 0 28. 0 29. 8 30. 3	30, 5 26, 1 28, 8 30, 2 31, 2	30. 1 26. 8 28. 8 29. 4 31. 0	29. 7 27. 6 30. 5 29. 9 31. 8	30, 1 20, 9 31, 5 30, 5 31, 5	30. 2 28. 1 30. 4 29. 0 32. 7	30, 7 29, 6 31, 2 29, 4 33, 2
May 31	31. 5	31. 2	30, 3	29, 7	29, 4	28.8	28, 2	29. 3	28, 8	29. 3	30. 1	31. 1	32. 6	34.9
Means	24, 35	23, 29	22, 05	21.35	20, 12	19, 54	18,93	19, 03	19.36	19.61	20, 18	21. 06	22, 01	22, 15
Date.	3 I . m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Doily means.	Max.	Min.	Diff.
1883. May 1 May 2 May 3 May 4 May 5	- 1.5 4.9 3.4 9.3 27.8	0. 9 6. 2 4. 3 10. 0 30. 1	2. 7 8. 2 5. 1 12. 0 33. 6	3, 7 9, 1 6, 2 13, 3 33, 9	4, 6 10, 1 6, 9 14, 8 33, 5	4. 0 10. 0 8. 0 14. 9 30. 3	5, 1 9, 5 8, 0 15, 1 32, 9	5, 0 9, 5 8, 2 15, 2 33, 1	4. 4 8. 8 8. 1 15. 6 33. 8	4, 0 7, 7 7, 5 14, 7 33, 5	- 2.13 1, 29 2, 71 7, 68 23, 62	5. 1 10. 3 8. 2 15. 6 33. 9	-11.0 -10.8 - 6.5 - 2.2 13.5	19.1 21.4 11.7 17.8 20.1
May 6 May 7 May 8 May 9 May 10	19. 1 21. 2 20. 9 22. 8 26. 8	19. 8 23. 5 1 0 23. 7 25. 9	20, 1 25, 2 23, 6 25, 3 27, 4	19. 8 25. 7 23. 7 27. 9 27. 9	19, 4 27, 0 20, 7 20, 4 28, 4	18, 8 27, 6 24, 0 27, 9 28, 6	18, 6 28, 4 24, 0 27, 1 30, 1	17. 8 28. 4	17. 9 28. 2 23. 1 27. 0 27. 6	10. 3 28. 2 21. 1 27. 1 27. 0	23, 63 20, 26 21, 52 23, 58 24, 26	28, 4 28, 4 26, 3 29, 4 30, 2	15. 0 12. 4 12. 9 19. 2 17. 5	18.4 16.0 13.4 10.2 12.7
May 11 May 12 May 13 May 14 May 15	25, 4 18, 8 23, 8 30, 2 22, 5	26, 7 19, 5 23, 6 30, 5 24, 5	26, 2 21, 7 24, 9 31, 5 26, 8	26. 0 22. 5 25. 6 31. 3 26. 7	27, 9 23, 7 25, 6 29, 9 26, 6	27, 2 24, 8 25, 3 29, 8 26, 7	26, 6 25, 5 24, 9 30, 7 26, 9	26, 0 25, 6 24, 5 32, 1 27, 3	25, 6 25, 3 24, 5 30, 3 28, 2	25, 5 25, 3 24, 8 29, 2 28, 6	26, 03 21, 36 23, 43 26, 92 24, 08	27, 9 25, 6 25, 6 32, 1 28, 6	22, 2 13, 3 18, 6 21, 8 18, 5	5, 7 12, 3 7, 0 10, 3 10, 1
May 16 May 17 May 18 May 19 May 20	32 3 26, 3 26, 9 28, 1 24, 1	33, 0 27, 4 26, 7 29, 4 25, 3	33. 9 28. 4 28. 4 30. 8 27. 1	33, 7 27, 9 28, 1 30, 4 29, 2	33, 4 27, 6 28, 8 30, 1 30, 0	34, 4 28, 2 28, 5 29, 9 30, 9	22, 5 27, 4 27, 6 29, 3 30, 0	31, 8 26, 0 26, 5 29, 7 31, 6	31, 0 25, 3 25, 3 29, 6 31, 8	30, 1 25, 2 25, 1 28, 7 32, 3	29, 72 26, 56 24, 54 22, 90 22, 95	34, 4 29, 0 28, 8 30, 8 32, 3	24. 7 22. 4 19. 5 7. 6 11. 5	9, 7 6, 6 9, 3 20, 2 20, 8
May 24 May 22 May 23 May 24 May 25	29.5 25.3 30.4 34.6 36.0	24. 6 25. 6 32. 1 34. 4 37.8	26. 4 25. 9 33. 2 35. 4 37.8	27, 6 26, 8 34, 4 35, 4 37, 6	28, 7 27, 1 34, 4 35, 0 37, 4	29, 6 27, 6 33, 5 26, 6 36, 4	20, 2 28, 0 33, 3 35, 8 35, 4	28, 0 27, 1 32, 3 35, 1 35, 5	26, 3 25, 8 32, 0 34, 1 35, 7	24, 6 25, 2 30, 5 33, 9 35, 0	22, 42 20, 80 28, 49 29, 62 31,02	29. 6 28. 0 34. 4 36. 6 37.8	11, 5 19, 2 22, 8 18, 9 28, 7	18, 1 8, 8 11, 6 17, 7 9, 1
May 26 May 27 May 28 May 29 May 19	31. 1 30. 6 30. 8 30. 7 33. 9	31, 9 31, 4 31, 8 31, 6 31, 1	32, 5 33, 2 32, 5 32, 5 34, 4	32, 5 32, 7 32, 7 32, 9 33, 7	33, 0 31, 9 33, 5 33, 7 33, 5	33, 7 33, 5 34, 2 33, 5 32, 9	32. 4 32. 9 33. 2 33. 5 32. 3	32. 0 32. 6 32. 4 33. 6 32. 2	32, 0 32, 1 31, 6 33, 6 31, 6	31, 0 32, 9 31, 9 34, 0 31, 9	31, 73 20, 55 30, 77 31, 63 32, 60	34, 4 33, 5 34, 2 34, 0 34, 4	28. 6 23. 7 24. 5 26. 2 28. 3	5 8 9 8 9 7 7, 8 6 1
Мау ат	04. 4	34. 6	34.9	35, 9	34, 4	34.6	34, 4	33, 6	32. 1	31, 5	31. 86	35, 9	27. 0	* 9
Mestes	24, 30	25, 25	26, 48	26, 93	27, 23	27,39	27, 12	26, 86	26, 40	25 92	23 25	28, 67	16, 02	12.65

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Reight of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes.]

, accompany						17	minutes.	1						
Date.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a, m.	10 a. m.	11 a. m.	12 m.	1 p. m.	2 p. m.
1883. Jane 1 Jane 2 Jane 3 Jane 4	112. 2	30, 5 31, 2 27, 6 21, 5	→ 29. 9 30. 5 27. 2 20. 8	29. 8 30. 1 26. 7 20. 3	29. 9 28. 9 26. 4 20.0	29. 6 27. 6 26. 2 20. 1	29, 5 26, 6 25, 6 20, 3	29. 4 26. 7 24. 7 20. 2	29. 4 26. 1 26. 0 20. 4	30, 1 26, 4 25, 1 21, 2	29. 5 2 <b>6.</b> 5 24. 5 20. 6	30, 1 26, 6 24, 5 21, 0	30, 4 26, 7 23, 5 24, 1	30, 9 28, 1 25, 8 23, 8
June 5 June 6 June 7 June 8 June 9	39, 0	29, 3 32, 4 38, 3 30, 0 29, 5	26. 7 31. 3 38. 3 29. 6 28. 5	25. 7 31. 5 33. 5 29. 2 28. 4	25. 2 30. 5 34. 0 28. 4 27. 6	24. 9 31. 7 35. 2 28. 2 26. 4	24. 2 32. 5 31. 5 28. 4 26. 1	23. 7 33. 5 27. 8 28. 8 23. 8	23, 2 33, 3 27, 4 29, 4 25, 8	24. 2 34. 2 29. 1 29. 9 25. 5	25, 2 35, 2 29, 5 30, 1 25, 5	25, 8 35, 2 30, 4 30, 2 25, 6	27. 6 36. 6 31. 7 31. 1 26. 3	28. 4 37. 1 32. 6 32. 6 27. 4
Inne 10 Iune 11 Iune 12 Iune 13 Iune 14	30. 6 33. 3	31, 7 30, 6 29, 7 33, 3 33, 3	31. 3 29. 7 29. 8 33. 2 32. 3	29. 4 27. 8 29. 6 33. 0 32. 3	27. 6 27. 0 29. 3 32. 4 31. 7	27. 4 26. 8 29. 2 32. 0 31. 7	27. 9 26. 6 28. 6 32. 1 32. 3	29. 1 26. 7 29. 1 32. 3 32. 5	29. 7 26. 8 29. 1 32. 6 32. 5	30, 6 26, 5 30, 1 32, 8 33, 2	31. 1 27. 3 30. 4 34. 0 33. 1	32, 4 25, 1 29, 5 35, 4 33, 8	33. 9 26. 8 30. 2 36. 8 34. 2	35. 27. 31. 37. 34.
fune 15 fune 16 fune 17 fune 18 fune 19	33, 3 31, 5 30, 1 35, 2 32, 2	32, 5 31, 1 25, 3 35, 0 31, 1	31. 4 30. 6 28. 4 32. 1 30. 7	31. 0 30. 5 27. 4 29. 7 30. 2	30. 8 30. 1 26. 8 29. 4 29. 6	31. 3 29. 8 25. 2 29. 1 29. 2	31, 4 29, 6 25, 6 28, 8 28, 4	21. 3 29. 6 26. 6 29. 4 29. 0	31. 4 29. 9 26. 9 29. 6 28. 0	32. 6 30. 1 27. 8 30. 1 28. 5	33. 0 30. 7 28. 9 30. 8 28. 7	33, 3 32, 5 29, 6 31, 5 29, 6	32. 9 31. 7 30. 7 30. 7 30. 0	33. 32. 31. 31.
Inno 20 inno 21 luno 22 inno 23 luno 24	31. 3 35. 9 28. 7 31. 5 36. 8	30. 1 32. 3 28. 2 28. 7 37. 2	29. 6 30. 7 28. 2 28. 0 35. 4	28. 7 30. 2 27. 3 28. 6 33. 0	27. 6 29. 2 27. 3 30. 1 32. 5	27. 2 28. 8 27. 1 30. 5 32. 1	27. 4 28. 1 27. 4 31. 8 32. 3	28. 0 27. 9 27. 8 31. 5 31. 5	29. 9 27. 2 27. 7 31. 4 31. 3	29, 8 27, 8 27, 3 31, 5 31, 5	29, 5 27, 6 28, 2 32, 0 32, 5	30, 1 28, 8 29, 5 32, 1 33, 5	31. 7 29. 4 30. 3 32. 5 34. 3	32. 30. 32. 33. 4
une 25 une 26 une 27 une 28 une 29	37. 0 36. 2 34. 5 35. 7 47. 8	36. 3 35. 5 34. 0 35. 5 40. 1	35. 4 34. 5 34. 4 35. 0 40. 3	33. 9 34. 1 34. 2 34. 6 41. 6	33, 1 33, 5 34, 2 34, 2 40, 7	31, 5 33, 1 34, 4 34, 4 40, 3	81.3 33.3 33.9 35.0 39.5	31. 2 33. 5 34. 0 35. 5 39. 1	31, 1 33, 5 33, 6 30, 6 40, 1	31. 6 33. 3 34. 1 39. 6 39. 1	31. 2 33. 5 34. 3 41. 3 37. 2	32, 4 33, 9 33, 9 44, 5 37, 4	32. 5 34. 2 34. 3 46. 6 39. 0	32. 34. 36. 49.
une 30	40.4	39. 9	40. :	38. 3	40.1	36.8	36.4	37. 5	39, 0	38.4	37.7	37. 5	37, 2	37.
Means	33. 25	32. 19	21.48	30.73	30, 27	29. 93	29.73	29, 79	29, 96	52, 40	30, 65	31, 19	32.00	32.
Date.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	5 p. m.	9 p. m.	10 p. m.	11 p. m.	12 p. m.	Daily means.	Max.	Min.	Diff.
1883. uno 1 une 2 une 3 une 4	31. 6 28. 5 25. 9 26. 5	32, 1 28, 8 26, 7 25, 9	33. 2 39. 3 27. 4 26. 1	34. 0 32. 0 26. 9 28. 1	34. 2 31. 8 26. 4 27. 6	34. 4 31. 5 23. 0 30. 1	33, 3 39, 2 24, 6 28, 3	33. 1 30. 4 23. 4 28. 7	32, 5 29, 8 23, 1 28, 1	32. 0 28. 9 22. 7 28. 1	31, 25 29, 02 25, 66 23,92	34. 8 33. 0 30. 7 30. 2	27. 9 21. 5 20. 9 18.2	6. 8. 9.
une 5 une 6 une 7 une 8	30. 7 38. 0 33. 5 32. 2 28. 5	33, 9 38, 6 33, 6 32, 7 29, 3	35. 6 38. 6 34. 2 33. 3 30. 5	36. 2 37. 8 33. 9 32. 8 31. 5	36. 0 37. 9 34. 4 32. 8 31. 9	37. 1 37. 4 34. 2 32. 8 32. 0	37. 1 37. 4 33. 6 32. 2 31. 8	36. 0 37. 8 32. 7 31. 5 32. 0	35. 8 . 38. 3 . 32. 8 . 31 . 2 . 32. 1	35. 2 39. 9 31. 9 30, 7 32. 5	29, 67 35, 45 33, 13 30, 78 28, 78	38. 1 39. 4 39. 4 33. 4 32. 5	22. 7 28. 2 26. 2 27. 0 24. 2	15. 11. 13. 6. 8.
une 10 une 11 une 12 une 13 une 14	34, 6 30, 4 31, 8 37, 9 31, 6	35, 2 30, 7 32, 9 38, 4 35, 4	35, 4 31, 7 33, 5 38, 5 35, 6	35, 4 32, 0 34, 2 37, 8 35, 4	34. 6 31. 3 34. 2 36. 0 35. 4	34. 6 81. 4 84. 7 36. 0 35. 4	33, 9 32, 1 33, 9 33, 4 35, 4	33. 9 32. 1 33. 7 34. 4 35. 2	33. 7 30. 9 34. 0 34. 1 34. 4	33, 9 30, 5 33, 5 33, 6 33, 7	32, 28 29, 23 31, 37 34, 70 33, 81	36, 3 34, 9 35, 4 38, 9 35, 6	25. 7 24. 7 27. 5 30. 8 30. 5	10. 10. 10. 7. 1 8. 5.
une 15! nne 16! une 17! une 18!	33. 8 33. 9 32. 5 32. 3 32. 3	34. 5 34. 6 33. 7 32. 6 33. 2	34. 6 33. 9 34. 6 32. 8 34. 7	34. 6 33. 9 34. 6 33. 0 35. 4	33. 7 33. 7 34. 2 33. 7 35. 4	33. 9 33. 5 35. 2 34. 2 35. 5	33, 5 33, 1 34, 5 34, 1 35, 0	32. 8 33. 1 34. 6 34. 0 34. 4	32. 5 31. 7 34. 0 33. 4 32. 6	31. 9 30. 8 35. 5 32. 7 31. 8	32, 73 31, 76 30, 77 31, 89 31, 53	34. 9 35. 5 35. 7 36. 2 35. 5	29, 8 28, 3 23, 6 27, 3 26, 5	5. 7. 12. 8. 9.
une 20 une 21 une 22 une 23 une 24	33, 5 30, 4 32, 9 34, 3 35, 2	35. 0 30. 8 32. 7 34. 4 35. 6	35, 9 30, 1 33, 5 35, 4 35, 6	36, 4 30, 5 33, 9 36, 2 36, 0	36, 9 31, 3 33, 9 35, 7 36, 9	37, 2 31, 0 33, 5 35, 5 37, 2	34. 1 30. 7 32. 5 35. 6 37. 0	33, 9 30, 0 32, 1 35, 5 37, 4	33, 9 29, 8 31, 8 36, 2 36, 8	35, 8 29, 0 31, 8 35, 2 36, 8	31, 91 29, 90 30, 24 32, 82 24, 70	37. 4 35. 8 34. 0 36. 1 37. 3	25, 6 25, 7 25, 4 26, 0 30, 1	11. 10. 8. 0 10. 7. 1
une 25 uno 26 une 27! une 28	32. 6 35. 3 36. 3 50.4 39. 4	33, 5 35, 6 36, 5 40, 1 40, 3	34, 3 35, 8 36, 6 39, 3 48, 1	34. 7 36. 2 37. 0 37. 9 49. 5	35, 6 36, 2 36, 9 37, 1 39, 2	36, 8 35, 9 36, 5 36, 4 39, 8	36. 4 35. 3 35. 9 37. 3 41. 2	36. 2 35. 0 35. 7 38. 5 41. 8	36. 1 34. 3 35. 2 40. 7 43. 7	35, 7 34, 3 35, 5 46, 6 42, 2	33, 88 34, 62 35, 08 39, 27 41,13	36. 7 36. 3 37. 2 50. 9 50. 4	30, 0 32, 0 32, 5 33, 2 35, 5	6. 4. 4. 17. 14.
шие 22										1077 (3			1	1
Tune 30	37. 3	38, 0	38. 6	38.0	37. 2	37. 9	37. 2	37. 2	38. 0	37. 2	38. 07	42.8	34.6	8,

tinued.

2 p. m. - 3.0 1.6 2.7 7.8 23.2 19.2

> 25, 8 18, 0 23, 7 29, 6 24, 7 24, 3 25, 8 22, 8 19, 7 24, 8

35.5 35.8 30.7 29.6 31.2 29.4 33.2

19.1 19.1 11.7 17.8 10.4 10.2 12.7

12. 5. 12. 7. 10. 10. 9. 6. 10. 23. 20. 18. 8.

Table showing the temperature of the air at Uglaamie from October, 1881, to August, 1883-Continued.

[Height of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time, --5 hours 17 minutes.]

| Date.  | 1 a. m.   | 2 a. m.   | 3 a. m.  | 4 a. m.   | 5 a. m.  | 6 a. m.   | 7 a. m.  | 8 a. m.  | 9 a. m.   | 10 a. m.   | 11 a. m.   | 12 m.  | 1 p. m.  | 2 p. m.  |
|--|---|---|--|---|--|---|--|--|---|--|--|--|--|--|
| 1883.<br>July 1<br>July 2<br>July 3<br>July 4  | 36. 4<br>34. 9<br>36. 3<br>39. 1  | 35. 2<br>34. 5<br>35. 6<br>39. 2  | 34. 4<br>34. 0<br>35. 3<br>38. 1   | 34. 1<br>33. 9<br>35. 0<br>37. 5  | 33. 7<br>34. 8<br>35. 0<br>36. 2   | 33. 9<br>33. 7<br>35. 2<br>36. 0  | 33, 2<br>33, 3<br>35, 3<br>35, 8   | 32, 5<br>33, 1<br>35, 3<br>35, 6   | 32. 6<br>33. 2<br>34. 6<br>35. 7  | 33, 6<br>33, 6<br>35, 4<br>35, 9   | 35. 1<br>33. 9<br>38. 5<br>37. 4   | 34. 9<br>34. 9<br>38. 7<br>37. 5   | 35, 0<br>34, 6<br>41, 1<br>37, 1   | 95, 4<br>95, 4<br>40, 4<br>97, 8   |
| July 5<br>July 6<br>July 7<br>July 8<br>July 9   | 35. 2<br>34. 3<br>42. 0<br>51. 2<br>36. 2   | 34. 8<br>34. 1<br>38. 4<br>50. 3<br>37. 2   | 35. 1<br>33. 9<br>37. 6<br>47. 8<br>33. 6  | 34. 0<br>33. 7<br>37. 5<br>41. 3<br>38. 1   | 38. 9<br>33. 3<br>37. 1<br>45. 8<br>35. 9  | 33. 5<br>33. 2<br>37. 0<br>45. 3<br>35. 6   | 33, 4<br>33, 7<br>37, 8<br>40, 3<br>32, 9  | 33, 7<br>34, 0<br>38, 0<br>36, 2<br>36, 2  | 33. 5<br>34. 6<br>41. 5<br>35. 2<br>39. 3   | 34. 0<br>34. 5<br>43. 3<br>35. 1<br>38. 8  | 34. 9<br>34. 6<br>44. 8<br>35. 4<br>36. 4  | 35, 3<br>34, 8<br>45, 8<br>35, 9<br>37, 4  | 35, 2<br>35, 2<br>46, 9<br>34, 7<br>37, 6  | 95, 7<br>95, 5<br>48, 9<br>94, 1<br>97, 9  |
| July 10<br>July 11<br>July 12<br>July 13<br>July 14  | 31, 5<br>38, 5<br>35, 9<br>36, 5<br>35, 5   | 30. 7<br>38. 7<br>34. 6<br>36. 1<br>36. 5   | 30. 2<br>38. 9<br>34. 5<br>34. 5<br>34. 1  | 30, 1<br>35, 8<br>34, 2<br>35, 0<br>33, 3   | 29, 6<br>35, 2<br>33, 9<br>33, 9<br>32, 1  | 29, 8<br>36,<br>33, v<br>34, 3<br>32, 3   | 30, 0<br>36, 9<br>33, 7<br>34, 5<br>34, 9  | 30. 2<br>37. 4<br>33. 5<br>34. 7<br>36. 4  | 30. 5<br>38. 3<br>33. 9<br>34. 7<br>33. 4   | 31. 2<br>38. 0<br>34. 1<br>35. 2<br>33. 8  | 32. 4<br>37. 9<br>33. 9<br>34. 5<br>34. 9  | 33. 8<br>38. 2<br>34. 1<br>34. 4<br>36. 0  | 31. 4<br>37. 6<br>34. 2<br>36. 6<br>35. 7  | 95, 5<br>37, 8<br>94, 9<br>95, 9   |
| July 15<br>July 16<br>July 17<br>July 18<br>July 19  | 35. 9<br>84. 1<br>33. 1<br>38. 9<br>48. 2   | 37. 4<br>33. 9<br>32. 1<br>30. 9<br>41. 0   | 35. 3<br>33. 9<br>31. 8<br>37. 9<br>43. 3  | 34. 6<br>33. 6<br>30. 5<br>37. 8<br>44. 0   | 34. 4<br>33. 3<br>29. 4<br>36. 0<br>37. 4  | 34. 4<br>33. 5<br>29. 4<br>37. 2<br>37. 9   | 34. 2<br>33. 5<br>29. 6<br>37. 4<br>38. 3  | 34. 0<br>33. 6<br>30. 7<br>39. 5<br>38. 8  | 33. 5<br>33. 0<br>32. 5<br>41. 5<br>40. 4   | 34, 5<br>83, 9<br>32, 8<br>42, 5<br>41, 8  | 33. 7<br>32. 6<br>32. 2<br>44. 3<br>37. 5  | 34. 1<br>34. 4<br>36. 3<br>45. 2<br>43. 0  | 31. 6<br>35. 2<br>36. 9<br>47. 3<br>42. 7  | 34. 7<br>36. I<br>38. 8<br>39. 8<br>43. 2  |
| July 20<br>July 21<br>July 22<br>July 23<br>July 24  | 37. 9<br>34. 5<br>33. 7<br>32. 6<br>31. 5   | 36, 5<br>33, 9<br>32, 8<br>34, 5<br>31, 1   | 36. 2<br>33. 2<br>32. 5<br>34. 0<br>30. 6  | 36. 3<br>40. 4<br>32. 2<br>31. 5<br>30. 1   | 35, 8<br>32, 8<br>31, 3<br>30, 1<br>30, 2  | 35. 5<br>32. 3<br>30. 9<br>29. 2<br>30. 3   | 35. 2<br>32. 5<br>31. 1<br>29. 2<br>30. 0  | 35, 2<br>32, 6<br>31, 6<br>29, 1<br>29, 4  | 35. 1<br>32. 3<br>31. 7<br>30. 8<br>28. 8   | 85. 4<br>40. 4<br>32. 0<br>32. 5<br>29. 1  | 35. 7<br>33. 1<br>32. 3<br>32. 1<br>29. 9  | 36, 6<br>34, 0<br>33, 5<br>32, 0<br>31, 1  | 36. 3<br>31. 4<br>54. 7<br>32. 4<br>32. 3  | 36, 9<br>34, 8<br>36, 1<br>32, 1   |
| Inly 25<br>Inly 26<br>Inly 27<br>Inly 28<br>Inly 20  | 40. 8<br>39. 8<br>39. 3<br>36. 3<br>32. 2   | 40. 8<br>35. 6<br>38. 9<br>35. 4<br>32. 2   | 39. 3<br>33. 2<br>37. 9<br>34. 5<br>31, 6  | 35. 9<br>32. 2<br>36. 5<br>34. 4<br>31. 1   | 35, 4<br>31, 7<br>34, 6<br>33, 9<br>30, 5  | 33, 5<br>31, 3<br>34, 0<br>33, 1<br>29, 8   | 33. 1<br>31. 1<br>34. 4<br>32. 7<br>29. 4  | 25. 8<br>31. 3<br>35. 4<br>33. 1<br>29. 4  | 36. 5<br>32. 9<br>36. 9<br>33. 9<br>29. 7   | 38, 3<br>33, 5<br>37, 3<br>36, 4<br>31, 1  | 36. 4<br>34. 9<br>37. 6<br>36. 9<br>30. 8  | 34, 9<br>37, 1<br>38, 3<br>37, 2<br>30, 5  | 35. 2<br>37. 9<br>38. 6<br>37. 4<br>31. 2  | 39.4<br>39.4<br>39.1<br>57.0<br>52.7   |
| fuly 30<br>July 31   | 32. 0<br>35. 6  | 31. 9<br>34. 7  | 31. 1<br>33. 6   | 30. 6<br>32. 3  | 30. 1<br>29. 7   | 30. 1<br>29. 2  | 29. 6<br>29. 3   | 29. 4<br>29. 0   | 28.9<br>29.1  | 29. 4<br>29. 2   | 29. 3<br>30. 1   | 29. 4<br>30. 4   | 30. 2<br>31. 6   | 31. 1<br>33. 4   |
| Means  | 36. 80  | 36, 08  | 35, 22   | 34, 95  | 23. 73   | 33, 60  | 33.43  | 33. 70   | 34. 15  | 35, 05   | 34. 90   | 35, 80   | 36. 29   | 36.7   |
| Date.  | 3 p. m.   | 4 p. m.   | 5 p. m.  | 6 a. m.   | 7 p. m.  | 8 p. m.   | 9 p. m.  | 10 p. m.   | 11 p. m.  | 12 p. m.   | Daily<br>means.  | Max.   | Min.   | Din.   |
| 1883.<br>nly 1<br>nly 2<br>uly 3<br>uly 4  | 34. 6<br>36. 4<br>39. 9<br>38. 5  | 34. 2<br>36. 7<br>38. 7<br>38. 6  | 33. 9<br>36. 0<br>38. 3<br>39. 9   | 33. 9<br>37. 7<br>37. 9<br>37. 6  | 34. 4<br>35. 4<br>39. 3<br>38. 1   | 35, 9<br>39, 9<br>40, 2<br>37, 8  | 35. 1<br>38. 7<br>38. 8<br>37. 9   | 35. 1<br>37. 9<br>39. 5<br>37. 5   | 34. 9<br>36. 3<br>40. 3<br>36. 2  | 35, 0<br>37, 1<br>39, 3<br>35, 5   | 34. 46<br>35. 38<br>37. 58<br>37. 37   | 38. 7<br>39. 6<br>42. 2<br>40. 2   | 31. 4<br>31. 9<br>33. 4<br>33. 8   | 7. 3<br>7. 3<br>8, 8   |
| uly 5<br>uly 6<br>uly 7<br>uly 8<br>uly 9  | 50.4  | 35, 2<br>37, 9<br>52, 3<br>35, 5<br>35, 1   | 35. 4<br>40. 2<br>51. 7<br>36. 9<br>34. 4  | 35. 4<br>40. 4<br>50. 2<br>36. 7<br>35. 1   | 36. 0<br>42. 5<br>50. 5<br>36. 4<br>35. 4  | 36, 4<br>42, 2<br>51, 2<br>36, 9<br>35, 4   | 37, 2<br>43, 5<br>52, 8<br>35, 9<br>34, 1  | 37, 4<br>42, 6<br>52, 5<br>36, 1<br>33, 8  | 36. 3<br>41. 7<br>52. 0<br>35. 3<br>32. 5   | 34. 8<br>40. 7<br>53.2<br>35. 1<br>31. 9   | 35. 10<br>37. 03<br>45.57<br>38. 02<br>35. 65  | 37. 5<br>43. 9<br>53. 1<br>53. 2<br>39. 4  | 32. 0<br>5° 5<br>35. 8<br>32. 9<br>30. 7   | 5.7<br>11.1<br>17.1<br>20.1<br>8.7   |
| fuly 10  | 36. 7<br>38. 0  | 37. 1   | 39. 3  | 40. 1   | 40.1   | 40.0  |  |  |   |  |  |  |  |  |
| fuly 12<br>Inly 13   | 35. 1   | 35. 9<br>36. 9  | 38. 3<br>36. 0<br>36. 1<br>37. 6   | 38, 6<br>36, 7<br>36, 6<br>37, 7  | 38, 6<br>36, 2<br>37, 2<br>38, 3   | 40, 6<br>38, 3<br>36, 1<br>36, 3<br>37, 5   | 40. 8<br>37. 7<br>35. 9<br>38. 2<br>37. 7  | 39. 7<br>37. 4<br>36. 1<br>36. 5<br>38. 1  | 38. 3<br>37. 6<br>35. 6<br>37. 2<br>37. 4   | 38, 3<br>36, 5<br>35, 4<br>37, 4<br>37, 2  | 34. 62<br>37, 70<br>34. 27<br>35. 69<br>35. 81   | 41. 2<br>39. 7<br>37. 5<br>37. 6<br>38. 9  | 28, 3<br>33, 7<br>32, 5<br>32, 5<br>30, 4  | 6, 6<br>5, 0<br>5, 1   |
| fuly 12 Inly 13 Inly 14 Inly 15 Inly 16 Inly 17 Inly 18  | 35. 1<br>35. 1  | 35. 2   | 38. 3<br>36. 0<br>36. 1  | 38, 6<br>36, 7<br>36, 6   | 38, 6  | 38, 3<br>36, 1<br>36, 3   | 14.5. 51   | 37. 4<br>36. 1<br>36. 5  | 37. 6<br>35. 6<br>37. 2   | 35 4   | 34. 27<br>35. 69   | 37. 5<br>37. 6   | 32.5   | 12. 9<br>6. 6<br>5. 0<br>5. 1<br>8. 7<br>13. 1<br>14. 0<br>13. 1                   |
| July 12 July 13 July 14 July 15 July 16 July 16 July 17 July 18 July 19 July 19 July 20 July 21 July 22 July 22 July 22 July 23  | 35. 1<br>35. 1<br>36. 7<br>35. 2<br>36. 7<br>39. 5<br>40. 5<br>43. 4  | 35. 9<br>36. 9<br>29. 0<br>27. 6<br>42. 7   | 38. 3<br>36. 0<br>36. 1<br>37. 6<br>36. 2<br>37. 8<br>31. 8<br>41. 5   | 38, 6<br>36, 7<br>36, 6<br>37, 7<br>36, 4<br>38, 3<br>41, 2<br>40, 3  | 38. 6<br>36. 2<br>37. 2<br>38. 3<br>37. 2<br>39. 5<br>39. 6<br>40. 6   | 38, 3<br>36, 1<br>36, 3<br>37, 5<br>37, 6<br>23, 3<br>39, 1<br>41, 2  | 35, 9<br>38, 2<br>37, 7<br>36, 8<br>36, 8<br>38, 3<br>42, 8  | 37. 4<br>36. 1<br>36. 5<br>38. 1<br>35. 9<br>36. 2<br>38. 4<br>43. 0   | 37, 6<br>35, 6<br>37, 2<br>37, 4<br>35, 0<br>35, 3<br>38, 4<br>44, 5  | 35, 4<br>37, 4<br>37, 2<br>34, 5<br>34, 1<br>39, 0<br>42, 8  | 34, 97<br>35, 69<br>35, 81<br>35, 25<br>35, 22<br>35, 57<br>40, 97   | 37. 5<br>37. 6<br>38. 9<br>37. 9   | 32, 5<br>30, 4<br>32, 3<br>31, 9<br>28, 0<br>24, 2   | 6. 6<br>5. 0<br>5. 1<br>8. 3<br>5. 6<br>7. 1<br>13. 1                              |
| July 12 July 13 July 14 July 15 July 15 July 15 July 16 July 17 July 17 July 17 July 19 July 21 July 22 July 23 July 23 July 23 July 24 July 25 July 26 July 26 July 27 July 27 July 28 July 2 | 35. 1<br>35. 1<br>36. 7<br>35. 2<br>36. 7<br>39. 5<br>40. 5<br>43. 4<br>36. 6<br>36. 6<br>33. 1   | 1.7.4<br>35.9<br>36.9<br>29.0<br>37.6<br>42.1<br>40.7<br>43.2<br>37.1<br>36.4<br>33.4                             | 38.3<br>36.0<br>36.1<br>37.6<br>36.2<br>37.8<br>41.5<br>43.0<br>36.6<br>35.7<br>36.6<br>35.7<br>37.8                 | 38. 6<br>36. 7<br>36. 6<br>37. 7<br>36. 4<br>38. 3<br>41. 2<br>40. 3<br>39. 6<br>36. 4<br>35. 8<br>35. 8          | 38, 6<br>36, 2<br>37, 2<br>38, 3<br>37, 2<br>39, 5<br>39, 6<br>40, 6<br>41, 6<br>36, 7<br>36, 6<br>35, 9<br>34, 4          | 38. 3<br>36. 1<br>36. 3<br>37. 5<br>37. 6<br>28. 3<br>39. 1<br>41. 2<br>41. 5<br>37. 8<br>36. 6<br>36. 8  | 35. 9<br>38. 2<br>37. 7<br>36. 8<br>36. 8<br>38. 3<br>42. 8<br>30. 2<br>38. 5<br>36. 0<br>38. 5  | 37. 4<br>36. 5<br>38. 1<br>35. 9<br>36. 2<br>38. 4<br>43. 0<br>40. 4<br>37. 0<br>35. 5<br>34. 6<br>34. 3   | 37. 6<br>35. 6<br>37. 4<br>37. 4<br>35. 0<br>35. 3<br>38. 4<br>44. 5<br>40. 0<br>36. 0<br>35. 2<br>38. 2<br>38. 3                   | 35, 4<br>37, 4<br>37, 2<br>34, 5<br>34, 1<br>39, 0<br>42, 8<br>40, 1<br>34, 9<br>34, 9<br>34, 9<br>34, 9<br>34, 9<br>34, 9<br>34, 7<br>32, 5 | 34, 87<br>35, 69<br>35, 81<br>35, 25<br>35, 22<br>35, 57<br>40, 97<br>41, 23<br>34, 89<br>33, 81<br>32, 61   | 37.5<br>37.6<br>38.9<br>37.9<br>39.1<br>41.2<br>48.3<br>48.7<br>40.9<br>37.2<br>37.8<br>35.6   | 02.5<br>30.4<br>32.3<br>31.9<br>28.0<br>34.2<br>34.2<br>34.0<br>31.0<br>29.4   | 6.6<br>5.1<br>5.1<br>5.6<br>7.1<br>13.1<br>14.0<br>13.9<br>6.5<br>8.4<br>8.2<br>12 |
| July 13 July 15 July 15 July 15 July 16 July 17 July 18 July 20 July 20 July 21 July 23 July 24 July 25 July 25 July 27 July 27 July 27 July 27 July 28 July 28  | 35. 1<br>35. 1<br>36. 7<br>35. 2<br>36. 7<br>39. 5<br>40. 5<br>43. 4<br>36. 2<br>35. 6<br>36. 6<br>36. 1<br>37. 1<br>41. 1<br>40. 0<br>40. 0<br>40. 0 | 35. 4<br>36. 9<br>37. 6<br>42. 7<br>40. 7<br>43. 2<br>37. 1<br>35. 4<br>36. 4<br>34. 4<br>36. 6<br>30. 9<br>40. 4 | 38.3<br>36.1<br>37.6<br>36.2<br>37.8<br>41.5<br>43.0<br>36.6<br>36.6<br>36.2<br>37.8<br>41.4<br>40.6<br>41.4<br>40.6 | 38. 6<br>36. 6<br>37. 7<br>36. 4<br>38. 3<br>41. 2<br>40. 3<br>39. 6<br>35. 7<br>34. 2<br>42. 2<br>40. 6<br>35. 7 | 38, 6<br>36, 2<br>37, 2<br>38, 3<br>37, 2<br>39, 5<br>40, 6<br>41, 6<br>36, 6<br>35, 9<br>34, 4<br>40, 7<br>40, 7<br>40, 5 | 38, 3<br>30, 3<br>37, 5<br>37, 6<br>24, 3<br>41, 2<br>41, 5<br>37, 6<br>30, 1<br>41, 2<br>41, 5<br>37, 8<br>36, 8<br>36, 8<br>36, 8<br>36, 8<br>40, 7<br>40, 7<br>40, 0 | 36, 9<br>38, 9<br>37, 7<br>36, 8<br>36, 8<br>36, 8<br>36, 8<br>36, 2<br>36, 3<br>42, 8<br>36, 3<br>42, 8<br>36, 3<br>42, 8<br>36, 3<br>42, 8<br>36, 3<br>42, 8<br>36, 4<br>40, 4<br>4<br>4<br>38, 3<br>40, 4<br>40, 4<br>4<br>38, 3<br>40, 4<br>40, 4<br>4<br>4<br>38, 4<br>40, 4<br>40, 4<br>40, 4<br>4<br>4<br>38, 4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4<br>4 | 36.5<br>36.5<br>38.1<br>35.9<br>36.2<br>43.0<br>40.4<br>37.0<br>36.5<br>34.6<br>34.6<br>34.6<br>34.6<br>34.6<br>35.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5<br>36.5 | 37. 6<br>35. 6<br>37. 2<br>37. 4<br>35. 0<br>38. 3<br>44. 5<br>40. 0<br>36. 2<br>33. 9<br>33. 9<br>30. 9<br>38. 8<br>39. 9<br>38. 8 | 35, 4<br>37, 2<br>4 37, 2<br>5 34, 5<br>4 34, 1<br>39, 0<br>40, 1<br>5 34, 9<br>5 34, 2<br>7 34, 2<br>7 30, 0<br>30, 8<br>8 38, 0            | 34, 97<br>35, 80<br>35, 81<br>35, 82<br>35, 22<br>35, 22<br>35, 57<br>40, 97<br>41, 23<br>36, 30<br>31, 81<br>32, 61<br>33, 34<br>37, 26<br>36, 56<br>36, 56<br>36, 56 | 37, 5<br>37, 5<br>31, 9<br>37, 9<br>37, 9<br>41, 2<br>48, 7<br>40, 9<br>37, 8<br>40, 9<br>41, 3<br>42, 2<br>41, 3<br>42, 2<br>41, 3<br>40, 9 | 02.5<br>30.5<br>30.5<br>31.9<br>28.0<br>28.0<br>31.0<br>31.0<br>20.4<br>27.7<br>30.8<br>31.8<br>31.0<br>31.0<br>31.0<br>31.0<br>31.0<br>31.0<br>31.0<br>31.0 | 6. 6<br>5. 0<br>5. 1<br>8. 7<br>13. 1<br>14. 0<br>13. 1                            |

Table showing the temperature of the air at Uglaamie from October, 1381, to August, 1883-Continued. Reight of the thermometer above the surface of the earth, 4 feet. Washington mean time. Correction to reduce to mean local time; - 5 hours

| Reight of   | the there                                 | nometer a                                 | ibove the                                 | Bulline of                                |   | 17  | minutes.                                  | ]   |   |   |  |   |   | o nours                                   |
|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
| Date.   | 1 a. m.                                   | 2 a. m.                                   | 3 a. m.                                   | 4 a. m.                                   | 5 n. 1:1.                                 | 6 a. m.                                   | 7 a. m.                                   | 8 a. m.                                   | 9 a. m.                                   | 10 a. m.                                  | 11 a. m.                                       | 12 m.                                     | $1 p_{i_0} m_{i_0}$                       | 2 p, m.                                   |
| 1883.<br>Ang. 1<br>Ang. 2<br>Ang. 3                 | 34. 3<br>34. 9<br>30. 3                   | 34.4 °<br>34.5<br>35.7                    | 34. 0<br>34. 2<br>34. 9                   | 33. 9<br>34. 0<br>34. 8                   | 33, 5<br>33, 9<br>35, 9                   | 33. 3<br>33. 5<br>34. 2                   | 33. 0<br>33. 7<br>33. 9                   | 33. 2<br>34. 0<br>34. 0                   | 33, 1<br>34, 2<br>33, 6                   | 33, 3<br>34, 9<br>33, 9                   | 33, 6<br>35, 4<br>35, 0                        | 33, 7<br>36, 1<br>37, 1                   | 34. 4<br>37. 0<br>38. 4                   | 35, 4<br>38, 3<br>38, 5                   |
| Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8      | 30, 4<br>35, 7<br>35, 0<br>33, 5<br>39, 9 | 35. 0<br>35. 1<br>34. 5<br>33. 0<br>41. 0 | 34. 9<br>34. 6<br>34. 2<br>33. 3<br>43. 2 | 34. 4<br>33. 9<br>33. 9<br>33. 5<br>43. 0 | 35, 2<br>33, 3<br>33, 9<br>33, 5<br>43, 9 | 35, 5<br>32, 7<br>34, 0<br>33, 6<br>43, 6 | 35. 4<br>32. 0<br>34. 1<br>38. 7<br>44. 0 | 35. 4<br>33. 5<br>34. 4<br>33. 7<br>41. 0 | 35. 2<br>33. 9<br>34. 2<br>33. 5<br>45. 0 | 35, 4<br>34, 4<br>34, 1<br>33, 6<br>45, 6 | 30. 0<br>35. 0<br>34. 4<br>34. 4<br>46. 4      | 36, 4<br>35, 2<br>34, 6<br>35, 2<br>47, 9 | 37. 9<br>35. 6<br>34. 1<br>37. 0<br>50, 3 | 38, 0<br>35, 8<br>34, 0<br>38, 2<br>46, 2 |
| Aug. 0<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13  | 52. 8<br>44. 1<br>42. 2<br>46. 5<br>37. 9 | 50. 0<br>42. 3<br>40. 4<br>46. 7<br>30. 8 | 46. 4<br>39. 4<br>39. 1<br>49. 0<br>40. 3 | 44. 4<br>38. 1<br>40. 5<br>48. 9<br>40. 1 | 43. 4<br>38. 0<br>40. 2<br>46. 2<br>40. 5 | 42, 8<br>38, 1<br>41, 0<br>45, 0<br>40, 6 | 42. 2<br>38. 3<br>38. 5<br>43. 2<br>40. 5 | 42. 2<br>39. 5<br>38. 5<br>42. 6<br>39. 1 | 44. 0<br>42. 2<br>37. 7<br>41. 7<br>38. 3 | 46, 9<br>41, 8<br>37, 9<br>41, 8<br>39, 3 | 48, 9<br>45, 2<br>37, 5<br>42, 2<br>39, 3      | 50. 3<br>48. 0<br>38. 9<br>41. 8<br>39. 1 | 54. 1<br>51. 7<br>39. 8<br>43. 9<br>37. 0 | 58. 1<br>49. 0<br>45. 1<br>46. 2<br>96. 8 |
| Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18 | 34, 4<br>40, 5<br>47, 3<br>38, 0<br>39, 9 | 34 5<br>30.3<br>45.5<br>37.1<br>37.4      | 34. 2<br>36. 1<br>44. 8<br>36. 6<br>36. 4 | 34. 0<br>35. 8<br>42. 0<br>36. 1<br>25. 0 | 34. 2<br>34. 2<br>43. 4<br>36. 1<br>37. 0 | 34. 2<br>33. 9<br>42. 6<br>36. 2<br>37. 4 | 34. 0<br>33, 3<br>42. 6<br>36. 2<br>37. 6 | 34. 0<br>32. 5<br>40, 6<br>36. 2<br>37. 1 | 32. 4<br>33. 2<br>38. 1<br>34. 0<br>35. 2 | 33. 0<br>35. 0<br>37. 9<br>33. 1<br>33. 8 | 34, 1<br>37, 3<br>37, 2<br>32, 9<br>33, 6      | 35, 2<br>38, 8<br>38, 1<br>34, 0<br>34, 6 | 37. 3<br>41. 8<br>37. 2<br>34. 4<br>34. 2 | 39, 9<br>44, 5<br>37, 2<br>35, 4<br>34, 4 |
| Aug. 19<br>Aug. 20<br>Aug. 21<br>Aug. 22<br>Aug. 23 | 31, 0<br>29, 4<br>29, 8<br>25, 6<br>34, 6 | 30. 8<br>28. 7<br>29. 2<br>25. 1<br>34. 1 | 29. 6<br>29. 2<br>25. 2<br>34. 2          | 29. 6<br>29. 4<br>28. 7<br>25. 2<br>34. 0 | 29, 4<br>30, 1<br>28, 6<br>24, 9<br>34, 3 | 29. 2<br>30. 2<br>27. 9<br>24. 3<br>34. 7 | 28. 6<br>30. 1<br>27. 6<br>24. 7<br>34. 9 | 28. 2<br>30. 1<br>27. 2<br>24. 5<br>35. 7 | 27. 5<br>30. 3<br>27. 1<br>24. 6<br>36. 2 | 28. 1<br>30-3<br>26. 4<br>25. 4<br>36. 4  | 28. 6<br>30. 1<br>26. 4<br>26. 4<br>37. 0      | 27. 6<br>29. 9<br>26. 4<br>26. 7<br>36. 6 | 28, 2<br>30, 3<br>26, 1<br>27, 3<br>36, 4 | 28, 2<br>30, 5<br>25, 9<br>27, 6<br>37, 1 |
| Aug. 24<br>Aug. 25<br>Aug. 26<br>Aug. 27            | 33, 4<br>27, 1<br>40, 1<br>29, 7          | 38, 1<br>26, 6<br>40, 3<br>29, 1          | 37. 9<br>26. 9<br>43. 3<br>29. 0          | 37. 6<br>27. 2<br>44. 0<br>28. 4          | 38. 1<br>27. 4<br>44. 4<br>29. 0          | 38. 3<br>26. 4<br>42. 7<br>28. 5          | 39. 1<br>27. 2<br>39. 5<br>28. 8          | 39. 3<br>37. 4<br>39. 8<br>28. 6          | 38. 6<br>27. 3<br>39. 1<br>20. 1          | 38. 4<br>27. 7<br>37. 9<br>29. 4          | 37, 9<br>27, 5<br>36, 0<br>30, 0               | 36, 0<br>29, 7<br>34, 6<br>30, 6          | 34. 2<br>29. 4<br>33. 5<br>32. 0          | 33, 9<br>30, 3<br>33, 7<br>33, 0          |
| Means   | 26. 86                                    | 36, 23                                    | 35, 97                                    | 35, 65                                    | 35, 61                                    | 35, 35                                    | 35, 10                                    | 35, 01                                    | 34, 79                                    | 35, 03                                    | 35, 49   | 36, 04                                    | 36. 80                                    | 37.45                                     |
| Date.   | 3 p. m.                                   | 4 p. m.                                   | 5 p. n.                                   | 6 p. m.                                   | 7 p. m.                                   | 8 p. m.                                   | 9 p. m.                                   | 10 p. m.                                  | 11 p. m.                                  | 1.9 p. r.a.                               | Daily means.                                   | Max.                                      | Min.                                      | Diff.                                     |
| 1883.<br>Aug. 1<br>Aug. 2<br>Aug. 3                 | 35. <b>6</b><br>38. 9<br>38. <b>1</b>     | 36. 4<br>39. 5<br>39. 3                   | 36. 2<br>39. 9<br>39. 7                   | 36. 4<br>40. 3<br>40. 6                   | 36. 9<br>40. 6<br>40. 7                   | 37. 9<br>40. 0<br>40. 1                   | 37. 4<br>38. 6<br>40. 0                   | 37. 4<br>39. 0<br>39. 3                   | 38. 4<br>38. 3<br>38. 1                   | 35. 8<br>87. 4<br>37. 7                   | 34, 98<br>36, 71<br>37, 04                     | 38. 1<br>40. 6<br>40. 9                   | 32, 0<br>32, 0<br>32, 5                   | 6. 1<br>8. 6<br>8. 4                      |
| Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8      | 37. 9<br>36. 0<br>34. 8<br>40. 2<br>44. 5 | 38. 8<br>36. 7<br>36. 0<br>41. 5<br>43. 8 | 38, 7<br>37, 4<br>36, 1<br>42, 6<br>44, 9 | 38, 3<br>38, 3<br>36, 5<br>44, 3<br>44, 3 | 38. 8<br>37. 9<br>36. 0<br>45. 3<br>42. 8 | 38, 1<br>38, 3<br>36, 0<br>46, 9<br>42, 3 | 37. 7<br>37. 4<br>35. 0<br>45. 2<br>47. 4 | 37. 4<br>36. 4<br>34. 4<br>44. 4<br>48. 9 | 37. 0<br>35. 8<br>33. 8<br>42. 5<br>51. 7 | 36. 4<br>35. 8<br>33. 3<br>42. 5<br>54. 9 | 36, 68<br>35, 48<br>34, 64<br>38, 13<br>45, 52 | 39, 1<br>38, 5<br>36, 7<br>48, 7<br>54, 6 | 33. 4<br>31. 3<br>32. 1<br>32. 0<br>38. 8 | 5, 7<br>7, 2<br>4, 6<br>16, 7<br>15, 8    |
| Aug. 9<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13  | 60, 3<br>53, 2<br>47, 0<br>49, 9<br>37, 4 | 57. 6<br>54. 0<br>47. 7<br>52. 3<br>37. 0 | 57. 2<br>50. 7<br>48. 1<br>52. 4<br>36. 7 | 60.5<br>46.3<br>49.2<br>45.0<br>37.0      | 57. 5<br>43. 8<br>48. 3<br>41. 2<br>37. 4 | 54. 7<br>47. 8<br>44. 4<br>41. 2<br>36. 0 | 52. 9<br>45. 1<br>47. 3<br>39. 4<br>35. 4 | 50. 6<br>43. 6<br>45. 5<br>40. 0<br>34. 7 | 50, 1<br>43, 4<br>48, 1<br>39, 5<br>35, 0 | 46. 7<br>42. 6<br>46. 4<br>38. 9<br>34. 5 | 50.61<br>44.46<br>42.80<br>44.40<br>37.94      | 60.5<br>57.1<br>49.7<br>53.5<br>40.9      | 40, 5<br>36, 5<br>36, 2<br>37, 7<br>33, 4 | 20. 0<br>20. 6<br>13. 5<br>15. 8<br>7. 5  |
| Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18 | 37. 0<br>37. 7                            | 38. 8<br>43. 2<br>37. 7<br>37. 8<br>34. 0 | 39, 3<br>49, 4<br>36, 7<br>38, 0<br>33, 5 | 40. 4<br>45. 7<br>37. 4<br>30. 5<br>32. 7 | 40. 4<br>47. 7<br>37. 9<br>40. 2<br>32. 5 | 41. 0<br>46. 4<br>40. 4<br>41. 9<br>32. 0 | 41. 0<br>43. 5<br>41. 3<br>42. 0<br>32. 5 | 43. 0<br>43. 6<br>40. 6<br>43. 3<br>32. 3 | 40, 8<br>46, 5<br>39, 1<br>43, 1<br>32, 2 | 40.3<br>46.5<br>39.0<br>41.2<br>31.7      | 37, 06<br>40, 66<br>40, 11<br>37, 55<br>34, 70 | 43. 8<br>50. 9<br>48. 2<br>44. 8<br>42. 8 | 31. 2<br>31. 0<br>35. 5<br>31. 8<br>30. 3 | 12. 6<br>19. 9<br>12. 7<br>13. 0<br>12. 5 |
| Aug. 19<br>Aug. 20<br>Aug. 21<br>Aug. 22<br>Aug. 23 | 23. 4<br>30, 8<br>26. 4<br>30, 0<br>37. 9 | 28. 7<br>31. 2<br>25. 9<br>31. 1<br>37. 9 | 28. 7<br>31. 0<br>27. 2<br>32. 0<br>38. 3 | 28. 3<br>30. 3<br>27. 0<br>32. 7<br>30. 5 | 29. 2<br>30. 2<br>27. 8<br>33. 5<br>38. 8 | 29. 0<br>30. 1<br>27. 7<br>34. 5<br>39. 4 | 29. 2<br>30. 1<br>27. 8<br>34. 0<br>39. 2 | 29. 6<br>29. 9<br>27. 5<br>34. 4<br>39. 3 | 29. 1<br>30. 0<br>27. 1<br>34. 4<br>38. 8 | 29. 4<br>29. 9<br>26. 6<br>34. 6<br>38. 1 | 28, 95<br>30, 10<br>27,42<br>28, 36<br>34, 06  | 32, 0<br>31, 0<br>31, 2<br>35, 4<br>40, 4 | 26.2<br>27.2<br>21.0 (<br>22.4<br>52.6    | 13.0                                      |
| Aug. 24<br>Aug. 25<br>Aug. 26<br>Aug. 27            | 33, 8<br>31, 6<br>33, 7<br>34, 4          | 34, 0<br>32, 4<br>33, 5<br>36, 2          | 33. 7<br>33. 7<br>33. 1<br>38. 8          | 32. 6<br>35. 0<br>32. 3<br>40. 3          | 32. 4<br>36. 4<br>31. 9<br>41. 3          | 31. 9<br>38. 1<br>32. 0<br>42. 4          | 30. 5<br>30. 6<br>31. 5<br>43. 2          | 20. 1<br>39. 9<br>31. 0<br>43. 7          | 28, 3<br>39, 9<br>30, 5<br>41, 6          | 28. 2<br>39. 9<br>30. 3<br>40. 3†         | 26, 81<br>35, 01<br>31, 44<br>36, 20           | 39, 4<br>40, 3<br>44, 4<br>44, 8          | 26.8<br>25.2<br>28.5<br>27.2              |   |
| Means   | 38, 43                                    | 38, 63                                    | 39,04                                     | 38. 94                                    | 38. 79                                    | 38, 94                                    | 38. 67                                    | 38.47                                     | 38, 30                                    | 37. 74                                    | 36. 97   | 43, 27                                    | 31.42                                     | 11.85                                     |
|   |   |   |   |   |   |   | 1   | !   | 1   |   | 1  |   |   |   |

\*Station abandoned  $\Delta$ ugust 27, 1883. †Approximated. Temperature observations at Uglaamie, Alaska. Mean. | Max. | Min. | Range. Month. Mean. Max. Min. Range. Mouth. Mean. Max. Min. Range. - 0, 05 -17, **96** 30. 4 11. 5 58. 4 64. 1 -28.0 -52.6 30, 4 - 52, 6 83. 0

1882.
May....June....July...August...September October...November December. 21, 99 34, 52 43, 21 37, 86 31, 46 8, 77 - 7, 12 -17, 10 37. 0 53. 5 65. 5 58. 9 51. 3 40. 7 28. 8 8. 0 - 1. 7
24. 5
27. 1
26. 6
19. 5
-21. 8
-35. 5
-42. 0 38. 7 29. 0 38. 4 32. 3 31. 8 62. 5 64. 3 50. 0 January
February
March
April
May
June
July
August \* November December. 54. 1 58. 7 77. 0 45. 0 51. 8 32. 7 25. 0 38. 1 -16. 9 -6. 32 -13. 31 - 2. 76 -23. 25 -32. 32 -36. 17 -36. 97 Whole period. - 9, 00 -15, 49 20, 3 -45, 6 -23, 16 -2, 3 -52, 5 -4, 55 22, 8 -30, 4 -4, 36 32, 3 -23, 5 Whole | 3riod. 8. 83 | 65. 5 -- 52. 5 118.0 | Whole period. | 11.17 :

H. Ex. 44---32

Month.

35, 4 35, 4 40, 4 37 8 25, 7 15, 5 48, 3 31, 1 37, 3

inued.

 $2~\mathrm{p.\,m.}$ 

04. 7 06. 1 38. 8 59. 9 40. 2 39, 5 39, 4 39, 3 37, 6 32, 5

Diff. 7.3 7.7 8.8 6.4

 $\begin{array}{c} 5.5 \\ 11.9 \\ 17.3 \\ 8.7 \\ 12.9 \\ 6.0 \\ 5.1 \\ 8.5 \\ 5.6 \\ 7.2 \\ 14.0 \\ 13.9 \\ 6.8 \\ 8.4 \\ 8.2 \\ 5.6 \\ 10.4 \\ 9.0 \\ 10.6 \\ 6.2 \\ 8.4 \\ 9.0 \\ 6.6 \\ 2.6 \\ 8.4 \\ 9.0 \\ 6.6 \\ 8.6 \\ 9.6$ 

<sup>\*</sup> August for 27 days only.

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883.

|  |                                    | _                          |                             |                            |                                  |                              |                             |                            |                            |                            | 17 1                        | ninut                      | es. }                       |                             |                             |                              |                             |                            |                              |                            |                            |                                     | _                            |                            |                                 |
|--|------------------------------------|----------------------------|-----------------------------|----------------------------|----------------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|-------------------------------------|------------------------------|----------------------------|---------------------------------|
| Pate.  | 1 a. m.                            | 2 a. m.                    | 44<br>13<br>13              | 4 a. m.                    | 5 a. m.                          | 6 a. m.                      | a. m.                       | , ii. iii.                 | 9 a. m.                    | 10 а. т.                   | H a. m.                     | .ii                        | 1 p. m.                     | 2 p. m.                     | å p. m.                     | 1 p. m.                      | . p. m.                     | 6 p. m.                    | . p. m.                      | № р. ш.                    | 9 p. m.                    | 10 p. m.                            | Пр. п.                       | 12 p. m.                   | Daily                           |
| 1881.<br>Det. 18<br>Jet. 19<br>Jet. 20<br>Jet. 21<br>Jet. 22 | 88<br>96<br>92<br>90               | 87<br>88<br>96<br>87<br>91 | 90<br>84<br>96<br>91        | 84<br>86<br>92<br>72<br>91 | 88<br>85<br>90<br>92<br>89       | 85<br>84<br>95<br>92<br>89   | 97<br>88<br>95<br>93<br>90  | 97<br>90<br>94<br>92<br>90 | 96<br>90<br>96<br>91       | 95<br>92<br>98<br>92<br>90 | 93<br>92<br>92<br>91<br>90  | 90<br>88<br>93<br>93<br>87 | 94<br>901<br>94<br>90<br>85 | 90<br>93<br>95<br>87<br>90  | 57<br>90<br>92<br>88<br>86  | . 85<br>97<br>87<br>88<br>84 | 85<br>96<br>89<br>88<br>84  | 58<br>97<br>88<br>89<br>86 | 87<br>165<br>89<br>91<br>88  | 88<br>95<br>90<br>92<br>88 | 86<br>89<br>92<br>86       | 88<br>96<br>87<br>92<br>106         | 92<br>97<br>87<br>90<br>77   | 92<br>96<br>93<br>89<br>84 | 89,<br>91,<br>92,<br>89,<br>88, |
| Oct. 23 ;<br>Oct. 24 ;<br>Oct. 25<br>Oct. 26<br>Oct. 27      | 91<br>81<br>87<br>87<br>83         | 88<br>84<br>86<br>86<br>76 | 79<br>83<br>88<br>84<br>82  | 74<br>82<br>87<br>84<br>86 | 91<br>85<br>82<br>82             | . 91<br>77<br>87<br>84<br>82 | 83<br>80<br>85<br>86<br>82  | 83<br>84<br>85<br>86<br>86 | 85<br>84<br>85<br>85<br>80 | 80<br>82<br>87<br>84       | 84<br>85<br>80<br>80<br>82  | 84<br>86<br>78<br>86<br>79 | 81<br>88<br>76<br>86<br>79  | 82<br>68<br>78<br>86<br>75  | 86<br>78<br>80<br>79<br>85  | 88<br>80<br>85<br>81<br>85   | 82<br>77<br>78<br>80<br>81  | 89<br>79<br>87<br>79<br>73 | 80<br>80<br>87<br>79<br>- 78 | 89<br>82<br>87<br>79<br>86 | 88<br>84<br>87<br>79<br>89 | 84 :<br>80 :<br>83 :<br>84 :        | 85<br>81<br>82<br>81<br>81   | 85<br>87<br>85<br>74<br>76 | 85.<br>82.<br>83.<br>82.<br>81. |
| let. 28<br>let. 29<br>let. 30<br>let. 31                     | 74<br>76<br>88<br>84               | 73<br>83<br>94<br>88       | 94<br>84                    | 76<br>83<br>89<br>86       | 74<br>88<br>89<br>88             | 79<br>85<br>93<br>86         | 82<br>87<br>88<br>85        | 87<br>87<br>84             | 87<br>88<br>85<br>81       | 100<br>87<br>89<br>84      | 90<br>89<br>83<br>83        | 86<br>89<br>85<br>82       | 89<br>87<br>87<br>81        | 88<br>89<br>83<br>1 85      | 88<br>85<br>89              | 86<br>86<br>86<br>82         | 57<br>72<br>88<br>84        | 88<br>87<br>86<br>88       | - 68                         | 50<br>86<br>78<br>85       | 86                         | 88<br>91<br>83<br>85                | 84<br>88<br>82<br>85         | 80<br>87<br>88<br>88       | 84.<br>85,<br>86,<br>85,        |
| Means 8  | ·3. 0                              | 86. 2                      | 85.8                        | 83.7                       | 56, 7                            | 86, 3                        | ×7. 2                       | 87, 3                      | 87. 3                      | 49,2                       | 87. 2                       | 86, 5                      | '8G. G                      | 86. 3                       | 86, 0                       | 185, 6<br>1                  | \$3.6                       | ×6, 0                      | ≻6, 2                        | 86.7                       | ,86, 5                     | 87. 6                               | 85. 1                        | '86, O                     | l 56                            |
| 1881.<br>Sov. 1  | 85                                 | 55                         | 84                          | 88                         | 89                               | 83                           | 95                          | 87                         | 77                         | ۶G                         | ,                           | 86                         | 86                          | . 81                        | 82                          | 81                           | 84                          | <b>≻</b> 6                 | 66                           | 86                         | 84                         | 84                                  | 74                           | 79                         | 85                              |
| čov. 2<br>čov. 3<br>vov. 4<br>čov. 5<br>čov. 6               | 84<br>79<br>76<br>90               | 86<br>84<br>83<br>77<br>97 | 86<br>84<br>80<br>80<br>100 | 56<br>54<br>80<br>80<br>80 | 88<br>81<br>85<br>82<br>96       | 22222                        | 855584                      | 80<br>81<br>85<br>84<br>82 | 84<br>81<br>82<br>86<br>80 | 84<br>81<br>82<br>91<br>83 | 84<br>87<br>83<br>94<br>78  | 86<br>82<br>83<br>90<br>88 | 86<br>82<br>81<br>80<br>87  | 85<br>81<br>75<br>93<br>100 | 87<br>82<br>87<br>86<br>96  | 80<br>80<br>80<br>83<br>96   | 80<br>80<br>82<br>87<br>89  | 84<br>80<br>82<br>87<br>85 | 84<br>80<br>86<br>83         | 81<br>82<br>85<br>87<br>93 | 85<br>82<br>85<br>90<br>97 | 85<br>84<br>90<br>97                | 83<br>82<br>91<br>80<br>96   | 87<br>86<br>75<br>87<br>92 | 84.<br>82.<br>82.<br>85.<br>91. |
| (ov. 7<br>(ov. 8)<br>(ov. 9)<br>(ov. 10)                     | 96<br>85<br>90<br>85<br>93         | 87<br>96<br>90<br>91<br>93 | 90<br>96<br>87<br>84<br>90  | 96<br>96<br>90<br>91<br>93 | 90<br>96<br>96<br>90<br>90<br>90 | 89<br>90<br>94<br>93<br>96   | 93<br>100<br>91<br>97<br>89 | 96<br>97<br>88<br>96<br>89 | 96<br>93<br>84<br>96<br>83 | 78<br>79<br>85<br>96<br>80 | 68<br>100<br>94<br>57<br>76 | 83<br>97<br>90<br>87<br>81 | 86<br>97<br>94<br>87<br>76  | 86<br>97<br>91<br>83<br>86  | 82<br>96<br>91<br>80<br>86  | . 56<br>91<br>90<br>76       | 88<br>96<br>89<br>90<br>76  | 90<br>90<br>90<br>71       | 88<br>96<br>88<br>90         | 92<br>97<br>91<br>97       | 96<br>96<br>83<br>97<br>56 | 96<br>97<br>89<br>90                | 96<br>90<br>91<br>90<br>46†  | 96<br>97<br>86<br>93<br>43 | 89.<br>94.<br>89.<br>90.<br>76. |
| iov. 12<br>iov. 13<br>iov. 14<br>iov. 15<br>iov. 16          | 50<br>80<br>50<br>86<br>86<br>82   | 43<br>80<br>76<br>84<br>84 | 59<br>58<br>77<br>84<br>88  | 59<br>65<br>81<br>86<br>87 | 50<br>64<br>88<br>90<br>90       | 60<br>64<br>97<br>88<br>86   | 58<br>53<br>85<br>90<br>83  | 57<br>69<br>88<br>91<br>82 | 58<br>70<br>84<br>88<br>83 | 58<br>68<br>68<br>91<br>80 | 58<br>69<br>88<br>79        | 55<br>53<br>69<br>91<br>76 | 55<br>70<br>80<br>91<br>81  | 57<br>64<br>75<br>94<br>89  | 65<br>66<br>93<br>94        | 46<br>61<br>78<br>93<br>94   | 52<br>48<br>81<br>89<br>94  | 42<br>45<br>72<br>86<br>91 | 52<br>46<br>85<br>90<br>91   | 68<br>45<br>90<br>89       | 68<br>49<br>86<br>89<br>90 | 61<br>42<br>87<br>87<br>96          | 61<br>62<br>85<br>84<br>76   | 66<br>43<br>85<br>88<br>76 | 55.<br>58,<br>79,<br>88,<br>85, |
| ov. 17<br>ov. 18<br>ov. 19<br>ov. 20<br>ov. 21               | 75 <br>97<br>84<br>88<br>85        | 74<br>90<br>84<br>88<br>88 | 64<br>93<br>88<br>90<br>83  | 61<br>93<br>88<br>87<br>82 | 55<br>96<br>91<br>94<br>85       | 61<br>96<br>94<br>85<br>85   | 59<br>96<br>86<br>87<br>87  | 50<br>96<br>89<br>94<br>92 | 89<br>96<br>87<br>94       | 63<br>96<br>79<br>87<br>91 | 63<br>96<br>83<br>87<br>91  | 68<br>93<br>73<br>87<br>82 | 64<br>93<br>85<br>90<br>78  | 47<br>93<br>83<br>90<br>100 | 84<br>90<br>82<br>90<br>100 | 84<br>90<br>83<br>1 90<br>76 | 54<br>86<br>82<br>91<br>79  | 32<br>77<br>84<br>96<br>79 | 76<br>74<br>84<br>90<br>83   | 87<br>74<br>87<br>86<br>86 | 92<br>67<br>82<br>88<br>91 | 100°.<br>80 :<br>79<br>87 :<br>82 : | 100°<br>87<br>79<br>83<br>87 | 96<br>88<br>89<br>84<br>90 | 70.<br>89.<br>84.<br>88.        |
| ov. 22<br>ov. 23<br>ov. 24<br>ov. 25<br>ov. 26               | 9 <b>6</b><br>72<br>75<br>63<br>85 | 96<br>73<br>76<br>73<br>85 | 96<br>72<br>74<br>74<br>88  | 89<br>51<br>76<br>75<br>86 | 96<br>69<br>76<br>92<br>87       | 88<br>75<br>76<br>86<br>87   | 79<br>74<br>76<br>83<br>84  | 79<br>42<br>76<br>93<br>72 | 78<br>76<br>83<br>83       | 71<br>45<br>67<br>81<br>83 | 53<br>48<br>72<br>81<br>85  | 47<br>36<br>82<br>81<br>86 | 48<br>32<br>88<br>88        | 47<br>41<br>75<br>83        | 55<br>54<br>72<br>89<br>88  | 57<br>47<br>76<br>100<br>77  | 63<br>46<br>72<br>78<br>75  | 63<br>46<br>67<br>78<br>76 | 69<br>51<br>68<br>69<br>86   | 67<br>49<br>69<br>87       | 75<br>49<br>87<br>77<br>87 | 67<br>49<br>87<br>77<br>87          | 73<br>52<br>78<br>84<br>80   | 79<br>63<br>79<br>85<br>77 | 70.<br>53.<br>75.<br>82.<br>83. |
| ov. 27<br>ov. 28<br>ov. 29<br>ov. 20                         | 80<br>85<br>80<br>84               | 75<br>81<br>81             | 81<br>81<br>88              | 83<br>84<br>84<br>8        | 80<br>84<br>87<br>87             | 81<br>82<br>90<br>93         | 75<br>70<br>90<br>89        | 78<br>79<br>90<br>90       | 83<br>81<br>89<br>89       | 81<br>83<br>87<br>85       | 50<br>57<br>(8)             | 85<br>80<br>86<br>89       | 80<br>85<br>84<br>93        | 83<br>82<br>85<br>87        | 78<br>84<br>84<br>97        | 81<br>85<br>80<br>100        | 80<br>83<br>86<br><b>86</b> | 81<br>86<br>84<br>75       | 100<br>86<br>82<br>80        | 88<br>86<br>86             | 84<br>89<br>88<br>77       | 86<br>89                            | 89<br>86<br>88<br>87         | 88<br>81<br>82<br>84       | 83,<br>83,<br>85,<br>87,        |

Wet bulb read higher than dry bulb.

Interpolated.

Table showing the moisture of the air at Uylaamie from October, 1881, to August, 1883—Continued.

(Reight of the hygrometer above the surface of the ground, 4 feet. Washington mean time. Correction reduced to mean local time, -5 hours.)

5 hours

Paily means,

92 89,9 96 91,6 93 92,2 88 89,7 84 88,2 85 85,2 85 85,2 85 83,6 74 82,7 76 81,2 80 84,1 88 86,5 88 85,0 86,0 86,0 86,0

70 85.0
87 84.7
86 82.5
87 80.5
87 80.6
87 80.6
87 80.6
88 80.6
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88 80.7
66 35.2
43 76.7
66 35.2
43 76.7
66 35.2
43 76.7
66 35.2
88 80.1
70 72.0
66 35.2
88 88.3
88 88.7
77 85.3
88 88.1
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| Date.   | 1 a. m.                        | 2 a.m.                         | 3 a.m.                        | 4 a. m.                       | 5 a.m.                         | 6 а. па.                   | # a. m.                        | 8 a. m.                     | 9 a.m.                      | 10 a.m.                       | Ha.m.                           | 4 51                           | fp.m.                              | 2 p.m.                       | 2 p. m.                      | 4 p. so.                        | 5 p. m.                           |                              | 7 h. m.                       | C p. m.                                | 9 p.m.                       | 10 р. ш.                        | Пр.т.                      | 12 p. m.                           | Daily<br>means.                                  |
|---|--------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|----------------------------|--------------------------------|-----------------------------|-----------------------------|-------------------------------|---------------------------------|--------------------------------|------------------------------------|------------------------------|------------------------------|---------------------------------|-----------------------------------|------------------------------|-------------------------------|--|------------------------------|---------------------------------|----------------------------|------------------------------------|--|
| test<br>Dec. 1  | 112                            | 79                             | 78                            | <b>&gt;</b> 3                 | 79                             | 93                         | 74                             | 93                          | 90                          | 90                            | 83                              | 74                             | 89                                 | 75                           | 90                           | 77                              | 61                                | 84                           | 82                            | 82                                     | <b>F</b> 3                   | 84                              | 85                         | 87                                 | 83. 6  |
| Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5<br>Dec. 6          | 92<br>85<br>91<br>79<br>39     | 88<br>86<br>53<br>80<br>59     | 87<br>86<br>60<br>92<br>57    | 86<br>85<br>56<br>92<br>69    | 84<br>85<br>61<br>92<br>57     | 93<br>88<br>54<br>92<br>57 | 82<br>92<br>54<br>88<br>48     | 88<br>83<br>63<br>80<br>43  | 86<br>87<br>68<br>84<br>50  | 84<br>90<br>57<br>84<br>65    | 87<br>97<br>58<br>79<br>71      | 87<br>173<br>33<br>83<br>67    | 84<br>100°<br>50<br>71<br>72       | 84<br>96<br>51<br>87<br>77   | 78<br>88<br>76<br>65<br>83   | 40<br>73<br>66<br>65<br>83      | 88<br>76<br>70<br>64<br>70        | 84<br>60<br>75<br>100*<br>67 | 77<br>60<br>76<br>65          | 53<br>81<br>50<br>83                   | 85<br>51<br>82<br>50<br>88   | 84<br>56<br>78<br>51<br>92      | 97<br>51<br>79<br>52<br>89 | 160°<br>55 :<br>83  <br>59  <br>84 | 84. 7<br>78. 2<br>65. 2<br>75. 3<br>70. 1        |
| Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10<br>Dec. 11        | 75<br>83<br>45<br>81<br>73     | 75<br>70<br>48<br>80<br>84     | 85<br>80<br>47<br>86<br>92    | 89<br>87<br>461<br>81<br>92   | 88<br>71<br>45<br>81<br>78     | 79<br>78<br>50<br>80<br>73 | 83<br>83<br>59<br>84<br>52     | 77<br>78<br>57<br>83<br>60  | 78<br>62<br>54<br>82<br>66  | 83<br>66<br>71<br>88<br>61    | 79<br>60<br>80<br>91<br>65      | 58<br>91<br>91<br>00           | 84<br>42<br>63<br>88<br>66         | 83<br>56<br>60<br>91<br>62   | 92<br>40<br>73<br>91<br>67   | 92<br>49<br>52<br>81<br>67      | 89<br>44<br>50<br>85<br><b>66</b> | 92<br>50<br>70<br>71<br>70   | 96<br>47<br>81<br>83<br>77    | 86<br>86<br>83                         | 96<br>63<br>92<br>89<br>88   | 96<br>51<br>84<br>80<br>88      | 92<br>58<br>84<br>74<br>81 | 79<br>43<br>81<br>73<br>89         | 85. 7<br>61. 8<br>65. 4<br>83. 7<br>73. 3        |
| Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15<br>Dec. 16     | 61<br>63<br>53<br>50           | 87<br>48<br>46<br>52<br>60     | 97<br>49<br>40<br>58<br>61    | 84<br>53<br>51<br>59<br>61    | 79<br>50<br>51<br>67<br>50     | 82<br>51<br>40<br>59<br>58 | 67<br>47<br>41<br>52<br>100    | 51<br>54<br>54<br>100*      | 100°<br>54<br>54<br>100°    | 58<br>49<br>60<br>59          | 48<br>93<br>42<br>66<br>55      | 47<br>56<br>42<br>66<br>53†    | 47<br>58<br>41<br>72<br>51         | 43<br>51<br>48<br>71<br>57   | 50<br>51<br>44<br>71<br>50   | 50<br>55<br>46<br>72<br>50      | 52<br>48<br>44<br>71<br>50        | 64<br>48<br>54<br>81<br>43   | 52<br>53<br>59<br>71<br>48    | 52<br>64<br>80<br>48                   | 43<br>53<br>58<br>80<br>46   | 48<br>52<br>54<br>71<br>41      | 47<br>57<br>54<br>64<br>52 | 47<br>581<br>531<br>49<br>48       | 59, 3<br>55, 0<br>49, 5<br>64, 7<br>58, 3        |
| Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20<br>Dec. 21     | 53<br>100<br>100<br>100<br>100 | 53<br>100<br>100<br>100<br>100 | 100<br>100<br>100<br>100      | 100<br>100<br>100<br>100      | 58<br>100<br>100<br>100<br>100 |                            | 51<br>100<br>100<br>100<br>100 | 100                         |                             | 100°<br>100°<br>100°<br>100°  | 100<br>100<br>100<br>100<br>100 | 53<br>100<br>100<br>100<br>100 | 53<br>100*<br>100*<br>100*<br>100* | 100°<br>100°<br>100°<br>100° | 100°<br>100°<br>100°<br>100° | 88<br>100<br>100;<br>100<br>100 | 100<br>100*<br>100;<br>100<br>100 |                              | 100                           | 100<br>100<br>100<br>100<br>100<br>100 | 100°<br>100°<br>100          | 100<br>100<br>100<br>100<br>100 | 100*                       | 100<br>100*<br>100                 | 72. 3<br>100.0<br>100.0<br>100.0<br>100.0        |
| Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25<br>Dec. 26     | 100<br>100<br>33<br>73         | 100<br>100<br>33<br>80<br>38   | 100°<br>100<br>03<br>68<br>38 | 100°<br>100<br>33<br>80<br>40 | 100°<br>100<br>40<br>90<br>34  | 100°<br>100°<br>46<br>90   | 100°<br>76<br>53<br>61<br>53   | 100<br>78<br>59<br>49<br>52 | 100<br>79<br>55<br>47<br>53 | 100<br>701<br>62<br>651<br>47 | 100<br>60<br>69<br>78<br>49     | 100<br>47<br>67<br>56<br>52    | 100<br>47<br>89<br>51<br>46        | 100°<br>47<br>88<br>47<br>50 | 100<br>55<br>91<br>68<br>50  | 86<br>53<br>100<br>61<br>47     | 67<br>69<br>100<br>61<br>55       | 55<br>100<br>58<br>56        | 100<br>58<br>100*<br>51<br>61 | 100<br>59<br>100<br>66<br>50           | 100<br>56<br>100<br>66<br>52 |                                 | 106                        | 33<br>100                          | 97, 5<br>70, 5<br>73, 1<br>64, 7<br>48,2         |
| Dec. 27<br>Dec. 28<br>Dec. 29<br>Dec. 30<br>Dec. 31     | 60                             | 51<br>401<br>79<br>63<br>81    | 51<br>44<br>78<br>53<br>81    | 51<br>58<br>58<br>54<br>54    | 52<br>453<br>58<br>66<br>88    | 51<br>51<br>69<br>52<br>81 | 57<br>89<br>48<br>83           | 43<br>57<br>81<br>48<br>100 | 46<br>58<br>55<br>63<br>78  | .58<br>57<br>65<br>65<br>85   | 54<br>66<br>56<br>72<br>86      |                                | 27                                 | 66<br>61<br>46<br>56<br>83   | 53<br>80<br>57<br>89<br>84   |                                 | 86                                | 51<br>52<br>50<br>87<br>100  | 100<br>48<br>87<br>100        | 37<br>100<br>58<br>97<br>100           | 89                           | 83                              | 83                         | 38<br>100<br>74<br>91<br>82        | 52, 2<br>65, 2<br>64, 0<br>73, 1<br>86, 2        |
| Mean -  | 73, 5                          | 72.0                           | 72. 2                         | 72.7                          | 72.8                           | 72. 9                      | 72. 2                          | 72.8                        | 72. 9                       | 72. 1                         | 73.3                            | 71.2                           | 69.6                               | 72.2                         | 74. 7                        | 70, 3                           | 72.6                              | 74.5                         | 76, 1                         | .77. 7                                 | 78. 5                        | 77.3                            | 74.4                       | 74.5                               | 73. <b>6</b><br>-                                |
| 1882.<br>Jan. 1<br>Jan. 2<br>Jan. 3<br>Jan. 4<br>Jan. 5 | 85<br>59<br>46<br>59<br>47     | 88<br>61<br>54<br>56<br>67     | 85<br>67<br>61<br>56<br>76    | 85<br>65<br>61<br>60<br>88    | 90<br>65<br>55<br>60<br>77     | 88<br>67<br>56<br>75<br>77 | 91<br>54<br>50<br>65<br>78     | 90<br>67<br>52<br>64<br>89  | 96<br>65<br>52<br>71<br>77  | 88<br>50<br>57<br>70<br>88    | 96<br>49<br>69<br>70<br>88      | 87<br>50<br>68<br>68<br>88     | 82<br>55<br>68<br>68<br>91         | 82<br>46<br>61<br>70<br>78   | 76<br>47<br>56<br>70         | 78<br>55<br>61<br>71<br>64      | 77<br>58<br>50<br>80<br>64        | 87<br>55<br>62<br>63<br>65   | 76<br>58<br>68<br>63<br>05    | 74<br>46<br>62<br>72<br>65             | 75<br>53<br>63<br>63<br>56   | 63<br>61<br>63<br>82            | 64<br>36<br>59<br>90<br>73 | 64<br>66<br>58<br>70<br>80         | 81, 9<br>5 <b>6,2</b><br>58, 7<br>67, 2<br>74, 3 |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10]        | 80<br>47<br>62<br>60<br>89     | 80<br>47<br>62<br>90<br>89     | 81<br>61<br>69<br>89          | 80<br>52<br>79<br>62<br>89    | 79<br>52<br>68<br>79<br>89     | 77<br>51<br>79<br>79<br>89 | 67<br>61<br>89<br>79<br>87     | 77<br>70<br>100<br>78       | 03<br>79<br>65<br>89<br>89  | 88<br>79<br>100<br>78<br>89   | 65<br>68<br>100*<br>100<br>89   | 68<br>100<br>76<br>89          | 65<br>68<br>100<br>100<br>89       | 89<br>68<br>88<br>88<br>89   | 44<br>79<br>70<br>79<br>89   | 78<br>79<br>77<br>67<br>87      | 68<br>79<br>76<br>56<br>97        | 67<br>79<br>89<br>67<br>97   | 78<br>58<br>80<br>89<br>98    | 79<br>90<br>88<br>89<br>97             | 57<br>58<br>100<br>78<br>98  | 68<br>50<br>88<br>67<br>97      | 45<br>62<br>69<br>67<br>96 | 47<br>62<br>71<br>67<br>96         | 70. 3<br>64. 8<br>82. 3<br>77. 2<br>91. 8        |
| Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15     | 96<br>96<br>91<br>90<br>92     | 96<br>96<br>90<br>90           | 96<br>97<br>90<br>90<br>92    | 97<br>97<br>89<br>91<br>90    | 97<br>97<br>89<br>91<br>92     | 97<br>97<br>89<br>91<br>89 | 97<br>97<br>89<br>91<br>90     | 97<br>97<br>89<br>91<br>90  | 97<br>97<br>89<br>91<br>90  | 97<br>97<br>89<br>91<br>90    | 97<br>97<br>89<br>90<br>92      | 99<br>97<br>89<br>90<br>91     | 99<br>97<br>89<br>91<br>91         | 97<br>97<br>89<br>90<br>91   | 100<br>96<br>82<br>90<br>91  | 100<br>96<br>84<br>90<br>91     | 89<br>84<br>90<br>91              | 100<br>94<br>84<br>90<br>91  | 96<br>98<br>84<br>91          | 94<br>93<br>84<br>91                   | 94<br>91<br>84<br>91<br>90   | 91<br>91<br>88<br>91<br>90      | 96<br>91<br>88<br>91<br>90 | 96<br>91<br>33<br>91<br>90         | 97.0<br>95.2<br>87. a<br>90. 5<br>90. 6          |
| Jan. 16<br>Jan. 17<br>Jan. 18<br>Jan. 19<br>Jan. 29     | 91<br>91<br>91<br>91           | 91<br>91<br>91<br>91           | 91<br>91<br>91<br>91          | 91 .<br>91<br>91<br>91<br>91  | 91<br>91<br>91<br>91           | 91<br>90<br>91<br>91       | 91<br>91<br>90<br>91<br>91     | 91<br>91<br>91<br>91<br>91  | 91<br>91<br>91<br>91<br>91  | 91<br>91<br>91<br>91          | 91<br>91<br>91<br>91            | 90<br>91<br>91<br>91<br>92     | 90<br>91<br>91<br>91<br>92         | 90<br>91<br>91<br>93         | 90<br>91<br>91<br>91<br>91   | 90<br>91<br>91<br>91<br>92      | 90<br>91<br>91<br>91<br>92        | 91<br>91<br>91<br>91<br>92   | 91<br>91<br>91<br>91<br>91    | 91<br>91<br>91<br>91                   | 90<br>91<br>91<br>91         | 90<br>91<br>91<br>91<br>90      | 90<br>91<br>91<br>91<br>91 | 90<br>1 91<br>91<br>91<br>91       | 90, 5<br>91, 0<br>90, 9<br>91, 0<br>91, 3        |
| Jan. 21<br>Jan. 22<br>Jan. 23<br>Jan. 24<br>Jan. 25     | 91<br>96<br>88<br>85<br>85     | 91<br>94<br>87<br>85<br>85     | 91<br>96<br>87<br>85<br>85    | 91<br>96<br>87<br>84<br>85    | 91<br>96<br>86<br>83<br>85     | 91<br>96<br>86<br>83<br>84 | 91<br>96<br>86<br>82<br>82     | 91<br>96<br>85<br>79<br>84  | 91<br>96<br>85<br>80<br>83  | 91<br>95<br>85<br>80<br>82    | 91<br>94<br>84<br>79<br>81      | 91<br>96<br>81<br>81<br>81     | 94<br>80<br>81<br>81               | 91<br>94<br>81<br>81<br>83   | 95<br>94<br>83<br>80<br>82   | 95<br>91<br>82<br>80<br>82      | 95<br>90<br>94<br>80<br>83        | 96<br>89<br>83<br>81<br>83   | 96<br>89<br>84<br>81<br>84    | 96<br>89<br>84<br>80<br>85             | 96<br>89<br>84<br>81<br>86   | . 97<br>89<br>83<br>83<br>85    | 97<br>90<br>85<br>84<br>88 | 97<br>90<br>85<br>84<br>88         | 93, 9<br>93, 2<br>91, 8<br>81, 7<br>82, 8        |
| Jan. 26<br>Jan. 27<br>Jan. 28<br>Jan. 29<br>Jan. 30     | 88<br>83<br>80<br>78<br>77     | 88<br>82<br>80<br>77<br>76     | 88<br>82<br>80<br>77<br>76    | 88<br>80<br>77<br>70          | 88<br>82<br>80<br>77<br>76     | 87<br>82<br>80<br>77<br>76 | 87<br>82<br>80<br>76<br>76     | 87<br>82<br>80<br>76<br>76  | 87<br>79<br>80<br>75<br>74  | 87<br>79<br>80<br>75<br>74    | 87<br>79<br>78<br>74<br>74      | 85<br>80<br>79<br>74<br>74     | 83<br>80<br>78<br>74<br>74         | 80<br>79<br>74<br>74         | 82<br>78<br>79<br>75<br>74   | 81<br>78<br>77<br>74<br>75      | 81<br>79<br>77<br>74<br>75        | 82<br>79<br>78<br>75<br>74   | 89<br>80<br>77<br>76<br>75    | 82<br>89<br>75<br>75                   | 80<br>78<br>78<br>74         | 82<br>80<br>78<br>76<br>75      | 82<br>80<br>78<br>77<br>76 | 80<br>78<br>74<br>76               | 84. 5<br>80. 2<br>78. 3<br>75. 5<br>75. 0        |
| Jan. 01   | 76                             |                                | 75                            | 75                            | 75                             | 76                         | 76                             | 76                          | 75                          | 75                            | 74                              | 74                             |                                    |                              | 74                           |                                 | 74                                | 75                           |                               |  | _                            |                                 |                            | 76                                 | 75. 9  |
| Means   | 30,0                           | 81.7                           | 61.7                          | 82.6                          | 87. 3                          | 8J. 0                      | 82, 3                          | 11.1                        | 82, 9                       | 84.1                          | 51.1                            | 83, 4                          | 83.8                               | 82. 9                        | 80. 1                        | 81.7                            | 80. 8                             | 81.9                         | 82.4                          | 82, 8                                  | 80. 7                        | 80,                             | 80, 1                      | 80, 6                              | 82. 2  |

Wet bulb reading higher than dry bulb. Interpolated. Below the scale § On and after January 10, 1882, until August 27, 1883, "elative hamility taken from hair hygrometer."

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883—Continued.

[Height of the hygrometer above the surface of the ground, 4 fest. Washington mean time. Correction reduced to mean local time, - 5 hours 17 minutes.]

|   |                            |                            |                            |                            |                            |                            |                            |                            |                              |                              |                                  | munt                         | ca.j                             |                            |                            |                             |                            |                                  |                                  |                                  |                                  |                            |                            |   |   |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------------------------------|------------------------------|----------------------------------|------------------------------|----------------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|---|---|
| Date.   | . s. m.                    | 2 a. m.                    | 2 a. m.                    | 4 a. w.                    | 5 a. m.                    | 6 a.m.                     | 5 a. m.                    | 8 a. m.                    | 9 a.m.                       | 10 a.m.                      | H 2 m.                           | 12 m.                        | 1 p. m.                          | 44<br>Fr                   | ap.m.                      | 4 p. m.                     | 5 p.m.                     | 6 p.m.                           | . p. no.                         | 8 p.m.                           | 9 p. m.                          | 10 p.m.                    | Hp.n.                      | 12 p. m.  | les ily<br>nucams.                              |
| 1882.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | 76<br>75<br>78<br>80       | 76<br>75<br>78<br>79       | 76<br>73<br>78<br>79       | 75<br>75<br>78<br>79       | 75<br>76<br>78<br>80       | 74<br>76<br>80<br>80       | 74<br>76<br>79<br>80       | 70<br>70<br>79<br>80       | 76<br>76<br>79<br>80         | 77<br>76<br>79<br>79         | 76<br>76<br>76<br>76             | 76<br>76<br>78<br>77         | 76<br>76<br>78<br>77             | 76<br>76<br>78<br>77       | 76<br>76<br>80<br>78       | 75<br>77<br>80<br>78        | 75<br>77<br>79<br>78       | 76<br>77<br>79<br>77             | 76<br>77<br>76<br>77             | 77<br>76<br>79<br>77             | 77<br>76<br>70<br>77             | 77<br>76<br>80<br>78       | 70<br>70<br>70<br>70       | 76<br>76<br>10<br>76  | 75. 7<br>76. 0<br>78. 7<br>78. 2                |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | 76<br>82<br>83<br>80<br>82 | 75<br>84<br>80<br>81<br>83 | 75<br>84<br>82<br>80<br>83 | 74<br>85<br>81<br>80<br>83 | 74<br>86<br>83<br>82<br>84 | 75<br>86<br>83<br>82<br>84 | 77<br>86<br>83<br>82<br>84 | 77<br>86<br>83<br>82<br>83 | 77<br>83<br>83<br>82<br>83   | 77<br>85<br>83<br>82<br>83   | 77<br>83<br>83<br>82<br>83       | 77<br>83<br>83<br>82<br>83   | 77<br>85<br>83<br>84<br>82       | 77<br>83<br>83<br>84<br>81 | 77<br>83<br>82<br>83<br>80 | 77<br>85<br>82<br>84<br>80  | 78<br>85<br>83<br>84<br>80 | 79<br>85<br>81<br>84<br>80       | 79<br>85<br>83<br>85<br>80       | 80<br>85<br>82<br>85<br>81       | 80<br>84<br>82<br>84<br>81       | 81<br>85<br>83<br>84<br>81 | 83<br>84<br>84<br>81       | 80<br>80<br>81<br>80<br>81  | 77.5<br>84.7<br>82.3<br>82.8<br>81.9            |
| Feb. 10<br>Feb. 11<br>Fob. 12<br>Feb. 13<br>Feb. 14 | 83<br>79<br>77<br>76<br>79 | 80<br>77<br>70<br>79       | 71<br>77<br>76<br>78       | 80<br>50<br>76<br>75<br>77 | 83<br>10<br>77<br>70<br>79 | 83<br>79<br>70<br>76<br>78 | 70<br>76<br>76<br>78       | 83<br>73<br>76<br>76<br>78 | 83<br>79<br>70<br>77<br>78   | 83<br>79<br>76<br>77<br>78   | 83<br>79<br>76<br>77<br>78       | 79<br>78<br>77<br>78         | 83<br>79<br>76<br>77<br>78       | 83<br>76<br>78<br>78       | 83<br>79<br>76<br>77<br>78 | 79<br>70<br>77<br>78        | 82<br>79<br>76<br>77<br>70 | 83<br>70<br>76<br>73<br>79       | 83<br>79<br>76<br>78<br>79       | 81<br>78<br>76<br>78<br>80       | 81<br>78<br>76<br>78<br>79       | 81<br>78<br>77<br>78<br>77 | 70<br>78<br>76<br>76<br>79 | 92<br>77<br>77<br>80<br>79  | 82. 1<br>78. 8<br>76. 2<br>76. 9<br>78. 3       |
| Feb. 13<br>Feb. 16<br>Feb. 17<br>Feb. 1             | 79<br>80<br>84<br>80       | 79<br>80<br>82<br>81<br>93 | 79<br>80<br>82<br>81<br>82 | 80<br>82<br>80<br>81       | 70<br>81<br>81<br>81<br>83 | 79<br>81<br>84<br>81<br>83 | 80<br>81<br>84<br>82<br>83 | 80<br>81<br>83<br>83       | 80<br>81<br>85<br>82<br>83   | 80<br>81<br>84<br>82<br>82   | 80<br>81<br>84<br>82<br>82       | 80<br>81<br>84<br>82<br>82   | 80<br>61<br>84<br>82<br>82<br>82 | 81<br>83<br>83<br>83       | 80<br>81<br>83<br>82<br>80 | 79<br>81<br>83<br>82<br>81  | 79<br>81<br>83<br>82<br>81 | 79<br>81<br>82<br>83<br>81       | 80<br>81<br>82<br>82<br>81       | 80<br>82<br>82<br>83<br>83       | 80<br>82<br>82<br>82<br>82       | 80<br>83<br>82<br>82<br>82 | 82<br>82<br>82<br>82<br>80 | 81<br>85<br>80<br>82<br>82  | 79.7<br>81.2<br>-0.0<br>-1.6<br>81.7            |
| Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24            | 78<br>76<br>74<br>75       | 77<br>76<br>75<br>75       | 81<br>77<br>76<br>75<br>75 | 80<br>76<br>75<br>75<br>74 | 81<br>78<br>76<br>76<br>74 | 82<br>78<br>76<br>76<br>74 | 82<br>78<br>76<br>76<br>74 | 82<br>78<br>75<br>74       | 82<br>77<br>76<br>75<br>74   | 82<br>77<br>78<br>73<br>74   | 82<br>77<br>70<br>75<br>74       | 82<br>77<br>76<br>75<br>74   | 82<br>77<br>76<br>75<br>74       | 82<br>77<br>76<br>73<br>75 | 82<br>76<br>75<br>75<br>75 | 79<br>76<br>75<br>75<br>75  | 79<br>76<br>76<br>76<br>76 | 79<br>76<br>76<br>76<br>76<br>75 | 80<br>70<br>70<br>70<br>70<br>75 | 80<br>76<br>76<br>76<br>76<br>75 | 80<br>76<br>76<br>76<br>77<br>75 | 80<br>76<br>76<br>76       | 79<br>76<br>74<br>75<br>74 | 79<br>77<br>76<br>75  | 77.1<br>75.7<br>75.3<br>71.5                    |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 27            | 74<br>78<br>76<br>77       | 75<br>76<br>76<br>76       | 78<br>76<br>76<br>77       | 75<br>76<br>77<br>76       | 74<br>76<br>77<br>77       | 74<br>76<br>77<br>77       | 74<br>76<br>78<br>78       | 74<br>76<br>79<br>78       | 74<br>76<br>79<br>79         | 74<br>75<br>77<br>80         | 74<br>73<br>77<br>80             | 74<br>75<br>77<br>80         | 74<br>75<br>76<br>80             | 74<br>76<br>76<br>80       | 74<br>70<br>70<br>81       | 74<br>76<br>76<br>81        | 75<br>76<br>77<br>81       | 75<br>76<br>77<br>82             | 75<br>76<br>77<br>82             | 76<br>76<br>77<br>83             | 76<br>77<br>77<br>82             | 76<br>77<br>77<br>77<br>85 | 75<br>75<br>76<br>84       | 78<br>77<br>77<br>85  | 74. 9<br>76. 0<br>76. 8<br>80. 0                |
| Means.  | 78. 6                      | 78.4                       | 78. 3                      | 75.0                       | 78, 8                      | 78. 9                      | 79. 1                      | 79. 1                      | 79. 1                        | 79. 0                        | 78. 7                            | 78.8                         | 78. 8                            | 78.8                       | 78.7                       | 78. 7                       | 78.8                       | 78.9                             | 79. 0                            | 79. 0                            | 79. 1                            | 79. 3                      | 78.7                       | 79.1  | 78.8  |
| Mar 1   | 84                         | 84                         | 85                         | 85                         | 84                         | 85                         | 84                         | 84                         | 84                           | 85                           | 85                               | 85                           | 83                               | 82                         | <br>  62                   | 81                          | 81                         | 83                               | 83                               | 80                               | 83                               | 81                         | 84                         | 415   | e 1. 7  |
| Mar. 2<br>Mar. 3<br>Mar. 4<br>Mar. 5<br>Mar. 6      | 86<br>85<br>86<br>85<br>85 | 86<br>85<br>86<br>85<br>85 | 86<br>85<br>86<br>84<br>85 | 86<br>84<br>81<br>85<br>85 | 86<br>84<br>85<br>85<br>85 | 86<br>84<br>85<br>85<br>85 | 85<br>81<br>80<br>85<br>85 | 85<br>85<br>85<br>85<br>85 | 85<br>84<br>85<br>85         | 85<br>85<br>85<br>85         | 85<br>82<br>85<br>85<br>84       | 95<br>81<br>85<br>85<br>84   | 85<br>81<br>85<br>85<br>84       | 81<br>81<br>85<br>85<br>84 | 85<br>81<br>86<br>85<br>83 | 86<br>81<br>86<br>85<br>83  | 86<br>84<br>86<br>85<br>84 | 86<br>84<br>86<br>85<br>84       | 86<br>84<br>87<br>85<br>81       | 86<br>84<br>87<br>85<br>84       | 86<br>85<br>86<br>85<br>84       | 86<br>85<br>87<br>85<br>84 | 85<br>86<br>85<br>85       | 84<br>85<br>86<br>86<br>86  | 85, 4<br>83, 6<br>85, 6<br>85, 0<br>84, 4       |
| Mar. 7<br>Mar. 8<br>Mar. 9<br>Mar. 1c<br>Mar. 11    | 86<br>88<br>93<br>91<br>89 | 86<br>38<br>94<br>91<br>80 | 84<br>88<br>93<br>92<br>87 | 85<br>87<br>92<br>92<br>85 | 85<br>87<br>92<br>91<br>86 | 85<br>88<br>92<br>91<br>85 | 85<br>88<br>91<br>91<br>85 | 88<br>91<br>91<br>83       | 85<br>89<br>91<br>91<br>85   | 85<br>90<br>91<br>91<br>85   | 84<br>90<br>91<br>91<br>84       | 84<br>90<br>91<br>91<br>82   | 84<br>91<br>93<br>91<br>80       | 84<br>91<br>93<br>91<br>80 | 84<br>91<br>93<br>91<br>80 | 84<br>92<br>93<br>91<br>89  | 85<br>96<br>95<br>91<br>81 | 85<br>96<br>96<br>91<br>81       | 86<br>94<br>96<br>91<br>81       | 86<br>94<br>91<br>91<br>91       | 86<br>96<br>92<br>91<br>82       | 85<br>96<br>92<br>91<br>82 | 84<br>96<br>91<br>91<br>80 | 87<br>96<br>91<br>91<br>82  | 84.8<br>91.2<br><b>92.6</b><br>91.0<br>80.2     |
| Mar. 12<br>Mar. 13<br>Mar. 14<br>Mar. 15<br>Mar. 16 | 82<br>85<br>87<br>83<br>80 | 82<br>86<br>87<br>84<br>79 | 80<br>83<br>87<br>80<br>78 | 81<br>89<br>81<br>78       | 81<br>83<br>89<br>81<br>79 | 81<br>85<br>88<br>80<br>79 | 81<br>85<br>89<br>81<br>79 | 82<br>85<br>89<br>80<br>79 | 82<br>85<br>89<br>80<br>79   | 82<br>85<br>89<br>80<br>79   | 83<br>84<br>85<br>78<br>79       | 83<br>87<br>80<br>79         | 83<br>82<br>87<br>74<br>79       | 85<br>80<br>87<br>78<br>79 | 87<br>80<br>87<br>78<br>81 | 87<br>80<br>88<br>70<br>80  | 89<br>83<br>83<br>79<br>81 | 89<br>84<br>88<br>79<br>82       | 90<br>84<br>87<br>80<br>82       | 90<br>84<br>88<br>81<br>82       | 90<br>86<br>89<br>81<br>82       | 00<br>86<br>89<br>81<br>82 | 88<br>86<br>79<br>82       | 86<br>  86<br>  80<br>  82  | , 84, 7<br>, 83, 8<br>; 87, 8<br>79, 8<br>80, 0 |
| Mar, 17<br>Mar, 18<br>Mar, 19<br>Mar, 20<br>Mar, 4  | 81<br>83<br>84<br>79       | 83<br>83<br>83<br>83<br>78 | 82<br>82<br>81<br>84<br>78 | 80<br>82<br>81<br>83<br>78 | 82<br>82<br>83<br>83<br>78 | 82<br>82<br>83<br>83<br>78 | 81<br>82<br>83<br>82<br>78 | 81<br>82<br>83<br>92<br>78 | 81<br>82<br>1 83<br>82<br>78 | 80<br>82<br>83<br>82<br>78   | 80<br>82<br>83<br>83<br>83<br>78 | : 88<br>82<br>83<br>81<br>78 | 80<br>82<br>82<br>81<br>77       | 80<br>81<br>82<br>81<br>77 | 80<br>82<br>82<br>81<br>70 | 80<br>82<br>83<br>81<br>.77 | 80<br>82<br>83<br>80<br>78 | 80<br>82<br>83<br>80<br>78       | 81<br>82<br>84<br>80<br>78       | 81<br>82<br>85<br>80<br>78       | 81<br>82<br>80<br>78             | 81<br>82<br>83<br>75<br>78 | 82<br>83<br>83<br>79<br>78 | 82<br>84<br>84<br>79<br>78  | 80, 8<br>82, 1<br>82, 6<br>81, 7<br>77, 8       |
| Mar. 22<br>Mar. 23<br>Mar. 24<br>Mar. 25<br>Mar. 26 | 78<br>81<br>81<br>83<br>77 | 70<br>81<br>82<br>83<br>78 | 77<br>80<br>82<br>84<br>79 | 77<br>80<br>83<br>83<br>79 | 77<br>79<br>83<br>83<br>79 | 77<br>80<br>83<br>83<br>79 | 77<br>80<br>83<br>83<br>79 | 77<br>80<br>83<br>83<br>79 | 77<br>80<br>83<br>83<br>79   | 77<br>80<br>83<br>83<br>79   | 77<br>80<br>83<br>82<br>79       | 79<br>80<br>83<br>82<br>79   | 80<br>83<br>83<br>82<br>78       | 81<br>81<br>82<br>79<br>78 | 81<br>81<br>82<br>79<br>78 | 80<br>81<br>82<br>78<br>78  | 81<br>82<br>78<br>79       | 81<br>81<br>82<br>78<br>80       | 81<br>82<br>83<br>78<br>80       | 81<br>82<br>83<br>79<br>81       | 82<br>82<br>83<br>79<br>80       | 82<br>83<br>83<br>79<br>80 | 82<br>83<br>81<br>78<br>81 | \$22.52<br>\$2.52<br>\$2.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53<br>\$3.53 | 79. 2<br>80. 7<br>82. 5<br>80. 8<br>70. 0       |
| Mar. 27<br>Mar. 28<br>Mar. 20<br>Mar. 30<br>Mar. 31 | 79<br>77<br>79<br>82<br>79 | 79<br>77<br>80<br>83<br>79 | 79<br>77<br>30<br>81<br>79 | 79<br>77<br>80<br>81<br>79 | 73<br>76<br>81<br>81<br>78 | 79<br>76<br>81<br>81<br>81 | 79<br>76<br>81<br>81<br>78 | 79<br>76<br>81<br>81<br>78 | 79<br>76<br>81<br>- 81<br>78 | 79<br>76<br>81<br>81<br>1 79 | 79<br>75<br>81<br>81<br>79       | 79<br>75<br>81<br>81<br>79   | 77<br>75<br>80<br>79             | 76<br>81<br>80<br>80       | 76<br>  81<br>  80<br>  80 | 76<br>76<br>81<br>80<br>80  | 78<br>76<br>81<br>80<br>81 | 78<br>77<br>81<br>80<br>81       | 78<br>76<br>81<br>80<br>81       | 76<br>76<br>81<br>80<br>82       | 77<br>78<br>81<br>80<br>82       | 77<br>78<br>81<br>79<br>83 | 80<br>82<br>79<br>83       | . 75<br>79<br>. 81<br>. 19<br>. 42  | 75 0<br>76.5<br>80.8<br>80.5<br>7 0.8           |
| Means   | 83. 3                      | 82. 7                      | 82. 8                      | 82. 6                      | 82.7                       | 82. 8                      | 82.8                       | 82.8                       | 82. 8                        | 82. 3                        | 82.5                             | 82. 1                        | 82.0                             | \$2.0                      | 82. 2                      | 82. 2                       | 83, 0                      | 83, 2                            | 83. 3                            | 83, 4                            | 83. 8                            | 43.6                       | 80.4                       | -11   | 1 12.8  |

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued.

tinued.

## prm Daily means.

5 75 75.7 6 76 76.0 9 89 78.7 8 70 78.2 77. 5 **M.7** 82. 3 82. 8 81. 9

81 -6 01.7

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued.

| 1882. 1882. 1882. 1883. 1883. 1884. 1885.  | 5 86 89 87 87 85 87 885 87 885 887 887 888 888  | #6 #8 #8 #8 #8 #8 #8 #8 #8 #8 #8 #8 #8 #8             | 1 10  | 87<br>87<br>87<br>82<br>88<br>85<br>85<br>86                   | 88<br>88<br>89<br>88<br>87<br>87<br>83<br>82<br>87<br>84       | 01   8<br>88   8<br>87   8<br>84   8<br>83   8<br>86   8 | 77 F160 H168 H168 H168 H168 H168 H168 H168 H168     | 90<br>90<br>90<br>80<br>80<br>83 | 87<br>80<br>91<br>89       | 87<br>87<br>87<br>91<br>90 | 85<br>86<br>91<br>90            | 85<br>86<br>90<br>87         | 87 : 80<br>87 :            | E d. 87 85 86 86                 | H d 9 85 85                    | - P.m.                     | 60 86 87                   | 6 85<br>85<br>85           | SEE NO P. III.                   | 80<br>87<br>87<br>84               | 12 p. m.                           | Agada Bailt                     |
|--|---|---|---|--|--|--|---|----------------------------------|----------------------------|----------------------------|---------------------------------|------------------------------|----------------------------|----------------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|------------------------------------|------------------------------------|---------------------------------|
| fune 1 85 fune 2 88 fune 3 85 fune 4 80 fune 5 87 fune 6 87 fune 6 87 fune 11 86 fune 11 86 fune 12 87 fune 12 87 fune 12 87 fune 15 87 fune 16 85 fune 18 87 fune 18 87 fune 18 87 fune 18 87 fune 18 87 fune 18 87 fune 18 87 fune 19 | 89 89 875 855 871 88 88 88 88 88 88 88 88 88 88 88 88 88  | 80 80 80 80 80 80 80 80 80 80 80 80 80 8              | 89   89   89   87   86   84   84   85   87   86   87   87   88   87   87   87 | 89<br>87<br>87<br>87<br>87<br>82<br>88<br>85<br>90<br>85<br>84 | 89<br>88<br>87<br>87<br>83<br>82<br>87<br>84<br>84<br>90<br>85 | 88 88 88 88 88 88 88 88 88 88 88 88 88                   | 10 81<br>18 81<br>10 81<br>14 81<br>15 81<br>14 71  | 90<br>90<br>90<br>80<br>80<br>83 | 80<br>91<br>89             | 57<br>91                   | 98<br>91                        | 86                           | 80                         | 86                               | 85                             | 84<br>86                   | H4<br>86                   | 84<br>85                   | 144<br>146                       | 87                                 | 86<br>83                           | 報でで                             |
| fune 6 87 fune 7 09 fune 8 72 fune 9 77 fune 10 85 fune 12 71 fune 13 87 fune 14 88 fune 16 85 fune 17 78 fune 19 87 fune 19 81  | 7 85<br>71 85<br>71 78<br>87 78<br>87 88<br>87 88 | 80 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8                | 7 80 87 88 89 84 81 81 81 81 89 89 89   | 87<br>82<br>88<br>85<br>90<br>85<br>84<br>90                   | 83<br>82<br>87<br>84<br>86<br>85                               | 84 8<br>83 8<br>86 8                                     | 4 8<br>5 8<br>4 7                                   | 83                               | 80                         | i                          |                                 | D1                           | 87                         | 85                               | 85                             | 86                         | 411                        | 4.00                       |                                  |                                    |                                    | 40                              |
| une 11   86   86   87   87   87   88   88   88   | 8 88 88 88 88 88 88 88 88 88 88 88 88 8   | 84 8<br>70 8<br>87 8<br>80 8<br>87 8<br>70 8<br>88 88 | 14   54<br>11   81<br>8   89<br>9   89<br>0   89                              | 85<br>84<br>90   | 85   |  | 8 8   | 83                               | 82<br>81<br>80             | 80<br>81<br>81<br>81<br>88 | 89<br>80<br>80<br>83<br>87      | 83<br>82<br>83<br>83<br>87   | 86<br>83<br>83<br>87       | 80<br>83<br>83<br>83<br>85       | 79<br>84<br>82  <br>81  <br>85 | 79<br>85<br>82<br>85<br>84 | 81<br>83<br>83<br>85<br>84 | 82<br>79<br>82<br>83<br>84 | 81<br>79<br>81<br>84<br>84       | 80<br>80<br>80<br>87               | 81<br>70<br>77<br>85               | 85.<br>82.<br>80,<br>82,<br>83, |
| tune 16   65<br>tune 17   78<br>tune 18   67<br>tune 19   81<br>tune 20   81   | 87 88 83 81 81 81 81 81 81 81 81 81 81 81 81 81   | 79 8<br>88 8  |   |  | 89<br>89   | 86 8<br>85 8<br>90 1                                     | 88   85<br>86   86<br>80   18<br>10   18            | 88<br>8 88<br>8 89               | 85<br>80<br>85<br>85<br>80 | 86<br>84<br>82<br>83<br>91 | 86<br>84<br>84<br>85<br>90      | 87<br>83<br>84<br>86<br>90   | 84<br>83<br>82<br>86<br>89 | 85<br>82<br>82<br>83<br>83<br>87 | 81<br>79<br>82<br>87<br>84     | 84<br>79<br>89<br>83<br>86 | 84<br>79<br>80<br>85<br>86 | 82<br>78<br>83<br>84<br>85 | 82<br>75<br>81<br>85<br>86       | 86<br>70<br>86<br>88<br>88         | 84<br>81<br>87                     | 2000                            |
| une 20   81  |   | 02, 8   | 1 84<br>9 88<br>4 87  | 88<br>86<br>85<br>88   | 89<br>88<br>87<br>81<br>87                                     | 88 8<br>85 8<br>79 7                                     | 11 81<br>17 81<br>12 8<br>16 7<br>16 7<br>87 81     | 86<br>1 82<br>8 80               | 88<br>83<br>81<br>83<br>89 | 87<br>83<br>81<br>82<br>85 | 87<br>83<br>81<br>82<br>82      | 87<br>80<br>82<br>83         | 85<br>86<br>80<br>82<br>75 | 84<br>84<br>83<br>80<br>76       | 85<br>84<br>84<br>80<br>78     | 85<br>84<br>80<br>78       | 87<br>85<br>84<br>81<br>80 | 86<br>83<br>85<br>83<br>81 | 81<br>81<br>80<br>81             | 85<br>81<br>86<br>75<br>80         | 56<br>56<br>76<br>81               | 54055                           |
| lune 21   88<br>lune 22   72<br>lune 23   81<br>lune 24   76   | 2 77  | 90   8<br>83   8<br>77   8                            | 6   .87<br>9   89<br>5   87<br>1   81<br>4   75                               | 89<br>89<br>87<br>81<br>81                                     | 90<br>89<br>86<br>83   | 89 8<br>83 8<br>79 7                                     | 00   00<br>80   81<br>65   71<br>70   70<br>44   81 | 89<br>83<br>76                   | 87<br>89<br>79<br>77<br>75 | 86<br>88<br>83<br>79<br>76 | 87<br>88<br>75<br>76<br>80      | 87<br>82<br>75  <br>78<br>80 | 85<br>78<br>72<br>76<br>80 | 83<br>78<br>74<br>80<br>79       | 84<br>77<br>76<br>80<br>78     | 86<br>75<br>75<br>79<br>74 | 86<br>76<br>74<br>80<br>76 | 78<br>78<br>78<br>82<br>77 | 87<br>73<br>76<br>85<br>76       | 87<br>  73<br>  81<br>  82<br>  76 | 87<br>74<br>82<br>70<br>70         | . 86<br>79<br>79<br>77          |
| une 25 70<br>ane 26 81<br>ane 27 84<br>ane 28 73<br>ane 29 80  | 1 83<br>4 88<br>3 75  | 89 8<br>89 8<br>76 8                                  | 78<br> 8   89<br> 8   87<br> 2   83<br> 7   89                                | 87<br>85   | 75<br>00<br>88<br>84<br>90                                     | 80 8<br>80 8<br>83 8                                     | 70 71<br>00 96<br>37 86<br>32 86<br>30 81           | 90<br>3 86<br>3 80               | 63<br>90<br>86<br>80<br>82 | 75<br>89<br>83<br>89<br>82 | 76<br>89<br>80<br>82<br>83      | 76<br>89<br>80<br>82<br>79   | 82<br>85<br>80<br>80<br>79 | 80<br>85<br>79<br>82<br>78       | 78<br>85<br>77<br>80<br>62     | 75<br>86<br>82<br>78<br>78 | 73<br>88<br>85<br>75<br>82 | 76<br>83<br>83<br>77<br>79 | 72<br>82<br>83<br>77<br>77       | 74<br>  83<br>  82<br>  81<br>  80 | 77<br>  83<br>  80<br>  80<br>  83 | 10<br>50<br>50<br>50<br>50      |
| une 30   85<br>Means, <b>44.1</b>  | -   | 86 8<br>86. 1 87.                                     |   | -  | 89<br>89.1 8   | 89   8   | 3 87. 0   |                                  | 85, 8                      | 86, 8                      | 85 .<br>86, 5                   | -6, 2                        | 85<br>5, 4                 | 85                               | 82                             | 83<br>81. 0                | 82<br>84. 9                | 81.8                       | 82<br>81. 2                      |                                    | 79                                 | - 50<br>1 - 80                  |
| 1882.<br>uly 1 83<br>uly 2 70<br>uly 3 80<br>uly 4 82  | 78<br>9 : 86  | 75   7<br>86   8                                      | 7   87<br>5   83<br>5   85<br>4   84  | 88<br>70<br>87<br>78   | 78<br>83<br>87<br>77   | 80   8   | 5 7:<br>1 : 8:<br>8   8:<br>2   7:                  | 88                               | 76<br>80<br>88<br>79       | 73<br>80<br>88<br>73       | 73<br>70  <br>88  <br>75        | 71<br>70<br>88<br>78         | 79<br>67<br>85<br>72       | 77<br>65<br>88<br>71             | 81<br>66<br>84<br>60           | 80<br>62<br>82<br>70       | 80<br>60<br>12<br>72       | 76<br>60<br>81<br>70       | 72<br>00<br>85<br>74             | 71<br>71<br>84<br>82               | 69<br>75<br>82<br>73               | 14.75                           |
| uly 5 74<br>uly 6 78<br>uly 7 66<br>uly 7 66<br>uly 8 62<br>uly 9 78   | 8 66  | 80 8<br>68 7<br>73 8                                  | 5   84<br>4   82<br>1   73<br>0   80<br>0   90                                | 85<br>87<br>73<br>83<br>91                                     | 86<br>83<br>72<br>85<br>91                                     | 84 8<br>60 6<br>82 8                                     | 6   8:<br>1   7:<br>8   6:<br>9   7:<br>0   9:      | 75<br>66<br>7 78                 | 70<br>75<br>70<br>75<br>90 | 70<br>72<br>70<br>76<br>88 | 70<br>72<br>70<br>80<br>85      | 65<br>70<br>69<br>80<br>85   | 68<br>70<br>66<br>78<br>82 | 67<br>70<br>65<br>79<br>83       | 67<br>73<br>65<br>79<br>83     | 72<br>76<br>62<br>79<br>80 | 73<br>76<br>64<br>80<br>76 | 73<br>73<br>64<br>80<br>75 | 75<br>59<br>78<br>74             |                                    | 71<br>71<br>58<br>78<br>88         | 76<br>76<br>66                  |
| nly 10   86<br>nly 11   86<br>nly 12   87<br>nly 13   81<br>nly 14   70  | 89<br>86<br>87  | 85 87 9<br>84 8<br>88 8<br>72 8                       | 0   87<br>1   85<br>7   87  | 86<br>87<br>85<br>85<br>86                                     | 81  <br>84  <br>89  <br>86  <br>82                             | 77   8<br>88   8<br>83   8                               | 0   86<br>2   76<br>8   86<br>3   81<br>8   80      | 77<br>82<br>82                   | 78<br>75<br>82<br>82<br>82 | 78<br>75<br>82<br>82<br>90 | 78<br>75<br>88<br>82<br>90      | 76<br>75<br>88<br>83<br>90   | 80<br>75<br>82<br>82<br>90 | 82<br>78<br>82 :<br>80<br>89 :   | 76<br>78<br>90<br>81<br>90     | 76<br>89<br>82<br>90       | 80<br>78<br>88<br>81<br>90 | 79<br>80<br>87<br>80<br>88 | 75<br>1 89<br>1 85<br>1 80<br>87 | 85                                 | 80<br>88<br>82<br>69<br>88         | 51<br>51<br>82<br>81            |
| aly 15   87<br>uly 16   78<br>uly 17   89<br>uly 18   92<br>uly 19   95  | 80<br>90<br>95  | 87 : 9<br>82 : 8<br>90   8<br>95   9<br>96 : 9        | 5 84<br>9 89<br>6 94  | 90<br>86<br>90<br>94<br>95                                     | 89<br>88<br>94<br>94<br>95                                     | 88 8   |   | 85<br>96<br>95                   | 87<br>80<br>98<br>92<br>95 | 83<br>82<br>98<br>93<br>82 | 87<br>82<br>98<br>90<br>88      | 86<br>82<br>98<br>90<br>80   | 80<br>82<br>98<br>87<br>85 | 87<br>81<br>97<br>82<br>86       | 87<br>82<br>97<br>83<br>85     | 87<br>82<br>95<br>82<br>88 | 85<br>85<br>93<br>80<br>90 | 83<br>87<br>95<br>81<br>92 | 82<br>87<br>92<br>80<br>90       | 89<br>91<br>84<br>93               | 70<br>57<br>97<br>85<br>91         | 54<br>94<br>89<br>89            |
| uly 20 89<br>uly 21 87<br>uly 22 90<br>uly 23 91<br>uly 24 84  | 92<br>92<br>95  | 97 : 9:<br>94 : 9:<br>93 : 9:<br>91 : 9:<br>93 : 9:   | 4 94<br>2 94<br>7 96  | 96<br>94<br>95<br>94<br>92                                     | 95<br>94<br>95<br>93<br>92                                     | 87 8<br>95 9<br>95 9<br>93 8<br>92 9                     | G · 96<br>G 96<br>D 87                              | 98<br>98<br>90                   | 98<br>98<br>89<br>89       | 98<br>98<br>90<br>70       | 90<br>98<br>95<br>90<br>70      | 90<br>98<br>92<br>80<br>70   | 85<br>98<br>90<br>75<br>65 | 84<br>95<br>90<br>68<br>62       | 81<br>98<br>29<br>71<br>68     | 81<br>96<br>83<br>78<br>75 | 60<br>95<br>80<br>64<br>80 | 84<br>97<br>81<br>90<br>73 | 84<br>93<br>83<br>88<br>75       | 87<br>94<br>87<br>89<br>78         | 87<br>89<br>89<br>89<br>78         | 95<br>91<br>87<br>81            |
| uly 25 78<br>uly 26 85<br>uly 27 96<br>uly 28 94<br>uly 29 75  | 96<br>98<br>98  | 88 8<br>86 8<br>98 98<br>90 8<br>79 8                 | 92<br>8 96<br>9 89  | 88<br>92<br>94<br>89<br>79                                     |  | 90 8<br>88 9<br>94 9<br>80 8<br>81 7                     | 1 · 88<br>4 · 95<br>9 · 88                          |                                  | 90<br>85<br>95<br>80<br>80 | 90<br>83<br>95<br>82<br>80 | 90<br>82<br>95<br>82<br>1<br>75 | 90<br>82<br>93<br>81<br>75   | 90<br>82<br>87<br>80<br>75 | 88<br>88<br>82<br>73             | 80<br>84<br>81<br>73           | 84<br>84<br>83<br>75       | 82<br>86<br>86<br>82<br>74 | 77<br>91<br>88<br>82<br>74 | 78<br>15<br>92<br>78<br>78       | #5<br>96<br>92<br>77<br>76         | 54<br>95<br>94<br>17<br>80         | 0211                            |
| uly 30   81<br>uly 31   78   |   | 90 90<br>80 8   |   | 90<br>86   | 90<br>88   | 90 9<br>90 0   |   | . 88<br>. 87                     | 90<br>83                   | 80 ·                       | 80                              | 75                           | 74                         | 76                               | 70                             | 69                         | 83                         | 78                         | 65                               | 74                                 | 7.1                                | 4.9                             |

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ntinued.

H p.m.

85.9 81.7 80.6 84.3 

86.5 ~1.7 79.4 .9.3 77.9

71.1 -6.9 -4.1 -0.0 -1.4 80 80 80 83

.41.9 .11.3 60,3 .17.9

51.0 54.1 94.2 59.4 96.3 57 57 57 57 51

81.6 -1

94 94

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued.

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued.

| 3hit                                 | e.                         | 1 a.m.                     | 11<br>4<br>21              | 1 4 2                      | 4 4                        | 10 to | 11 17                      | 1 9 10                     | . Tar 187                  | 9 2. 10.                   | 9                          | Ha.na.                     | 12<br>12                   | 1 p.m.                     | 2 p.m.                     | 2 p.m.  | 4 10 10                     | 5 p.m.                           | 6 p. m.                     | i b m                      | 5 p. p.                          | 9 p.m.                           | 10 p.m                     | Hp.m                       | 12 p.m.                                 | Daily                       |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---|-----------------------------|----------------------------------|-----------------------------|----------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|---|-----------------------------|
| 1880<br>Deti<br>Deti                 | 2. 1                       | 92<br>92                   | 90<br>03                   | 92                         | 92<br>92                   | 12<br>10  | 92                         | 93                         | 92                         | 93<br>91                   | 92                         | 91<br>91                   | 93                         | 92                         | 90<br>90                   | 02<br>80  | 92<br>91                    | 92<br>92                         | 92<br>92                    | 92<br>92                   | 92<br>91                         | 02<br>91                         | 94<br>94                   | 9K3<br>1K1                 | (f):<br>(1):                            | 92,                         |
| Jet.<br>Jet.<br>Jet.<br>Jet.<br>Jet. | 3 4 5 6 7                  | 95<br>90<br>89<br>85<br>84 | 94<br>99<br>89<br>84<br>84 | 91<br>89<br>84<br>84       | 95<br>19<br>19<br>84<br>84 | 90<br>58<br>84<br>83  | 91<br>89<br>84<br>83       | 92<br>59<br>88<br>83<br>84 | 91<br>89<br>88<br>83<br>84 | 91<br>80<br>89<br>84<br>84 | 91<br>89<br>89<br>84<br>84 | 90<br>89<br>89<br>83       | 80<br>80<br>83<br>84       | 90<br>80<br>88<br>84<br>86 | 90<br>88<br>87<br>84<br>85 | 86<br>86<br>86<br>85<br>85  | 89<br>89<br>84<br>85        | 69<br>88<br>89<br>83<br>83       | 89<br>88<br>89<br>83<br>83  | 88<br>89<br>83<br>83       | 88<br>89<br>89<br>83<br>83       | 88<br>88<br>89<br>44<br>83       | 80<br>80<br>80<br>84<br>83 | 89<br>89<br>81<br>81       | 00<br>FF<br>87<br>83<br>84              | 90.<br>90<br>88<br>81       |
| Det.<br>Det.<br>Det.<br>Det.         | 8<br>9<br>10<br>11<br>12   | 82<br>83<br>83<br>87<br>87 | 82<br>81<br>83<br>85<br>87 | 81<br>81<br>82<br>87<br>87 | 82<br>82<br>82<br>87<br>86 | 82<br>81<br>82<br>87<br>86  | 81<br>82<br>87<br>86       | 82<br>82<br>82<br>87<br>86 | 82<br>82<br>82<br>87<br>86 | 82<br>82<br>82<br>87<br>86 | 82<br>82<br>88<br>88       | H2<br>H2<br>H2<br>FH<br>84 | 82<br>82<br>83<br>84       | 82<br>83<br>82<br>89<br>83 | 80<br>80<br>80<br>84       | 14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>14<br>1 | 54<br>52<br>58<br>81        | 82<br>87<br>88<br>87             | H2<br>H3<br>H7<br>HH<br>H7  | 82<br>82<br>87<br>88       | 81<br>82<br>87<br>88<br>87       | 82<br>82<br>89<br>87<br>87       | 82<br>82<br>88<br>87<br>83 | 80<br>80<br>87<br>87<br>87 | 82<br>82<br>87<br>7<br>87<br>80         | 91.<br>80.<br>81.<br>85.    |
| Det.<br>Jet.<br>Jet.<br>Jet.<br>Jet. | 15                         | 87<br>82<br>87<br>87<br>88 | 86<br>87<br>86<br>87<br>88 | 86<br>87<br>86<br>88<br>88 | 86<br>88<br>88<br>89<br>87 | 86<br>85<br>85<br>88<br>86  | 86<br>86<br>86<br>88<br>88 | 86<br>86<br>86<br>88<br>87 | 86<br>86<br>87<br>87       | 85<br>85<br>87<br>87       | 84<br>84<br>86<br>87<br>87 | 83<br>85<br>86<br>87<br>87 | 82<br>86<br>86<br>87<br>86 | 81<br>86<br>86<br>86       | 83<br>86<br>85<br>86<br>86 | 80<br>87<br>85<br>86<br>86  | 87<br>86<br>86<br>86        | 83<br>86<br>86<br>86<br>86       | 84<br>87<br>85<br>86<br>86  | 84<br>87<br>86<br>86<br>87 | ##<br>##<br>##<br>##<br>##<br>## | 83<br>88<br>84<br>87<br>87       | 85<br>88<br>93<br>87<br>87 | 85<br>84<br>84<br>87<br>87 | 20<br>20<br>21<br>21<br>21<br>27        | 10 HO<br>10 HO<br>10 HO     |
| let.<br>let.                         | 18<br>10<br>20<br>21       | 88<br>87<br>89<br>83<br>88 | 88<br>89<br>88<br>83<br>88 | 89<br>88<br>84<br>84<br>88 | 88<br>89<br>88<br>83<br>87 | 87<br>87<br>87<br>84<br>86  | 87<br>88<br>87<br>83<br>87 | 87<br>86<br>86<br>82<br>87 | 87<br>86<br>85<br>81<br>86 | 87<br>85<br>84<br>82<br>88 | 87<br>85<br>84<br>83<br>86 | 83<br>84<br>84<br>82<br>83 | 84<br>84<br>84<br>84<br>85 | 84<br>85<br>83<br>93<br>93 | 84<br>84<br>83<br>82<br>83 | 85<br>84<br>83<br>82<br>83  | 86<br>85<br>83<br>83        | 86<br>85<br>85<br>85<br>85<br>83 | 86<br>85<br>83<br>83        | 86<br>83<br>83<br>82       | 88<br>82<br>83<br>82             | 87<br>85<br>80<br>85             | 87<br>84<br>84<br>83       | 86<br>86<br>81<br>82       | 86<br>87<br>88<br>84<br>80              | 100                         |
| let.<br>let.                         | 23<br>24<br>25<br>26<br>27 | 84<br>87<br>85<br>84<br>86 | 85<br>86<br>66<br>79<br>84 | 84<br>87<br>85<br>83<br>85 | 85<br>86<br>84<br>84<br>84 | 83<br>84<br>81<br>84<br>82  | 84<br>84<br>82<br>85<br>82 | 84<br>84<br>82<br>85<br>83 | 83<br>83<br>82<br>85<br>82 | #2<br>#3<br>#3<br>#4<br>#2 | 82<br>84<br>82<br>84<br>83 | 82<br>84<br>81<br>84<br>83 | 99<br>84<br>81<br>84<br>82 | 82<br>83<br>81<br>83<br>83 | 82<br>83<br>80<br>83<br>81 | 82<br>83<br>78<br>83<br>82  | 82<br>83<br>75<br>84<br>82  | 82<br>83<br>75<br>84<br>82       | 82<br>84<br>75<br>84<br>82  | 82<br>83<br>75<br>84<br>83 | 82<br>82<br>75<br>84<br>82       | 83<br>85<br>75<br>84<br>80       | 84<br>83<br>79<br>83<br>81 | 83<br>80<br>80<br>83<br>81 | 2 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 200                         |
| let.                                 | 20<br>30<br>31             | 83<br>82<br>85<br>89       | 82<br>84<br>86<br>90       | 83<br>82<br>86<br>89       | 82<br>81<br>85<br>90       | 81<br>81<br>85<br>88  | 81<br>80<br>85<br>88       | 81<br>80<br>85<br>88       | 82<br>79<br>85<br>87       | 82<br>79<br>83<br>86       | 82<br>79<br>80<br>89       | 82<br>70<br>80<br>80       | F3<br>79<br>81<br>90       | 83<br>80<br>83<br>89       | 83<br>81<br>85<br>88       | 84<br>81<br>85<br>86  | 84<br>81<br>92<br>82        | 85<br>80<br>95<br>80             | 85<br>80<br>94<br>80        | 85<br>80<br>90<br>79       | 85<br>80<br>92<br>77             | 85<br>80<br>91<br>75             | 85<br>81<br>88<br>76       | 84<br>81<br>89<br>76       | 87<br>87                                | 28.83                       |
| lean                                 | п.,                        | 46. 3                      | 86. 3                      | 46. 3                      | 86. 3                      | 85, 4   | ьб. Б                      | 85, 5                      | 85, 2                      | 85, 1                      | 85, 0                      | 84. 7                      | 81.8                       | 84.7                       | H4. 0                      | *1.5  | H4, 8                       | 85, 2                            | 65, 1                       | 84. 0                      | 84. 0                            | 85, 1                            | 85, 2                      | 24 \$ , \$1                | 15,1                                    | -                           |
| 18e2                                 | 1                          | 80                         | 81                         | 83                         | 82                         | 82  | 83                         | 85                         | 79                         | 70                         | 73                         | 75                         | 78                         | 81                         | 82                         | 82  | . 86                        | 87                               | 57                          | 87                         | 87                               | 85                               | 84                         | 83                         | 2413                                    | þ                           |
| ov.<br>ov.<br>ov.<br>ov.             | 23<br>4<br>5<br>6          | 81<br>75<br>85<br>81<br>88 | 84<br>77<br>85<br>83<br>88 | 81<br>78<br>85<br>82<br>88 | 81<br>70<br>86<br>82<br>87 | 81<br>79<br>83<br>81<br>86  | 80<br>78<br>83<br>81<br>86 | 73<br>78<br>80<br>81<br>86 | 73<br>79<br>83<br>81<br>86 | 73<br>80<br>83<br>81<br>86 | 73<br>79<br>83<br>81<br>86 | 74<br>80<br>83<br>81<br>86 | 74<br>70<br>82<br>81<br>86 | 74<br>80<br>81<br>82<br>86 | 73<br>80<br>81<br>82<br>86 | 70<br>79<br>80<br>82<br>86  | 74<br>80<br>81<br>82<br>86  | 75<br>80<br>82<br>82<br>86       | 75<br>80<br>83<br>82<br>85  | 74<br>80<br>83<br>82<br>85 | 74<br>82<br>83<br>82<br>82<br>85 | 75<br>82<br>81<br>82<br>82<br>84 | 73<br>84<br>81<br>83<br>84 | 75<br>83<br>81<br>85<br>84 | 74<br>83<br>84<br>87<br>88              | 777-1-1                     |
| ov.<br>ov.<br>ov.                    | 7<br>8<br>9<br>10          | 85<br>84<br>84<br>91<br>82 | 85<br>85<br>90<br>82       | 84<br>83<br>84<br>92<br>82 | 84<br>85<br>84<br>90<br>82 | 85<br>84<br>85<br>89<br>81  | 84<br>84<br>85<br>80<br>81 | 84<br>84<br>86<br>89<br>81 | 84<br>85<br>86<br>89<br>81 | 84<br>85<br>86<br>89<br>81 | 84<br>85<br>87<br>89<br>80 | 84<br>85<br>87<br>89<br>80 | 80<br>85<br>88<br>89<br>80 | 81<br>85<br>88<br>89<br>80 | 81<br>84<br>89<br>88<br>79 | 80<br>84<br>89<br>88<br>79  | 80<br>84<br>88<br>86<br>79  | 83<br>88<br>88<br>86<br>80       | 83<br>83<br>86<br>86<br>80  | 82<br>85<br>90<br>85<br>80 | 82<br>85<br>89<br>85<br>80       | 82<br>85<br>90<br>83<br>78       | 83<br>85<br>89<br>83<br>78 | 85<br>90<br>83<br>76       | 84<br>85<br>90<br>82<br>73              | 12221                       |
| ov. 1<br>ov. 1<br>ov. 1              | 13                         | 72<br>65<br>63<br>64<br>90 | 71<br>65<br>65<br>63<br>91 | 71<br>64<br>65<br>63<br>91 | 71<br>65<br>65<br>63<br>91 | 72<br>64<br>64<br>63<br>92  | 72<br>65<br>64<br>63<br>92 | 72<br>65<br>64<br>63<br>92 | 72<br>64<br>64<br>63<br>92 | 71<br>65<br>64<br>64<br>93 | 65<br>64<br>64<br>93       | 72<br>65<br>63<br>64<br>92 | 72<br>66<br>63<br>64<br>92 | 72<br>65<br>63<br>64<br>92 | 72<br>65<br>64<br>65<br>92 | 73<br>64<br>64<br>65<br>92  | 71<br>64<br>64<br>65*<br>92 | 72<br>68<br>62<br>65*<br>93      | 73<br>65<br>63<br>66°<br>93 | 72<br>66<br>63<br>66<br>83 | 72<br>66<br>64<br>67<br>93       | 72<br>66<br>63<br>75<br>91       | 70<br>65<br>64<br>79<br>91 | 65<br>64<br>85<br>91       | 67<br>65<br>64<br>88<br>90              | 666                         |
| ov. 1<br>ov. 1<br>ov. 1              | 18                         | 89<br>94<br>93<br>92<br>91 | 89<br>93<br>92<br>92<br>91 | 89<br>92<br>92<br>92<br>91 | 91<br>93<br>92<br>92<br>91 | 91<br>93<br>92<br>92<br>92  | 91<br>93<br>92<br>92<br>92 | 92<br>93<br>92<br>92<br>92 | 92<br>92<br>92<br>92<br>92 | 91<br>93<br>92<br>92<br>92 | 92<br>93<br>92<br>92<br>92 | 92<br>93<br>92<br>92<br>92 | 93<br>93<br>92<br>92<br>92 | 93<br>92<br>92<br>92<br>92 | 04<br>02<br>92<br>92<br>92 | 94<br>92<br>92<br>92<br>92  | 93<br>92<br>92<br>92<br>92  | 93<br>92<br>92<br>92<br>92       | 93<br>92<br>92<br>92<br>92  | 93<br>92<br>92<br>92<br>92 | 93<br>92<br>92<br>92<br>92       | 93<br>92<br>92<br>92<br>93       | 94<br>92<br>92<br>92<br>92 | 94<br>92<br>93<br>92<br>92 | 9 :<br>92 92 92 92                      | 9;<br>9;<br>9;<br>6         |
| ov. 2<br>ov. 2<br>ov. 2              | 3<br>14<br>15              | 92<br>91<br>90<br>89<br>88 | 92<br>91<br>89<br>89<br>89 | 93<br>90<br>89<br>89<br>87 | 93<br>90<br>89<br>88<br>87 | 94<br>91<br>89<br>88<br>87  | 93<br>91<br>89<br>88<br>87 | 94<br>91<br>89<br>88<br>87 | 93<br>91<br>89<br>88<br>87 | 93<br>91<br>89<br>88<br>87 | 94<br>91<br>80<br>88<br>87 | 93<br>91<br>89<br>88<br>87 | 93<br>91<br>89<br>88<br>87 | 92<br>99<br>89<br>88<br>87 | 92<br>90<br>89<br>88<br>88 | 92<br>90<br>89<br>88<br>87  | 92<br>90<br>89<br>88<br>87  | 92<br>91<br>90<br>90<br>87       | 92<br>91<br>90<br>90<br>87  | 92<br>92<br>90<br>90<br>87 | 92<br>92<br>90<br>90<br>87       | 92<br>90<br>89<br>88<br>87       | 92<br>90<br>89<br>88<br>87 | 92<br>96<br>89<br>88<br>87 | 121<br>190<br>189<br>187<br>187         | 91;<br>91<br>21<br>21<br>21 |
| uv. 2                                | 7 8                        | 86                         | 86                         | 86<br>86                   | 86<br>88                   | 87<br>86  | 87<br>8 <b>6</b>           | 87<br>86                   | 87<br>86                   | 57<br>86                   | 87<br>87                   | 87<br>87                   | 87<br>87                   | 87<br>87                   | 87<br>87                   | 87<br>86  | 87<br>86                    | 87<br>86                         | 87<br>86                    | 87<br>86                   | 87<br>86                         | 87<br>86                         | 87<br>87                   | 87                         | 27                                      | 1. 4                        |

<sup>&#</sup>x27;Interpolated.

|  |                            |                            |                            |                            |                            |                            |                            |                            |                                | - 4                        |                            |                            |                            |                            |                            |                             |                             |                             |                                    |                              |                            | -1                         |                            |                                  |  |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------------|------------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|--|
| inte.  | I a m                      | 3 a.m.                     | 4                          | 4 10                       | 2 to 10.                   | 6 2 10                     | 10 10                      | **                         | 9 4 5                          | 10 10                      | 4 1                        | 21<br>21                   | 44                         | ii de                      | 1 1 1                      | 4 p.m.                      | 2 p. m.                     | 6 p. ii.                    | 11                                 | 1 d &                        | 9 p.m.                     | 10 p.m                     | H p.m.                     | 12 p. m.                         | Bail   |
| 1882.<br>ec. 1                                 | 86                         | 87                         | 87                         | 87                         | 87                         | 87                         | 87                         | 87                         | 87                             | 87                         | 87                         | 67                         | нт                         | 87                         | 87                         | 87                          | 167                         | 67                          | 87                                 | 67                           | 87                         | 87                         | 1-7                        | 87                               | b7   |
| ec. 2<br>ec. 3<br>ec. 4<br>ec. 5               | 87<br>86<br>86<br>86       | 87<br>86<br>86<br>86       | 87<br>87<br>86<br>86<br>86 | 86<br>86<br>86<br>86       | 87<br>87<br>86<br>86<br>88 | 87<br>87<br>86<br>86<br>86 | 87<br>86<br>86<br>86       | 87<br>86<br>86<br>88       | 87<br>86<br>86<br>86           | 87<br>86<br>86<br>87       | 87<br>86<br>86<br>87       | 87<br>87<br>87<br>86<br>87 | 86<br>87<br>86<br>86<br>86 | 86<br>86<br>86             | 86<br>87<br>86<br>86       | 86<br>86<br>86<br>86        | 86<br>87<br>86<br>86<br>86  | 86<br>87<br>86<br>86        | 86<br>87<br>86<br>86               | 86<br>87<br>86<br>86         | 86<br>86<br>86<br>87       | 87<br>86<br>86<br>86       | 87<br>86<br>86<br>87       | HT<br>HT<br>HB<br>HB<br>HB<br>HB | 85<br>×1<br>×1<br>×1<br>×1<br>×1<br>×1<br>×1<br>×1 |
| 90. 7<br>90. 8<br>90. 9<br>90. 10              | 86<br>86<br>86<br>86       | 86<br>86<br>86<br>86       | 86<br>86<br>86<br>86       | 86<br>86<br>86<br>86       | 86<br>86<br>86<br>86       | 87<br>86<br>86<br>86       | 87<br>86<br>86<br>86<br>89 | 86<br>86<br>86<br>80       | 87<br>86<br>86<br>86<br>88     | 87<br>86<br>86<br>83<br>88 | 87<br>86<br>60<br>84<br>88 | 87<br>86<br>86<br>84<br>88 | 87<br>86<br>86<br>84<br>87 | 87<br>86<br>86<br>84<br>86 | 86<br>86<br>84<br>88       | 87<br>86<br>86<br>84<br>85  | 87<br>86<br>86<br>85<br>85  | 87<br>86<br>85<br>85        | 86<br>86<br>85<br>85               | 86<br>86<br>86<br>85         | 86<br>86<br>86<br>84<br>84 | 86<br>86<br>86<br>85<br>84 | 86<br>86<br>86<br>85       | 86<br>86<br>86<br>85             | H6<br>H6<br>H6<br>H6                               |
| ec. 12<br>sc. 13<br>sc. 14<br>sc. 15<br>sc. 16 | 84<br>82<br>83<br>87<br>89 | 82<br>83<br>83<br>86<br>88 | 83<br>81<br>86<br>87       | 83<br>84<br>81<br>87<br>87 | 83<br>84<br>82<br>87<br>87 | 89<br>84<br>83<br>87<br>88 | 82<br>84<br>81<br>57<br>88 | 83<br>84<br>81<br>88       | 81<br>84<br>80<br>88<br>88     | 81<br>84<br>81<br>87<br>89 | 80<br>84<br>83<br>87<br>89 | 83<br>84<br>82<br>87<br>90 | 81<br>85<br>83<br>86<br>90 | 81<br>83<br>83<br>86       | 81<br>83<br>82<br>86<br>89 | 80<br>84<br>82<br>86<br>89  | 80<br>85<br>82°<br>86<br>80 | 80<br>83<br>82°<br>87<br>89 | 80<br>83<br>82*<br>87<br>80        | 80<br>54<br>83°<br>87<br>80  | 82<br>84<br>83<br>87<br>90 | 81<br>83<br>86<br>87<br>90 | 81<br>84<br>87<br>87<br>90 | 81<br>83<br>88<br>89<br>80       | # 85<br>85<br>86<br>86                             |
| ec. 17<br>ec. 18<br>ec. 19 :<br>ec. 20         | 89<br>89<br>89<br>80       | 89<br>88<br>89<br>89       | 89<br>86<br>88<br>90       | 88<br>86<br>88<br>90       | 87<br>87<br>90<br>92       | 88<br>87<br>87<br>90<br>92 | 89<br>88<br>88<br>91<br>92 | 89<br>88<br>88<br>91       | 90<br>87<br>88<br>89<br>92     | 90<br>87<br>88<br>90<br>91 | 90<br>87<br>88<br>89<br>90 | 88<br>87<br>88<br>89<br>90 | 88<br>87<br>87<br>89       | 88<br>87<br>87<br>89       | 88<br>86<br>86<br>89       | 89<br>86<br>86<br>69        | 80<br>86<br>86<br>89        | 80<br>86<br>80<br>90        | 86<br>86<br>89<br>90               | 86<br>86<br>89               | 88<br>86<br>87<br>90<br>89 | 88<br>86<br>87<br>90<br>87 | 80<br>86<br>87<br>89<br>87 | 90<br>86<br>90<br>89<br>87       | 81<br>81<br>81<br>91                               |
| ec. 22<br>ec. 23<br>ec. 24<br>ec. 25           | 88<br>88<br>90<br>87<br>79 | 87<br>88<br>88<br>87<br>89 | 87<br>88<br>88<br>87<br>89 | 88<br>87<br>87<br>87<br>89 | 88<br>87<br>87<br>88<br>89 | 88<br>87<br>88<br>88       | 88<br>87<br>87<br>88<br>89 | 87<br>87<br>88<br>88       | 87<br>87<br>88<br>88           | 88<br>87<br>86<br>80<br>80 | 88<br>87<br>86<br>89       | 88<br>87<br>86<br>89       | 87<br>87<br>86<br>89       | 86<br>87<br>86<br>89       | 86<br>86<br>86<br>88       | 88<br>86<br>88<br>88        | 87<br>88<br>86<br>80<br>89  | 87<br>88<br>86<br>89<br>89  | 87<br>88<br>86<br>89               | 87<br>88<br>80<br>80         | 87<br>87<br>84<br>89<br>91 | 87<br>87<br>84<br>89<br>92 | 87<br>86<br>84<br>89       | 87<br>87<br>87<br>89<br>92       | 23983  |
| ec. 27<br>ec. 28<br>ec. 20<br>ec. 30           | 91<br>92<br>96<br>84<br>87 | 92<br>91<br>96<br>84<br>87 | 92<br>91<br>96<br>84<br>87 | 93<br>91<br>96<br>84<br>87 | 92<br>92<br>97<br>84<br>87 | 92<br>92<br>96<br>83<br>87 | 92<br>91<br>93<br>83<br>87 | 92<br>92<br>92<br>83<br>87 | 91<br>91<br>89<br>84<br>87     | 91<br>91<br>89<br>84<br>87 | 91<br>91<br>88<br>84<br>87 | 92<br>91<br>87<br>84<br>88 | 92<br>91<br>86<br>85       | 93<br>91<br>86<br>85<br>87 | 93<br>91<br>86<br>85<br>87 | 92<br>92<br>86<br>85        | 93<br>92<br>88<br>86<br>89  | 93<br>93<br>88<br>80<br>89  | 93<br>98<br>88<br>86               | 93<br>93<br>88<br>86<br>89   | 93<br>95<br>86<br>86       | 93<br>95<br>86<br>87<br>89 | 93<br>96<br>86<br>87<br>89 | 98<br>96<br>86<br>87<br>89       | 9 8 8 8  |
|  |                            |                            | 87. 1                      |                            | 87.5                       |                            |                            |                            |                                |                            | 87. 0                      |                            |                            |                            |                            | 88.6                        |                             |                             | ~~~                                | 87. 0                        | 87. 0                      | 87. 1                      | -                          | 47,5                             | -  |
| 1883.<br>n. 1<br>n. 2<br>n. 3<br>n. 4          | 80<br>90<br>92<br>91<br>87 | 89<br>91<br>91<br>91<br>87 | 89<br>92<br>91<br>91<br>86 | 89<br>92<br>91<br>90<br>86 | 99<br>92<br>90<br>90<br>87 | 99<br>92<br>90<br>91<br>87 | 89<br>92<br>89<br>91<br>87 | 89<br>93<br>89<br>90       | 89 .<br>92 ;<br>91<br>90<br>86 | 89<br>93<br>91<br>89<br>86 | 89<br>92<br>90<br>91<br>86 | 89<br>91<br>90<br>91<br>86 | 86<br>91<br>91<br>89       | 89<br>92<br>89<br>91<br>86 | 89<br>91<br>90<br>91<br>87 | 90<br>91<br>89<br>90<br>88  | 90<br>91<br>89<br>90<br>88  | 90<br>91<br>89<br>90<br>88  | 90<br>91<br>89<br>90<br>88         | 90<br>91<br>149<br>90<br>88  | 90<br>91<br>88<br>89<br>87 | 90<br>90<br>88<br>89<br>87 | 90<br>91<br>89<br>88<br>87 | 92<br>93<br>92<br>90<br>89       | 8 2 2 5  |
| n. 6<br>n. 7<br>n. 8<br>n. 9<br>n. 10          | 91<br>84<br>84<br>84<br>83 | 88<br>84<br>84<br>83<br>83 | 88<br>84<br>84<br>83<br>84 | 88<br>83<br>84<br>84<br>88 | 87<br>83<br>84<br>85<br>85 | 87<br>83<br>85<br>85       | 86<br>84<br>85<br>86<br>84 | 85<br>86<br>85<br>85       | 84<br>85<br>85<br>84           | 84<br>84<br>85<br>85<br>87 | 83<br>83<br>85<br>84<br>87 | 82<br>83<br>85<br>84<br>85 | 83<br>84<br>85<br>83<br>84 | 83<br>85<br>85<br>83<br>84 | 83<br>85<br>83<br>84       | 84<br>85<br>86<br>83<br>85  | 84<br>86<br>86<br>83<br>83  | 84<br>86<br>86<br>83<br>84  | 84<br>86<br>86<br>83<br>84         | 84<br>85<br>86<br>83<br>84   | 84<br>85<br>88<br>83<br>83 | 84<br>85<br>85<br>83<br>83 | 84<br>84<br>85<br>82<br>83 | 85<br>86<br>87<br>82<br>83       | * × × × ×  |
| n. 11<br>n. 12<br>n. 13<br>n. 14<br>n. 15      | 82<br>83<br>84<br>81<br>80 | 82<br>81<br>81<br>80       | 82<br>83<br>81<br>81<br>80 | 82<br>81<br>80<br>81<br>80 | 83<br>89<br>81<br>80       | 82<br>83<br>80<br>81<br>80 | 81<br>80<br>82<br>80       | 81<br>80<br>80<br>82<br>80 | 83<br>80<br>81<br>82<br>80     | 83<br>80<br>80<br>82<br>83 | 83<br>80<br>80<br>82<br>79 | 82<br>80<br>80<br>82<br>79 | 82<br>80<br>80<br>82<br>79 | 82<br>80<br>80<br>82<br>79 | 82<br>80<br>80<br>82<br>79 | 82<br>80<br>80<br>81<br>79° | 82<br>79<br>80<br>81<br>76  | 82<br>79<br>80<br>81<br>74° | 82<br>79<br>80<br>81<br>71         | 82<br>79<br>80<br>81,<br>69* | 81<br>79<br>80<br>83<br>67 | 82<br>80<br>80<br>80<br>85 | 82<br>79<br>80<br>80<br>70 | 82<br>83<br>83<br>83<br>74       | 8 8 8 8 7  |
| n. 16<br>n. 17<br>n. 18<br>n. 19<br>n. 20      | 76<br>95<br>91<br>87<br>86 | 77<br>95<br>96<br>87<br>86 | 78<br>94<br>90<br>86<br>86 | 79<br>94<br>90<br>86<br>86 | 80<br>95<br>90<br>84<br>84 | 81<br>89<br>85<br>84       | 83<br>97<br>89<br>85<br>84 | 83<br>97<br>88<br>86<br>84 | 87<br>96<br>88<br>86<br>84     | 88<br>94<br>88<br>86<br>84 | 89<br>94<br>88<br>86<br>84 | 91<br>93<br>88<br>86<br>84 | 91<br>93<br>88<br>85<br>84 | 92<br>93<br>87<br>85<br>84 | 94<br>93<br>87<br>85       | 95<br>93<br>87<br>85<br>85  | 94<br>93<br>89<br>85<br>86  | 94<br>93<br>88<br>86<br>86  | 95<br>93<br>88<br>86<br>86         | 95<br>93<br>88<br>86<br>86   | 91<br>92<br>87<br>85<br>88 | 94<br>91<br>87<br>83<br>86 | 94<br>91<br>87<br>85<br>86 | 94<br>93<br>87<br>87<br>86       | 8<br>9<br>8<br>8<br>8                              |
| n. 21<br>n. 22<br>n. 23<br>n. 24<br>n. 25      | 87<br>89<br>92<br>98<br>85 | 86<br>88<br>93<br>97<br>85 | 86<br>89<br>92<br>97<br>85 | 85<br>89<br>93<br>96<br>85 | 86<br>89<br>92<br>94<br>84 | 86<br>90<br>92<br>93<br>84 | 86<br>90<br>92<br>91<br>81 | 87<br>90<br>92<br>90<br>84 | 87<br>89<br>92<br>90<br>84     | 87<br>89<br>92<br>90<br>83 | 87<br>89<br>92<br>83       | 88<br>89<br>92<br>89<br>83 | 87<br>89<br>92<br>88<br>88 | 87<br>89<br>93<br>87<br>82 | 87<br>89<br>92<br>87<br>82 | 87<br>89<br>93<br>86<br>82  | 87<br>89<br>95<br>86<br>83  | 88<br>89<br>95<br>86<br>85  | 86<br>95<br>86<br>83               | 86<br>93<br>86<br>85         | 87<br>90<br>84<br>85<br>82 | 88<br>90<br>93<br>85<br>83 | 88<br>90<br>95<br>85<br>82 | 89<br>90<br>98<br>86<br>83       | 8 8 8 8 8 8  |
| n. 26<br>n. 27<br>n. 28<br>n. 29<br>n. 30      | 82<br>82<br>81<br>81       | 82<br>81<br>80<br>81<br>81 | 82<br>80<br>80<br>81<br>80 | 82<br>80<br>80<br>80<br>80 | 82<br>80<br>80<br>80<br>80 | 82<br>80<br>80<br>80       | 83<br>80<br>80<br>80<br>79 | 82<br>80<br>80<br>81<br>79 | 82<br>80<br>80<br>80<br>79     | 82<br>70<br>80<br>80<br>79 | 82<br>80<br>80<br>80<br>79 | 82<br>79<br>80<br>80<br>79 | 82<br>79<br>79<br>80<br>79 | 82<br>79<br>79<br>80<br>79 | 82<br>79<br>79<br>81<br>79 | 82<br>80<br>79<br>81<br>79  | 82<br>80<br>79<br>82<br>79  | 82<br>79<br>82<br>79        | 82  <br>80  <br>79  <br>81  <br>79 | 83<br>79<br>8t<br>79         | 82<br>80<br>80<br>81<br>79 | 82<br>80<br>80<br>80<br>79 | 81<br>80<br>80<br>80<br>79 | 85<br>80<br>80<br>80             | 10 to 10 to 10 to                                  |

Means.. 83. 8 | 85. 4 | 85. 3 | 85. 1 | 85. 2 | 85. 1 | 85. 2 | 85. 1 | 85. 2 | 85. 1 | 84. 8 | 85. 0 | 84. 9 | 84. 8 | 85. 0 | 85. 2 | 85. 3 | 85. 3 | 85. 3 | 85. 2 | 85. 1 | 84. 8 | 84. 7 | 84. 6 | 86. 0 | 85. 1 | 84. 8 | 85. 0 | 85. 2 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3 | 85. 3

atinued. me, -- a bours

Hpm. 12 pm. Daily second

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued.

|   |                            | , ,                        | rome                       | ter ab                     | ove th                     | ie suri                          | ace of                     | the                        | grour                      | id, 4 f                    | 17 r                         | Wash<br>ninut                | ingto:                           | n mea                      | n time                     | n Ce                       | rrect                      | ion re                     | duce                             | l to m                           | ean l                            | ocal                       | time,                      | —5 h                       | ours                                      |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------------------------------|------------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|---|
| Date.   | i a.m.                     | 2 a. m.                    | 3 p. El                    | 4 a. m.                    | 4 E                        | 6 a. m.                          | 7 a.m.                     | 8 a. m.                    | 9 a. m.                    | 10 a.m.                    | 11 a.m.                      | 12 m.                        | I p.m.                           | 2 p.m.                     | 3 p.m.                     | 4 p. m.                    | 5 p. m.                    | 6 p. m.                    | 7 p.m.                           | in d                             | e p. m.                          | 10 p.m.                    | II p. m.                   | 12 p. m.                   | Daily<br>means.                           |
| 1883.<br>feb. 1<br>feb. 2<br>feb. 3<br>feb. 4         | 86<br>87<br>91<br>97       | 87<br>87<br>91<br>96       | 86<br>87<br>91<br>96       | 88<br>87<br>92<br>96       | 88<br>87<br>92<br>96       | 87<br>87<br>92<br>95             | 37<br>ජරි<br>92<br>94      | 86<br>88<br>92<br>93       | 86<br>88<br>91<br>93       | 85<br>88<br>91<br>93       | 85<br>89<br>91               | 86<br>89<br>91<br>92         | 86<br>89<br>91<br>92             | 86<br>90<br>91<br>92       | 86<br>90<br>92<br>92       | 86<br>99<br>93<br>91       | 86<br>90<br>95<br>92       | 86<br>91<br>95<br>92       | 86<br>91<br>95<br>92             | 86<br>91<br>95<br>92             | 86<br>91<br>95<br>93             | 86<br>91<br>97<br>93       | 86<br>91<br>97<br>93       | 86<br>91<br>97<br>94       | 86, 4<br>89, 1<br>92, 9                   |
| Ceb. 5<br>Ceb. 6<br>Ceb. 7<br>Ceb. 8                  | 94<br>96<br>79<br>82<br>86 | 95<br>96<br>79<br>82<br>86 | 94<br>95<br>81<br>81<br>87 | 94<br>95<br>82<br>81<br>89 | 95<br>95<br>83<br>82<br>90 | 95<br>95<br>83<br>83<br>83       | 95<br>94<br>83<br>82<br>91 | 95<br>92<br>84<br>82<br>91 | 95<br>91<br>85<br>82<br>92 | 96<br>89<br>85<br>82<br>92 | 96<br>87<br>85<br>81<br>94   | 95<br>84<br>87<br>81<br>94   | 94<br>83<br>90<br>81<br>95       | 95<br>82<br>90<br>80<br>93 | 95<br>81<br>91<br>81<br>91 | 96<br>80<br>92<br>84<br>90 | 97<br>80<br>92<br>85<br>90 | 97<br>80<br>92<br>85<br>91 | 97<br>80<br>92<br>85<br>91       | 97<br>80<br>92<br>84<br>90       | 97<br>77<br>90<br>84<br>88       | 97<br>77<br>89<br>84<br>85 | 97<br>78<br>87<br>85<br>85 | 96<br>79<br>86<br>86<br>86 | 95.6<br>86.1<br>86.6<br>82.7<br>89.8      |
| Ceb. 10<br>Ceb. 11<br>Ceb. 12<br>Ceb. 13<br>Ceb. 14   | 81<br>75<br>76<br>86<br>81 | 81<br>75<br>76<br>86<br>79 | 80<br>75<br>77<br>85<br>77 | 79<br>76<br>77<br>81<br>77 | 79<br>76<br>77<br>82<br>77 | 78<br>76<br>78<br>82<br>76       | 77<br>76<br>78<br>81<br>75 | 77<br>77<br>79<br>80<br>75 | 77<br>77<br>79<br>80<br>76 | 77<br>77<br>80<br>80<br>76 | 76<br>77<br>80<br>80<br>76   | 76<br>77<br>80<br>80<br>77   | 76<br>77<br>81<br>80<br>77       | 76<br>77<br>81<br>79<br>77 | 76<br>77<br>81<br>70<br>77 | 75<br>77<br>82<br>79<br>73 | 75<br>77<br>85<br>79<br>78 | 76<br>77<br>85<br>79<br>78 | 77<br>77<br>85<br>79<br>78       | 77<br>77<br>85<br>79<br>77       | 76<br>76<br>86<br>79<br>78       | 76<br>76<br>86<br>78<br>78 | 76<br>76<br>86<br>78<br>78 | 76<br>76<br>87<br>77<br>79 | 77. 1<br>76. 4<br>81. 1<br>80. 1<br>77.   |
| Ceb. 15<br>Ceb. 16<br>Ceb. 17<br>Ceb. 18<br>Ceb. 19   | 81<br>77<br>77<br>76<br>85 | 79<br>74<br>77<br>76<br>84 | 80<br>74<br>77<br>76<br>84 | 79<br>74<br>76<br>78<br>83 | 79<br>74<br>76<br>76<br>82 | 79<br>74<br>76<br>77<br>82       | 79<br>74<br>78<br>77<br>81 | 77<br>74<br>79<br>78<br>80 | 77<br>74<br>79<br>79<br>80 | 76<br>74<br>79<br>79<br>86 | 75<br>75<br>78<br>81<br>82   | 75<br>74<br>77<br>81<br>83   | 76<br>73<br>76<br>81<br>81       | 76<br>73<br>76<br>80<br>81 | 76<br>74<br>74<br>81<br>81 | 77<br>74<br>74<br>81<br>81 | 77<br>75<br>75<br>81<br>81 | 77<br>75<br>75<br>82<br>84 | 77<br>75<br>75<br>83<br>85       | 77<br>75<br>75<br>83<br>85       | 74<br>75<br>75<br>84<br>85       | 74<br>75<br>74<br>83<br>82 | 74<br>75<br>73<br>83<br>82 | 74<br>76<br>74<br>84<br>81 | 76. 9<br>74. 5<br>76. 0<br>79. 9<br>82. 3 |
| 'eb. 20<br>'eb. 21<br>'eb. 22<br>'eb. 23<br>'eb. 24   | 81<br>75<br>75<br>76<br>75 | 81<br>75<br>74<br>74<br>79 | 80<br>75<br>74<br>72<br>76 | 79<br>74<br>74<br>71<br>74 | 78<br>74<br>73<br>71<br>72 | 77<br>74<br>72<br>71<br>72       | 76<br>75<br>72<br>77<br>72 | 76<br>75<br>72<br>75<br>71 | 75<br>73<br>72<br>75<br>71 | 76<br>75<br>72<br>74<br>70 | 75<br>75<br>71<br>73<br>70   | 75<br>75<br>71<br>73<br>70   | 74<br>76<br>70<br>74<br>71       | 74<br>75<br>71<br>73<br>71 | 73<br>76<br>71<br>73<br>71 | 78<br>76<br>71<br>74<br>71 | 74<br>76<br>72<br>75<br>72 | 74<br>76<br>72<br>75<br>72 | 75<br>77<br>72<br>74<br>72       | 75<br>76<br>72<br>74<br>72       | 75<br>76<br>71<br>72<br>70       | 75<br>76<br>71<br>72<br>72 | 75<br>76<br>71<br>72<br>75 | 75<br>75<br>72<br>71<br>73 | 75. 9<br>75. 9<br>72. 0<br>73             |
| 'eb. 25<br>'eb. 26<br>'eb. 27<br>'eb. 28              | 74<br>73<br>71<br>76       | 72<br>74<br>71<br>73       | 71<br>71<br>72<br>74       | 72<br>71<br>71<br>74       | 71<br>70<br>70<br>73       | 73<br>69<br>68<br>73             | 72<br>69<br>60<br>74       | 72<br>69<br>69<br>75       | 74<br>69<br>69<br>77       | 72<br>69<br>69<br>77       | 75<br>69<br>70<br>79         | 74<br>69<br>70<br>78         | 73<br>69<br>71<br>76             | 72<br>68<br>71<br>76       | 73<br>69<br>72<br>78       | 72<br>70<br>72<br>77       | 72<br>70<br>72<br>77       | 72<br>70<br>73<br>7;       | 72<br>71<br>73<br>77             | 72<br>72<br>73<br>78             | 71<br>72<br>73<br>77             | 71<br>72<br>71<br>76       | 71<br>72<br>72<br>77       | 70<br>70<br>72<br>75       | 70<br>70<br>71.0<br>76.                   |
| Means   | 41.1                       | 80. 7                      | 80.4                       | 80, 2                      | 79, 9                      | 79, 8                            | 79, 9                      | 79. 8                      | 79. 9                      | 80, 1                      | 79. 9                        | 79, 8                        | 79. 8                            | 79.5                       | 79. 7                      | 79. 9                      | 80, 4                      | 80. 6                      | 80, 8                            | 80, 8                            | 80. 2                            | 79. 9                      | 80. 0                      | 79. 8                      | 80.                                       |
| 1883.<br>Iar. 1                                       | 75                         | 74                         | 75                         | 75                         | 74                         | 72                               | 71                         | 71                         | 70                         | 70                         | 70                           | 69                           | 69                               | 69                         | 69                         | 70                         | 71                         | 72                         | 72                               | 72                               | 72                               | 73                         | 73                         | 7.3                        | 71.                                       |
| lar. 2<br>lar. 3<br>lar. 4<br>lar. 5<br>lar. 6        | 73<br>74<br>74<br>76<br>77 | 72<br>72<br>74<br>76<br>76 | 72<br>73<br>74<br>75<br>76 | 72<br>74<br>74<br>75<br>77 | 72<br>73<br>74<br>74<br>74 | 71<br>72<br>74<br>75<br>74       | 71<br>72<br>75<br>75<br>72 | 71<br>72<br>75<br>76<br>72 | 71<br>71<br>74<br>77<br>77 | 71<br>71<br>73<br>77<br>74 | 70<br>71<br>73<br>78<br>73   | 71<br>71<br>73<br>79<br>72   | 71<br>71<br>74<br>80<br>72       | 72<br>71<br>74<br>81<br>72 | 72<br>72<br>74<br>80<br>72 | 72<br>73<br>74<br>79<br>74 | 72<br>73<br>74<br>79<br>75 | 72<br>73<br>74<br>79<br>75 | 73<br>73<br>75<br>79<br>75       | 73<br>78<br>78<br>79<br>75       | 74<br>73<br>74<br>74             | 73<br>73<br>75<br>74<br>74 | 73<br>75<br>77<br>75<br>73 | 75<br>76<br>76<br>77<br>74 | 72<br>72<br>74.                           |
| lar. 7<br>lar. 8<br>lar. 9<br>lar. 10<br>lar. 11      | 75<br>75<br>70<br>73<br>71 | 75<br>76<br>71<br>72<br>71 | 74<br>76<br>71<br>71<br>71 | 74<br>74<br>72<br>71<br>69 | 72<br>72<br>71<br>69<br>68 | 71<br>73<br>71<br>68<br>68       | 72<br>71<br>70<br>68<br>68 | 73<br>72<br>69<br>69       | 72<br>72<br>68<br>68<br>68 | 71<br>72<br>68<br>67<br>68 | 71<br>72<br>67<br>67<br>68   | 71<br>73<br>68<br>67<br>69   | 72<br>70<br>69<br>67<br>68       | 74<br>68<br>69<br>68<br>70 | 75<br>69<br>70<br>68<br>71 | 75<br>70<br>70<br>71<br>71 | 75<br>70<br>70<br>71<br>71 | 75<br>70<br>71<br>71<br>71 | 75<br>70<br>71<br>71<br>71       | 75<br>71<br>71<br>71<br>71<br>71 | 75<br>72<br>71<br>70<br>71       | 74<br>70<br>71<br>69<br>72 | 73<br>70<br>70<br>69<br>72 | 74<br>72<br>71<br>70<br>74 | 73.<br>71.<br>70.<br><b>69.</b><br>70     |
| lav. 12 .<br>Jar. 13<br>Jar. 14<br>Jar. 15<br>Jar. 16 | 75<br>76<br>74<br>73<br>76 | 75<br>74<br>74<br>71<br>76 | 73<br>74<br>74<br>71<br>73 | 75<br>76<br>72<br>72<br>75 | 74<br>72<br>71<br>71<br>74 | 74<br>72<br>71<br>71<br>71<br>75 | 74<br>72<br>71<br>70<br>45 | 74<br>73<br>71<br>70<br>76 | 75<br>74<br>69<br>70<br>76 | 74<br>74<br>68<br>70<br>76 | 74<br>73<br>70<br>70<br>76   | 74<br>73<br>71<br>70<br>76   | 75<br>71<br>71<br>71<br>71<br>76 | 74<br>72<br>74<br>71<br>77 | 75<br>72<br>74<br>67<br>77 | 76<br>73<br>73<br>68<br>77 | 76<br>73<br>74<br>70<br>78 | 76<br>73<br>74<br>72<br>77 | 76<br>73<br>74<br>72<br>77       | 76<br>73<br>75<br>72<br>77       | 76<br>70<br>74<br>73<br>77       | 75<br>70<br>76<br>73<br>77 | 74<br>69<br>76<br>74<br>77 | 74<br>71<br>73<br>75<br>77 | 71 - 72 - 72 - 72 - 71 - 76 - 76          |
| lar. 17<br>far. 18<br>far. 19<br>far. 20<br>far. 21   | 78<br>76<br>78<br>74<br>78 | 78<br>75<br>78<br>78<br>78 | 78<br>75<br>78<br>73<br>77 | 80<br>75<br>78<br>73<br>77 | 77<br>73<br>76<br>71<br>76 | 76<br>73<br>76<br>71<br>76       | 77<br>73<br>76<br>73<br>76 | 76<br>72<br>76<br>76<br>77 | 76<br>73<br>76<br>75<br>77 | 76<br>73<br>75<br>75<br>77 | . 76<br>75<br>75<br>76<br>77 | 76<br>74<br>75<br>75<br>77   | 75<br>74<br>75<br>75<br>75       | 75<br>74<br>76<br>76<br>77 | 75<br>74<br>76<br>76<br>77 | 76<br>75<br>76<br>76<br>77 | 75<br>76<br>76<br>77<br>77 | 75<br>76<br>77<br>77<br>79 | 75<br>76<br>77<br>77<br>77<br>79 | 75<br>77<br>77<br>77<br>77<br>79 | 75<br>77<br>77<br>77<br>77<br>79 | 75<br>76<br>76<br>77<br>79 | 75<br>77<br>76<br>77<br>79 | 76<br>77<br>75<br>78<br>79 | 76.<br>74.<br>76.<br>75.<br>77            |
| lar, 22<br>lar, 23<br>lar, 24<br>lar, 25<br>lar, 26   | 79<br>81<br>79<br>81<br>84 | 79<br>70<br>80<br>81       | 79<br>79<br>81<br>86<br>81 | 79<br>81<br>80<br>88<br>82 | 79<br>80<br>79<br>90<br>81 | 80<br>80<br>80<br>90<br>82       | 79<br>80<br>79<br>91<br>83 | 79<br>78<br>79<br>91<br>83 | 79<br>78<br>79<br>91<br>83 | 80<br>77<br>79<br>90<br>83 | 80<br>77<br>79<br>89<br>85   | 80<br>-77<br>79<br>90<br>85  | 78<br>78<br>78<br>90<br>86       | 80<br>78<br>78<br>90<br>86 | 80<br>78<br>78<br>90<br>87 | 81<br>78<br>78<br>89<br>87 | 81<br>80<br>77<br>89<br>91 | 81<br>78<br>77<br>89<br>91 | 81<br>78<br>.8<br>89<br>91       | 81<br>78<br>78<br>93             | 81<br>78<br>81<br>87<br>90       | 81<br>78<br>84<br>85<br>89 | 80<br>78<br>81<br>83<br>89 | 82<br>78<br>81<br>84<br>89 | 80<br>78.<br>79.<br>84.<br>85.            |
| tar. 27<br>Iar. 28<br>Iar. 29<br>Iar. 30              | 87<br>82<br>88<br>88<br>81 | 86<br>82<br>88<br>82<br>83 | 86<br>81<br>88<br>85<br>82 | 86<br>79<br>88<br>85<br>82 | 86<br>78<br>88<br>84<br>82 | 86<br>77<br>88<br>83<br>82       | 85<br>77<br>87<br>82<br>82 | 85<br>76<br>87<br>79<br>81 | 85<br>77<br>87<br>79<br>79 | 84<br>78<br>66<br>79<br>79 | 84<br>77<br>28<br>.9<br>81   | 84<br>1 79<br>87<br>78<br>81 | 85<br>80<br>87<br>82<br>83       | 85<br>80<br>87<br>81<br>84 | 89<br>89<br>89<br>82<br>84 | 88<br>81<br>89<br>82<br>84 | 87<br>81<br>89<br>83       | 86<br>81<br>88<br>81       | 86<br>88<br>80<br>79             | 85<br>82<br>80<br>81<br>78       | 84<br>83<br>88<br>81<br>77       | 83<br>84<br>85<br>81<br>80 | 83<br>85<br>88<br>81<br>79 | 82<br>87<br>90<br>81<br>79 | . 85.<br>80.<br>87.<br>81.<br>81.         |
| <b>1</b> 01.31  |                            |                            |                            |                            |                            |                                  |                            |                            |                            |                            |                              |                              |                                  |                            |                            |                            |                            |                            |                                  |                                  |                                  |                            |                            |                            |   |

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883.—Continued.

inued.

12 p.m. Daily means.

86. 4 89. 1 92. 9 93. 4 95.6 86. 1 86. 6 82. 7 89. 8

.0 79.8 80.1

74, 8 72, 6 72, 7 71, 1 76, 2 76, 1 74, 8 76, 3 75, 0 77, 5 77 75 78 79

80. 6 78. 5 79. 2 58.3 85. 8 78 81 84 89 3 82 85.3 8 87 80.3 8 90 87.8 1 81 81.6 70 81.1 8 77.4 76.5 85, 3 80, 3 87, 9 81, 6 81, 1 Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883—Continued.
[Height of the hygrometer above the surface of the ground, 4 feet. Washington mean time. Correction to reduce to mean local time, -5 hours

|   |                            |                            |                            |                            |                              |                              |                            |                            |                            |                            | 11                         | шши                        | ree. j                     |                            |                                  |                            |                            |                            |                            |                            |                                  |                            |                                  |                                  |   |
|---|----------------------------|----------------------------|----------------------------|----------------------------|------------------------------|------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------|----------------------------------|----------------------------------|---|
| Date.   | 1 a. m.                    | 2 a.m.                     | 3 a.m.                     | 4 a.m.                     | . a. m.                      | 6 а. п.                      | 7 a.m.                     | 8 a. m.                    | 9 a. m.                    | 10 a. m.                   | 11 a. m.                   | 12 ш.                      | f p. m.                    | 2 p.m.                     | 3 p. m.                          | 4 p.m.                     | 5 p.m.                     | 6 p. m.                    | 7 p. m.                    | 8 p.m.                     | 9 p. m.                          | 10 р. ш.                   | Пр. ш.                           | 12 p. m.                         | Daily<br>means.                           |
| 1883.<br>June 1<br>June 2<br>June 3<br>June 4       | 88<br>89<br>86<br>89       | 90<br>89<br>88<br>90       | 90<br>89<br>90<br>89       | 86<br>90                   | 91<br>88<br>88<br>90         | 91<br>86<br>87<br>90         | 92<br>86<br>85<br>92       | 92<br>86<br>87<br>92       | 93<br>86<br>86<br>92       | 90<br>87<br>85<br>91       | 91<br>87<br>87<br>92       | 89<br>87<br>82<br>90       | 79                         | 87<br>86<br>80<br>86       | 86<br>86<br>81<br>86             | 86<br>84<br>81<br>62       | 85<br>81<br>81<br>83       | 84<br>78<br>83<br>80       | 82<br>80<br>84<br>80       | 80<br>78<br>86<br>78       | 83<br>80<br>84<br>78             | 84<br>77<br>86<br>79       | 84<br>78<br>86<br>81             | 85<br>89<br>84<br>80             | 87, 5<br>84, 0<br>84, 8<br>86, 2          |
| June 5 June 6 June 7 June 8 June 9                  | 85<br>91<br>79<br>96<br>90 | 83<br>91<br>78<br>96<br>92 | 87<br>92<br>78<br>97<br>93 | 88<br>89<br>82<br>97<br>92 | 87<br>83<br>95<br>91         | 89<br>80<br>81<br>95<br>91   | 90<br>79<br>84<br>93<br>92 | 94<br>79<br>92<br>93<br>93 | 92<br>81<br>93<br>98<br>92 | 91<br>80<br>94<br>90<br>90 | 91<br>79<br>93<br>90<br>90 | 89<br>82<br>92<br>88<br>89 | 88<br>81<br>90<br>86<br>87 | 86<br>82<br>89<br>85<br>85 | 85<br>83<br>87<br>84<br>84<br>84 | 80<br>84<br>88<br>85<br>84 | 78<br>83<br>88<br>84<br>83 | 81<br>83<br>88<br>84<br>82 | 80<br>85<br>88<br>85<br>78 | 89<br>89<br>85<br>78       | 80<br>85<br>90<br>85<br>80       | 83<br>91<br>86<br>80       | 86<br>81<br>93<br>86<br>81       |                                  | 85.9<br>54.3<br>87.7<br>89.4<br>86.5      |
| June 10<br>June 11<br>June 12<br>June 13<br>June 14 | 81<br>79<br>93<br>94<br>94 | 80<br>84<br>95<br>94<br>93 | 81<br>86<br>97<br>94<br>96 | 82<br>88<br>96<br>96       | 82<br>89<br>95<br>94<br>94   | 83<br>90<br>95<br>95<br>95   | 86<br>91<br>95<br>95<br>95 | 87<br>91<br>94<br>95<br>94 | 86<br>87<br>93<br>95<br>94 | 86<br>82<br>94<br>94<br>94 | 86<br>82<br>93<br>90<br>93 | 84<br>88<br>93<br>88<br>91 | 84<br>87<br>94<br>84<br>91 | 80<br>86<br>91<br>83<br>90 | 82<br>85<br>88<br>83<br>89       | 79<br>85<br>86<br>80<br>85 | 78<br>85<br>86<br>82<br>85 | 80<br>86<br>83<br>82<br>86 | 83<br>86<br>83<br>86<br>86 | 78<br>90<br>80<br>86<br>86 | 80<br>87<br>85<br>90<br>87       | 78<br>89<br>86<br>92<br>87 | 79<br>92<br>85<br>94<br>88       | 79<br>94<br>90<br>93<br>89       | \$1.8<br>87.0<br>90.5<br>89.9<br>90.7     |
| June 15<br>June 16<br>June 17<br>June 18<br>June 19 | 94<br>95<br>80<br>91       | 90<br>91<br>91             | 94<br>92<br>93<br>90<br>91 | 95<br>93<br>94<br>96<br>91 | 93<br>90<br>90<br>96<br>90   | 92<br>90<br>91<br>97<br>90   | 92<br>91<br>92<br>96<br>91 | 99<br>89<br>99<br>95<br>92 | 89<br>87<br>91<br>95<br>92 | 88<br>89<br>91<br>93<br>92 | 87<br>91<br>90<br>90<br>92 | 90<br>84<br>89<br>89<br>92 | 91<br>85<br>86<br>88<br>90 | 88<br>84<br>84<br>86<br>88 | 89<br>80<br>82<br>85<br>86       | 86<br>76<br>80<br>82<br>85 | 85<br>82<br>76<br>84<br>85 | 86<br>86<br>77<br>78<br>83 | 87<br>85<br>80<br>79<br>83 | 86<br>86<br>78<br>79<br>85 | 89<br>86<br>82<br>82<br>86       | 91<br>87<br>82<br>83<br>87 | 91<br>91<br>83<br>85<br>89       | 92<br>94<br>79<br>87<br>93       | 89, 6<br>87, 7<br>86, 0<br>87, 2<br>88, 9 |
| June 20<br>June 21<br>June 22<br>June 23<br>June 24 | 95<br>82<br>93<br>89<br>87 | 94<br>91<br>92<br>92<br>84 | 95<br>94<br>94<br>95<br>87 | 95<br>96<br>95<br>95       | 94<br>96<br>94<br>95<br>89   | 94<br>95<br>92<br>96<br>90   | 92<br>93<br>92<br>95       | 92<br>92<br>90<br>93<br>89 | 87<br>93<br>89<br>91<br>90 | 86<br>92<br>88<br>90<br>89 | 88<br>88<br>89<br>89       | 88<br>89<br>87<br>90<br>87 | 88<br>87<br>88<br>92<br>86 | 86<br>88<br>83<br>93<br>87 | 83<br>87<br>82<br>94<br>85       | 83<br>86<br>82<br>94<br>85 | 79<br>87<br>83<br>96<br>85 | 78<br>87<br>82<br>90<br>85 | 81<br>86<br>80<br>88<br>86 | 74<br>89<br>78<br>90<br>81 | 83<br>89<br>80<br>88<br>84       | 85<br>90<br>84<br>88<br>83 | 84 .<br>91<br>86<br>86<br>83     | 78<br>94<br>87<br>88<br>88<br>83 | 86, 7<br>90, 2<br>86, 8<br>91, 5<br>86, 5 |
| June 25<br>June 26<br>June 27<br>June 28<br>June 29 | 83<br>86<br>97<br>91<br>82 | 84<br>86<br>96<br>92<br>80 | 86<br>87<br>97<br>91<br>84 | 86<br>88<br>97<br>92<br>87 | 87<br>87<br>96<br>92<br>90   | 88<br>96<br>92<br>90         | 89<br>89<br>95<br>91       | 90<br>88<br>96<br>91<br>92 | 89<br>87<br>96<br>92<br>93 | 87<br>91<br>95<br>88<br>92 | 92<br>95<br>95<br>88<br>91 | 86<br>93<br>93<br>88<br>90 | 85<br>92<br>94<br>89<br>89 | 87<br>89<br>94<br>88<br>88 | 88<br>87<br>93<br>81<br>81       | 89<br>86<br>92<br>82<br>86 | 89<br>86<br>94<br>84<br>86 | 87<br>85<br>92<br>89<br>78 | 86<br>86<br>90<br>90<br>86 | 84<br>88<br>95<br>91<br>82 | 85<br>89<br>90<br>89<br>82       | 85<br>89<br>91<br>87<br>82 | 84<br>95<br>91<br>82<br>82       |                                  | 86.5<br>88.7<br>91.0<br>88.1<br>86.4      |
| June 30<br>Means                                    | 93                         | 94                         | 93<br>90. 7                | 91.4                       | 90. 7                        | 90. 6                        | 91 90. 8                   | 90, 9                      | 90, 5                      | 89, 6                      | 89. 4                      | 90<br>88 5                 | 87. 7                      | 87<br>85. 8                | 86<br>85. 4                      | 85<br>84. 2                | 82<br>84. 1                | 85<br>83.6                 | 83<br>84. 0                | 85<br>83. 7                | 83 84. 7                         | 86<br>85, 3                | 81<br>85, 9                      | 83<br>86, 5                      | 87. 7<br>87. 5                            |
| July 1<br>July 2<br>July 3<br>July 4                | 83<br>93<br>94<br>93       | 86<br>92<br>95<br>95       | 84<br>94<br>96<br>95       | 85<br>96<br>96<br>94       | 86<br>94<br>95<br>91         | * 89<br>94<br>95<br>91       | 89<br>94<br>95<br>92       | 89<br>95<br>95<br>92       | 89<br>94<br>95<br>92       | 88<br>95<br>95<br>92       | 86<br>95<br>96<br>92       | 84<br>96<br>96<br>93       | 84<br>95<br>96<br>92       | 86<br>96<br>92<br>93       | 90<br>95<br>98<br>88             | 88<br>94<br>91<br>88       | 91<br>94<br>94<br>90       | 91<br>94<br>93<br>93       | 91<br>94<br>88<br>90       | 94<br>94<br>85<br>85       | 9.3<br>94<br>89<br>87            | 92<br>93<br>89<br>85       | 92<br>93<br>90<br>88             | 93<br>93                         | 88. 2<br>91.2<br>93. 0<br>90. 9           |
| July 5<br>July 6<br>July 7<br>July 8<br>July 9      | 91<br>92<br>85<br>91<br>80 | 91<br>93<br>89<br>93<br>78 | 91<br>93<br>91<br>92<br>85 | 94<br>94<br>93<br>87<br>80 | 92<br>95<br>92<br>88<br>88   | 93<br>96<br>93<br>90<br>81   | 93<br>96<br>93<br>93<br>89 | 94<br>95<br>94<br>94<br>78 | 93<br>95<br>94<br>94<br>76 | 93<br>94<br>93<br>92<br>76 | 93<br>94<br>93<br>92<br>83 | 90<br>95<br>92<br>90<br>83 | 88<br>95<br>89<br>92<br>85 | 89<br>95<br>86<br>87<br>88 | 87<br>84<br>87<br>85<br>89       | 88<br>93<br>80<br>82<br>91 | 89<br>94<br>79<br>82<br>91 | 87<br>94<br>79<br>83<br>90 | 87<br>91<br>77<br>83<br>90 | 88<br>91<br>77<br>81<br>90 | 88<br>77<br>80<br>87             | 87<br>88<br>81<br>81<br>87 | 87 · 88 · 85 · 82 · 92           |                                  | 90. 1<br>92. 9<br>87. 0<br>87. 3<br>85. 2 |
| July 10<br>July 11<br>July 12<br>July 13<br>July 14 | 98<br>82<br>90<br>91<br>90 | 95<br>81<br>95<br>92<br>89 | 96<br>82<br>93<br>95<br>89 | 97<br>87<br>94<br>94<br>89 | 96<br>87<br>93<br>94<br>89   | 97<br>85<br>95<br>94<br>90   | 96<br>84<br>95<br>96<br>84 | 95<br>82<br>96<br>94<br>81 | 95<br>81<br>95<br>34<br>86 | 95<br>79<br>95<br>94<br>87 | 94<br>79<br>95<br>94<br>87 | 90<br>80<br>95<br>94<br>86 | 90<br>84<br>95<br>94<br>88 | 90<br>84<br>95<br>92<br>89 | 90<br>85<br>94<br>94<br>84       | 89<br>83<br>91<br>94<br>84 | 88<br>84<br>92<br>94<br>83 | 85<br>83<br>91<br>92<br>82 | 84<br>83<br>90<br>93<br>81 | 84<br>83<br>91<br>94<br>84 | 81<br>84<br>87<br>88<br>88<br>83 | 79<br>84<br>87<br>87<br>84 | 82<br>84<br>89<br>88<br>84       | 82<br>86<br>89<br>84<br>86       | 90, 3<br>83, 1<br>92, 5<br>92, 5<br>85, 7 |
| July 15<br>July 16<br>July 17<br>July 18<br>July 19 | 88<br>93<br>93<br>84<br>74 | 85<br>94<br>94<br>81<br>79 | 85<br>94<br>94<br>85<br>74 | 92<br>93<br>84<br>76       | 89<br>94<br>93<br>85<br>82   | . 89<br>94<br>92<br>83<br>82 | 90<br>95<br>92<br>83<br>85 | 91<br>95<br>91<br>82<br>86 | 90<br>94<br>86<br>78<br>87 | 90<br>95<br>87<br>78<br>87 | 93<br>94<br>89<br>78<br>85 | 87<br>94<br>86<br>80<br>82 | 85<br>94<br>85<br>80<br>86 | 87<br>92<br>85<br>82<br>84 | 87<br>90<br>84<br>81<br>82       | 85<br>91<br>81<br>83<br>80 | 86<br>89<br>83<br>80<br>80 | 85<br>86<br>86<br>80<br>94 | 84<br>88<br>88<br>82<br>92 | 82<br>84<br>85<br>81<br>92 | 85<br>84<br>84<br>79<br>92       | 87<br>83<br>84<br>79<br>90 | 89<br>84<br>84<br>76<br>87       |                                  | 87, 2<br>90, 8<br>87, 6<br>80, 8<br>84, 3 |
| July 20<br>July 21<br>July 22<br>July 23<br>July 24 | 90<br>94<br>88<br>94<br>94 | 93<br>95<br>91<br>91<br>92 | 95<br>96<br>91<br>88<br>91 | 94<br>96<br>92<br>94<br>91 | 94<br>95<br>92<br>95<br>90   | 94<br>95<br>93<br>94<br>90   | 94<br>96<br>94<br>94<br>93 | 94<br>96<br>94<br>94<br>94 | 94<br>95<br>94<br>92<br>94 | 93<br>94<br>94<br>85<br>94 | 93<br>93<br>94<br>84<br>94 | 94<br>92<br>94<br>86<br>94 | 92<br>89<br>92<br>86<br>94 | 92<br>88<br>99<br>87<br>85 | 92<br>85<br>90<br>85<br>83       | 91<br>84<br>90<br>84<br>84 | 92<br>87<br>89<br>85<br>81 | 92<br>88<br>66<br>84<br>82 | 90<br>80<br>88<br>86<br>82 | 85<br>82<br>84<br>84<br>79 | 86<br>86<br>85<br>78             | 89<br>88<br>89<br>77       | 90<br>87<br>≥9<br>89<br>73       | 92<br>91<br>89<br>93<br>76       | 91, 8<br>90, 6<br>90, 5<br>88, 6<br>87, 0 |
| July 25<br>July 26<br>July 27<br>July 28<br>July 29 | 80<br>82<br>80<br>82<br>96 | 80<br>91<br>80<br>85<br>96 | 82<br>96<br>83<br>85<br>93 | 82<br>96<br>86<br>85<br>96 | 81<br>95<br>88<br>84<br>- 94 | 83<br>94<br>89<br>88<br>94   | 82<br>94<br>89<br>89<br>95 | 82<br>93<br>86<br>90<br>94 | 80<br>91<br>80<br>89<br>92 | 79<br>90<br>77<br>82<br>88 | 78<br>90<br>75<br>76<br>87 | 82<br>85<br>74<br>77<br>90 | 83<br>84<br>72<br>77<br>89 | 80<br>82<br>73<br>76<br>86 | 70<br>83<br>74<br>73<br>85       | 82<br>82<br>72<br>70<br>85 | 82<br>72<br>70<br>86       | 82<br>80<br>75<br>80<br>86 | 82<br>84<br>74<br>76<br>84 | 84<br>81<br>73<br>80<br>84 | 84<br>79<br>72<br>86<br>86       | 82<br>72<br>72<br>91<br>86 | 83 1<br>74 -<br>74<br>92 -<br>88 | 86<br>78<br>77<br>95<br>88       | 81, 2<br>85, 6<br>77, 7<br>82, 4<br>89, 5 |
| July 30<br>July 31<br>Means                         | 89<br>79<br>88, 2          | 88<br>82<br>89. 0          | 88<br>84<br>89, 6          | 91<br>86<br>90, 3          | 91<br>90<br>90. 8            | 92<br>91<br>90. 9            | 93<br>91<br>91.5           | 93<br>91<br>60, 9          | 92<br>91<br>90. 1          | 92<br>91<br>89. 1          | 93<br>88<br>88, 8          | 92<br>87<br>88, 3          | 91<br>86<br>88. 1          | 90<br>83<br>87. 2          | 90<br>81<br>86, 0                | 88<br>77<br>85. 3          | 88<br>78<br>85. 7          | 84<br>77<br>85, 9          | 82<br>80<br>85, 2          | 76<br>82                   | 76<br>80                         | 76<br>83<br>84, 5          | 76<br>85<br>85, 3                | 77<br>87<br>86. 0                | 87. 0<br>84. 5<br>87. 7                   |

Table showing the moisture of the air at Uglaamie from October, 1881, to August, 1883-Continued. [Height of the hygrometer above the surface of the ground, 4 feet. Washington mean time. Correction to reduce to mean local time. -5 hours 17 minutes.]

|  |   |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            | -                          | -                          | -                          |                            |                            |                            |                            |                            |   |
|--|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---|
| Date.  | 69<br>El El                                     | 4 a. us.                   | 3 a.m.                     | 6 a.m.                     | 1 B. III.                  | % a. no.                   | 9 a. m.                    | 10 a.m.                    | 11 a.m.                    | 12 m.                      | I p. m.                    | 2 p.m.                     | 3 p.m.                     | 4 p.m.                     | 5 p.m.                     | 6 p.m                      | 7 p.m.                     | n d                        | 9 p.m.                     | 10 p. m.                   | 11 p. m                    | P4                         | Daily<br>means.                           |
| Aug. 2 91 9  | 8   88<br>2   92<br>6   94                      | 89<br>94<br>94             | 90<br>94<br>95             | 92<br>95<br>94             | 93<br>95<br>94             | 95<br>96<br>94             | 95<br>95<br>93             | 95<br>95<br>94             | 94<br>94<br>95             | 95<br>94<br>95             | 95<br>90<br>91             | 90<br>86<br>90             | 88<br>84<br>88             | 88<br>83<br>86             | 88<br>82<br>85             | 87<br>84<br>82             | 88<br>82<br>84             | 83<br>81<br>86             | 85<br>86<br>86             | 85<br>86<br>86             | 88<br>88<br>90             | 91<br>90<br>90             | 89. 9<br>89. 5<br>90. 6                   |
| Aug. 5 90 9<br>Aug. 6 89 9<br>Aug. 7 92 9                                    | 5 95<br>1 91<br>1 90<br>2 92<br>1 89            | 96<br>93<br>91<br>93<br>93 | 95<br>94<br>92<br>94<br>98 | 96<br>94<br>94<br>93<br>92 | 95<br>94<br>94<br>93<br>92 | 95<br>95<br>94<br>95<br>93 | 95<br>95<br>94<br>94<br>94 | 94<br>95<br>93<br>94<br>94 | 94<br>94<br>93<br>93<br>94 | 94<br>94<br>93<br>91<br>94 | 94<br>94<br>93<br>89<br>94 | 91<br>93<br>93<br>88<br>93 | 90<br>95<br>93<br>90<br>93 | 90<br>93<br>93<br>80<br>93 | 87<br>93<br>93<br>85<br>93 | 93<br>92<br>84<br>93       | 87<br>90<br>92<br>80<br>93 | 85<br>91<br>94<br>80<br>92 | 88<br>85<br>92<br>81<br>92 | 88<br>87<br>90<br>83<br>88 | 88<br>91<br>86<br>82       | 89<br>89<br>92<br>87<br>82 | 91. 6<br>92. 1<br>92. 3<br>88. 6<br>91. 5 |
| Aug. 9 85 8<br>Aug. 10 86 8<br>Aug. 11 95 8<br>Aug. 12 94 8                  | 9 90<br>9 91<br>5 94<br>2 92<br>3 95            | 95<br>91<br>95<br>93<br>95 | 95<br>91<br>95<br>93<br>95 | 94<br>92<br>95<br>92<br>94 | 93<br>92<br>96<br>92<br>95 | 92<br>91<br>94<br>93<br>94 | 92<br>88<br>94<br>93<br>94 | 89<br>90<br>94<br>93<br>94 | 87<br>85<br>94<br>93<br>94 | 84<br>83<br>93<br>93<br>93 | 77<br>83<br>95<br>93<br>92 | 68<br>86<br>95<br>90       | 67<br>86<br>94<br>90       | 72<br>87<br>93<br>82<br>91 | 75<br>92<br>87<br>83<br>90 | 72<br>98<br>82<br>89       | 74<br>93<br>88<br>93<br>90 | 80<br>92<br>88<br>94<br>91 | 79<br>91<br>85<br>89<br>91 | 80<br>96<br>91<br>91       | 81<br>95<br>84<br>94<br>91 | 84<br>95<br>88<br>93<br>90 | 83. 0<br>89. 9<br>91. 8<br>91. 4<br>92. 3 |
| Aug. 14   89   8<br>Aug. 15   88   8<br>Aug. 16   90   8<br>Aug. 17   95   8 | 2 91<br>7 91<br>1 90<br>5 94<br>9 91            | 92<br>94<br>91<br>94<br>91 | 92<br>93<br>91<br>94<br>91 | 91<br>92<br>91<br>94<br>92 | 93<br>92<br>92<br>94<br>92 | 94<br>92<br>91<br>94<br>92 | 94<br>92<br>91<br>94<br>92 | 94<br>92<br>91<br>93<br>92 | 94<br>96<br>91<br>90<br>92 | 93<br>95<br>92<br>90<br>92 | 91<br>97<br>92<br>90<br>91 | 90<br>95<br>92<br>88<br>91 | 87<br>94<br>92<br>89       | 90<br>94<br>92<br>88<br>92 | 92<br>80<br>93<br>85<br>92 | 87<br>80<br>94<br>80<br>92 | 88<br>89<br>94<br>80<br>91 | 86<br>89<br>94<br>78<br>91 | 87<br>88<br>95<br>75       | 87<br>88<br>95<br>70       | 88<br>88<br>95<br>72<br>88 | 89<br>89<br>94<br>81       | 90. 4<br>91. 3<br>92. 2<br>87. 7<br>90. 6 |
| Aug. 19 90 89 Aug. 21 94 Aug. 22 93 6  | 89<br>80 89<br>80 90<br>84 94<br>83 94<br>91 91 | 89<br>90<br>94<br>93<br>92 | 89<br>90<br>94<br>93<br>92 | 89<br>91<br>94<br>94       | 89<br>91<br>94<br>94<br>93 | 89<br>92<br>94<br>23<br>92 | 89<br>92<br>94<br>94<br>90 | 89<br>91<br>94<br>94<br>90 | 89<br>91<br>94<br>94<br>20 | 89<br>92<br>94<br>94<br>91 | 86<br>92<br>94<br>94<br>94 | 88<br>90<br>94<br>89       | 8×<br>90<br>94<br>90       | 88<br>91<br>94<br>89       | 88<br>91<br>94<br>89       | 87<br>93<br>94<br>89       | 88<br>94<br>94<br>88<br>91 | 88<br>94<br>94<br>88<br>91 | 86<br>94<br>93<br>88<br>92 | 85<br>94<br>93<br>88<br>92 | 88<br>94<br>93<br>86<br>92 | 87<br>94<br>92<br>90<br>93 | 88. 2<br>91. 6<br>93.7<br>91. 3<br>91. 2  |
| Aug. 24 94 6<br>Aug. 25   80 8<br>Aug. 26   92 6                             | 16 95<br>12 79<br>12 93<br>16 88                | 96<br>79<br>94<br>84       | 95<br>78<br>93<br>88       | 95<br>77<br>94<br>89       | 95<br>79<br>94<br>89       | 95<br>81<br>89             | 95<br>81<br>94<br>89       | 34<br>82<br>94<br>90       | 94<br>81<br>94<br>86       | 94<br>83<br>94<br>90       | 94<br>83<br>93<br>90       | 94<br>82<br>93<br>93       | 94<br>81<br>92<br>94       | 94<br>79<br>92<br>94       | 94<br>79<br>91<br>94       | 94<br>79<br>87<br>94       | 89<br>78<br>86<br>92       | 84<br>80<br>85<br>91       | 86<br>80<br>85<br>91       | 85<br>83<br>83<br>98       | 83<br>88<br>83<br>93       | 83<br>90<br>86<br>93       | 92. 1<br>81.0<br>90. 7<br>90. 2           |
| Means. 90. 0 91.   | 1 91. 2   | 92. 0                      | 92. 1                      | 92, 2                      | 92. 5                      | 92.7                       | 92. 4                      | 92. 3                      | 91.8                       | 91. 8                      | 91. 0                      | 89. 9                      | 89. 4                      | 88. 8                      | 88. 7                      | 88. 0                      | 88. 0                      | 87. 7                      | 87.4                       | 87.7                       | 88. 1                      | 88. 8                      | 90. 2                                     |

<sup>\*</sup>Station abandoned August 27, 1883.

inned. -5 hours

12 p. m. Daily means.

91 88.2 93 91.2 1 93 93.9 90 90.9 1 90 90.1 88 92.9 89 87.0 82 87.3 95 85.2

Statement showing the direction and velocity of the wind at Uglaumie from October, 1881, to August, 1883,

| !                  | i a. m.                      |                     | 2 a. n                         | n.                        | 3 a. n                          | 3.                         | 4 a. n                          | 1.                         | 5 a. n                           | 1.                         | 6 а. п                             | 1.                         | 7 a. m                           | lı                         | 8 a. m.                                      |                | 9 a. ı                                      | n.                         | 10 a                             | . m.                       | - 11                    | u.                             | 12 m                                |
|--------------------|------------------------------|---------------------|--------------------------------|---------------------------|---------------------------------|----------------------------|---------------------------------|----------------------------|----------------------------------|----------------------------|------------------------------------|----------------------------|----------------------------------|----------------------------|--|----------------|---|----------------------------|----------------------------------|----------------------------|-------------------------|--------------------------------|-------------------------------------|
| ate.               | Direction and velocity       |                     | Direct<br>and<br>veloci        |                           | Direct<br>and<br>veloci         |                            | Direct<br>and<br>veloci         |                            | Direc.<br>and<br>veloci          |                            | Directi<br>and<br>velocit          |                            | Directi<br>and<br>velocit        |                            | Direction and velocity                       |                | Direct<br>and<br>veloci                     |                            |                                  | stion<br>id<br>oity.       | a                       | etion<br>nd<br>ocity.          | Direction and velocity              |
| . 19               | ESE.                         | 86<br>18<br>8<br>14 | S.<br>W.<br>E.<br>E.           | 30<br>19<br>6<br>15       | S.<br>W.<br>E.<br>NE.<br>N.     | 30<br>20<br>4<br>15        | 8.<br>W.<br>E.<br>SE.           | 30<br>22<br>2<br>13        | SW.<br>W.<br>E.<br>S.<br>NNE.    | 28<br>20<br>4<br>13        | S.<br>W.<br>E.<br>S.<br>NNE.       | 28<br>21<br>4<br>13        | SSW.<br>WNW.<br>SE.<br>S.<br>NE. | 24<br>22<br>6<br>18        | SE.<br>SW.                                   | 7              | SSW.<br>W.<br>SE.<br>NW.<br>NNE.            | 17<br>20<br>12<br>18       | SSW.<br>NW.<br>SE.<br>NW.<br>NNE | 8<br>26<br>18<br>16        | SSW<br>NW.<br>SE.<br>N. | 6<br>24<br>20                  | N.                                  |
| 26                 | N.<br>N.<br>N.               | 20<br>25<br>44<br>8 | NNE.<br>N.<br>N<br>N.<br>N.    | 24<br>24<br>44<br>10<br>8 | NNE.<br>N.<br>N.<br>N.<br>NNE.  | 20<br>24<br>44<br>12<br>8  | NNE.<br>NNE.<br>NNE.<br>NE.     | 24<br>24<br>36<br>13<br>8  | NNE.<br>NNE.<br>NNE.<br>ENE.     | 20<br>10<br>32<br>15<br>8  | NNE.<br>NNE.<br>NNE.<br>NNE.<br>E. | 20<br>12<br>32<br>14<br>9  | NE<br>N.<br>N.<br>N.<br>SE.      | 24<br>13<br>32<br>20<br>10 | NNE.<br>N.<br>N.                             | 17<br>32<br>16 | NE.<br>NNE.<br>N.<br>N.<br>SE.              | 22<br>16<br>32<br>19<br>12 | NE.<br>N.<br>N.<br>N.<br>SE.     | 22<br>18<br>29<br>16<br>14 | NE.<br>N.<br>N.<br>SE.  | 20<br>30<br>24<br>12<br>10     |                                     |
| 1                  | NE.<br>ESE.<br>E.<br>ESE.    |                     | NE.<br>ENE.<br>E.              | 19<br>5<br>8<br>5         | NE.<br>NNE.<br>E.               | 20<br>3<br>8<br>8          | NE.<br>NNE.<br>SE.<br>E.        | 20<br>1<br>8<br>8          | NE.<br>NNE.<br>SE.<br>E.         | 24<br>1<br>9<br>6          | NNE<br>E.<br>SE.<br>SE.            | 20<br>2<br>9<br>6          | NNE.<br>E.<br>SE.<br>E.          | 21<br>2<br>12<br>7         | E.<br>SE.                                    | 6              | NNE.<br>E.<br>SE.<br>E.                     | 24<br>3<br>8<br>11         | NNE<br>Calm.<br>SE.<br>E.        | 24<br>3<br>8               | N.<br>E.<br>SE.<br>E.   | 24<br>2<br>4<br>10             | SE.                                 |
| cans.              | 16, 23                       |                     | 16. 6                          | 9                         | 16. 6                           |                            | 16. 0                           | 7                          | 14. 6                            |                            | 14. 61                             | l<br>                      | 16, 2                            | 3                          | 16. 46                                       |                | 16. 4                                       | 6                          | 15                               | . 53                       | 1                       | 5. 53                          | 15. 40                              |
|                    | 1 p. m.                      |                     | 2 p. r                         | n.                        | 3 p. n                          | 1.                         | 4 p. u                          | n.                         | 5 p. n                           | 1.                         | 6 р. п                             | 1.                         | 7 p. m.                          | .                          | 8 p. m.                                      | 1              | p. m.                                       | 1 11                       | 0 p. m.                          | 11 1                       | o. m.                   | 12 p.                          |                                     |
| ate.               | Direction<br>and<br>velocity |                     | Direct<br>and<br>veloci        |                           | Direct<br>and<br>veloci         |                            | Directi<br>and<br>veloci        |                            | Direct:<br>and<br>veloci         |                            | Directi<br>and<br>velocit          |                            | Direction and velocity           |                            | Direction<br>and<br>velocity.                |                | irection<br>and<br>elocity.                 | į                          | rection<br>and<br>locity.        |                            | ction<br>ud<br>city     | Direct<br>and<br>veloci        | 1001                                |
| 19<br>20<br>21     | NE.<br>SE. 2<br>N. 2         | 8 :                 | SW.<br>E.<br>SE:<br>N.         | 28<br>8<br>28<br>16<br>18 | SW.<br>E.<br>SE.<br>NNW.<br>NE  | 28<br>14<br>25<br>18<br>20 | SW.<br>E.<br>SE.<br>NNW.<br>NE. | 30<br>12<br>20<br>16<br>20 | SW.<br>E.<br>SE<br>NW.<br>NE.    | 32<br>15<br>20<br>14<br>22 | SW.<br>E.<br>SE<br>NW.<br>NE.      | 20<br>18<br>20<br>16<br>20 | SE.<br>NW.                       | 28<br>12<br>20<br>16<br>20 | SW. 36<br>E. 12<br>SE. 20<br>N. 16<br>NE. 21 | E.             | E. 18                                       | E.<br>SI                   | 16<br>L 16<br>NW. 16             | SE.                        | W. 12                   | SW<br>ESE.<br>ESE.<br>N.<br>NE | 40 1<br>20 1<br>8 3<br>13 1<br>21 1 |
| 24  <br>25  <br>26 | NNE. 2<br>N. 2<br>N. 1       | 0<br>4<br>6         | NE.<br>NNE.<br>N.<br>N.<br>SE. | 20<br>19<br>24<br>16<br>8 | NNE.<br>NE.<br>N.<br>N.<br>SSE. | 20<br>36<br>22<br>20<br>5  | NNE.<br>NE.<br>N.<br>Calm.      | 28<br>34<br>16<br>16       | NNE.<br>NE.<br>N.<br>NNW.<br>SE. | 24<br>36<br>17<br>18<br>4  | NNE.<br>NE<br>N.<br>NNW.<br>SE     | 26<br>40<br>16<br>18       | NE.<br>N.                        | 27<br>36<br>12<br>20<br>3  | NNE. 27<br>NE. 32<br>N. 10<br>NW. 16<br>E. 8 | N<br>N<br>N    | NE. 24<br>NE. 36<br>. 10<br>W. 16<br>NE. 10 | N<br>N                     | NE. 41<br>W. 14<br>NE. 10        | N.<br>NW                   | E. 40<br>11             | NNE.<br>NNE.<br>NNE.<br>NW.    | 24 4<br>44 2<br>12 1<br>13 1        |
| 29<br>30           | E.<br>SE.                    | 3                   | N.<br>E.<br>SE.<br>E.          | 24<br>8<br>2<br>16        | N.<br>ENE.<br>Calm.<br>E.       | 26<br>3<br>18              | N.<br>ENE.<br>SSE.<br>E.        | 25<br>4<br>4<br>22         | N.<br>ENE.<br>SE.<br>E.          | 25<br>6<br>10<br>22        | NE.<br>ENE.<br>E.                  | 12<br>4<br>5               | NNE.<br>E.                       | 15<br>4<br>14<br>26        | E. 16<br>NNE. 6<br>E. 8<br>E 28              | E.             | NE. 6                                       | E.                         | 8<br>8<br>3<br>28                | ESE                        |                         | SE<br>E<br>E                   | 4<br>7<br>8<br>26                   |

<sup>\*</sup> Record incomplete for October, 18.

testement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883—Continued.

gust, 1883. y given in miles per hour. 11 a. m

SSW. NW. SE. N. NNE. NE. N. SE. N. SE. E. SE. 20 30 24 12 10 NE. N N N SE

p. m

12 m

Direction Direction and velocity velocity

88W. 6 NW. 24 SE. 20 N. 16 NNE

24 N. 2 E 4 SE 19 E.

rection Direction locity velocity.

16. 92 16. 67

15 53

| Sta   | tement                             | she                        | owing                                | the                              | direct                              | ion                        | and ve                              | loc                        | ity of                              | the                        | wind c                             | at t                       | glaan<br>weetten                   | 11e )   | rom (                              | Deto                       | local tit                                     | 181,<br>110                | το ⊿:<br>.55.17:               |                                   |                               |                                    |                                     | itinuc                            |   |
|---|------------------------------------|----------------------------|--------------------------------------|----------------------------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|------------------------------------|----------------------------|------------------------------------|---|------------------------------------|----------------------------|---|----------------------------|--------------------------------|-----------------------------------|-------------------------------|------------------------------------|-------------------------------------|-----------------------------------|---|
| Hoight  | of anenu                           |                            | 2 a. n                               |                                  | ace or gr                           |                            | 4 a. m                              |                            | äaningii<br>Sa. n                   |                            | 6 a. m                             | 1                          | •7 a. n                            |   | 8 a. i                             |                            | local tir                                     |                            |                                | ) a. r                            |                               |                                    | . m.                                | 12 n                              |   |
| Date.   | Direct<br>and<br>velocit           | ion ;                      | Directi<br>and<br>velocit            |                                  | Direct<br>and<br>velocit            |                            | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit          |                            | Direct<br>and<br>veloci            |   | Direct<br>and<br>veloc             | 1                          | Direct<br>and<br>veloci                       | 1                          |                                | recti<br>and<br>docif             |                               | Dire<br>ar<br>velo                 |                                     | Direct<br>and<br>veloci           | 1   |
| 1881.<br>Jov. 1                                     | Е                                  | 25                         | Е                                    | 26                               | E.                                  | 24                         | E.                                  | 24                         | E.                                  | 22                         | E.                                 | 20                         | E.                                 | 18  | E.                                 | 20                         |   | 20                         | E.                             |                                   | 20                            | E.                                 | 20                                  | E.                                | 10  |
| ov. 2<br>ov. 3<br>ov. 4<br>ov. 5                    | ENE.<br>NE.<br>ENE.<br>NE.<br>NE   | 19<br>32<br>24<br>14<br>28 | ENE.<br>LNE.<br>LNE.<br>ENE.<br>ENE. | 20<br>38<br>24<br>20<br>26       | ENE.<br>ENE.<br>ENE.<br>ENE.        | 20<br>36<br>24<br>20<br>26 | ENE.<br>ENE.<br>ENE.<br>ENE.        | 20<br>32<br>24<br>24<br>20 | ENE.<br>ENE.<br>ENE.<br>ENE.        | 20<br>34<br>24<br>28<br>20 | ENE.<br>ENE.<br>ENE.<br>ENE.       | 16<br>32<br>24<br>22<br>24 | NE.<br>NE<br>ENE.<br>ENE.<br>ENE.  | 24<br>36<br>21<br>24<br>30                      | ENE.<br>ENE.<br>ENE.<br>ENE.       | 17<br>34<br>18<br>21<br>25 | ENE.<br>ENE.<br>ENE.<br>ENE.                  | 18<br>37<br>20<br>27<br>25 | EN<br>EN<br>EN                 |                                   | 19<br>36<br>21<br>27<br>25    | ENE.<br>NE<br>ENE.<br>ENE.<br>ENE. | 20<br>36<br>20<br>30<br>20          | END<br>NE<br>ENE.<br>ENE.<br>ENE. | 16<br>36<br>18<br>24<br>24                |
| ov. 7<br>ov. 8<br>ov. 9<br>ov. 10<br>ov. 11         | ENE.<br>ENE.<br>NNE.<br>NF.<br>NE  | 14<br>15<br>27<br>23<br>19 | ENE.<br>ENI<br>NNE.<br>NE.<br>NE     | 16<br>16<br>26<br>21<br>20       | ENE.<br>ENE.<br>NNE.<br>NE.<br>NE.  | 22<br>16<br>24<br>22<br>20 | NE.<br>ENE.<br>NNE.<br>NE.<br>NE    | 28<br>28<br>29<br>19       | NE.<br>ENE.<br>NNE.<br>NE.<br>NE.   | 22<br>14<br>28<br>20<br>16 | NE.<br>ENE.<br>NNE.<br>NE.<br>NE.  | 20<br>10<br>28<br>20<br>17 | NE.<br>ENE.<br>NNE.<br>NE.<br>ENE. | 20<br>14<br>28<br>21<br>20                      | ENE.<br>NNE.<br>NE.<br>ENE.        | 24<br>14<br>30<br>20<br>19 | NNE.  | 20<br>12<br>29<br>20<br>16 | EN<br>EN<br>NN<br>NE<br>EN     | E.                                | 31<br>22                      | NE.<br>ENE.<br>NE.<br>NE.<br>ENE.  | 20<br>10<br>28<br>26<br>12          | NE.<br>ENE.<br>NE<br>ENE          | 10<br>11-<br>2-<br>11:                    |
| ov. 12<br>ov. 13<br>ov. 14<br>ov. 15<br>ov. 16      | ENE.<br>ENE.<br>ESE.<br>S.<br>WNW. | 12<br>6<br>19<br>21<br>20  | ENE<br>ENE<br>ESE<br>S.<br>WNW.      | 5<br>20<br>24<br>21              | ENE<br>ENE<br>ESE<br>SSW.<br>WNW.   | 11<br>6<br>18<br>24<br>18  | ENE.<br>ENE.<br>ESE.<br>SSW.<br>W.  | 12<br>5<br>18<br>26<br>22  | ENE<br>ENE.<br>ESE.<br>SSW.<br>WNW. | 9<br>4<br>21<br>28<br>13   | ENE.<br>ENE.<br>SE.<br>SW.<br>WNW. | 12<br>4<br>20<br>25<br>20  | ENE.<br>E.<br>SE.<br>SW.<br>WNW.   | 10<br>5<br>18<br>27<br>22                       | ENT<br>E.<br>SE<br>SW.<br>NW.      | 9<br>1<br>18<br>24<br>18   | E.<br>SE                                      | 9<br>4<br>19<br>26<br>18   | EN<br>E.<br>SE.<br>SW<br>NW    |                                   | 18                            | ENE.<br>E<br>E SE.<br>SW.<br>NW.   | 10<br>5<br>20<br>26<br>16           | ENE<br>ESE<br>SW.<br>NW.          | 20 22 1                                   |
| lov. 17<br>lov. 18<br>lov. 19<br>lov. 29<br>lov. 21 | NNE.<br>NE.<br>NE.<br>E.<br>WNW.   | 13<br>21<br>38<br>24<br>24 | NNE.<br>NE.<br>ENE<br>ESE.<br>WNW.   | 12<br>24<br>34<br>24<br>24<br>21 | NNE.<br>NE.<br>ENE.<br>ESE.<br>WNW. | 10<br>24<br>36<br>16<br>24 | NNE.<br>NE.<br>ENE.<br>ESE.<br>WNW. | 11<br>24<br>36<br>14<br>21 | NNE.<br>NE.<br>ENE.<br>ESE.<br>WNW. | 28<br>36<br>10<br>26       | NNE<br>NNE.<br>ENE.<br>S.<br>NW.   | 10<br>28<br>32<br>16<br>28 | NNE.<br>NE.<br>ENE.<br>SSE.<br>NW. | 10<br>28<br>34<br>16<br>31                      | NE.<br>NE.<br>ENE.<br>SSE.<br>NW.  | 9<br>29<br>34<br>11<br>31  | NE.   | 12<br>32<br>31<br>16<br>28 | NE<br>NE<br>EN<br>S.           | E.                                | 10                            | NE.<br>NE<br>E.<br>SSE.<br>NW.     | 9<br>32<br>28<br>9<br>23            | NE.<br>NE<br>E.<br>SSE.<br>WNW.   | 3 2                                       |
| Not 22<br>Not 23<br>Not 24<br>Not 25<br>Not 26      | NW.<br>SSW.<br>ENE.<br>ENE         | 10<br>4<br>16<br>29<br>33  | NW.<br>SSW.<br>ENE<br>ENE.<br>E.     | 9<br>3<br>15<br>22<br>34         | NW.<br>SSW.<br>ENE<br>ENE.<br>E.    | 10<br>4<br>14<br>18<br>28  | NW,<br>88W,<br>ENE,<br>ENE,<br>E.   | 5<br>18<br>20<br>24        | NW.<br>SSW.<br>ENE.<br>ENE.<br>E.   | 6<br>3<br>16<br>24<br>22   | NW.<br>SSW.<br>ENE.<br>ENE.<br>E.  | 6<br>3<br>11<br>24<br>22   | NW.<br>SSW.<br>ENE.<br>ENE.<br>E.  | 6<br>4<br>16<br>27<br>25                        | NW.<br>SSW.<br>ENE.<br>ENE.<br>E.  | 6<br>12<br>24<br>22        | ENE.<br>ENE.                                  | 6<br>7<br>15<br>28<br>22   | S.<br>EN<br>EN<br>E.           | E.                                | 5<br>17<br>28                 | NW.<br>SSE.<br>ENE.<br>ENE.        | 2<br>6<br>18<br>28<br>20            | NW.<br>SSE.<br>ENE.<br>E          | 2 3 1                                     |
| Vov. 27<br>Vov. 25<br>Vov. 29<br>Vov. 30            | ENE<br>SW.<br>S                    | 14<br>8<br>15<br>12        | ENE<br>SW.<br>S.<br>N.               | 9<br>8<br>14<br>12               | ENF<br>S.<br>S.<br>N.               | 9<br>5<br>13<br>9          | ENE<br>SSW.<br>S.<br>N.             | 7<br>9<br>14<br>8          | ENE.<br>S.<br>S.<br>N.              | 7<br>9<br>10<br>8          | E.<br>S.<br>S.<br>N.               | 8<br>9<br>12<br>8          | ENE.<br>88E.<br>8.<br>N.           | 8<br>16<br>14<br>9                              | E.<br>88E.<br>8.<br>N.             | 14<br>10<br>10             | SSE.  | 10<br>8<br>12              | EN<br>SSI<br>S.<br>N.          |                                   | 9<br>10<br>10                 | ENE.<br>SSE<br>NW.<br>N.           | 6<br>7<br>7<br>10                   | ENE.<br>SSE.<br>NW.<br>N.         | ì   |
| Means.  | 19. 0                              | 6                          | 19. 10                               | 0                                | 18. 30                              | В                          | 18.33                               | 3                          | 18. 0                               | 3                          | 17. 80                             | )                          | 19. 1                              | 0   | 18. 0                              | 03                         | 18. 5   | 50                         |                                | 17. 9:                            | 3                             | 17.                                | 46                                  | 17. 4                             | 16  |
|   | <b>1</b> p. 1                      | u.                         | 2 p. n                               | н.                               | 3 р. т                              | n.                         | 4 p. n                              | 1.                         | 5 р. п                              | н.                         | 6 p. n                             | n.                         | 7 p. n                             | ١.  | 8 p. m                             | i. '                       | 9 p. m.                                       | 1                          | 0 р. п                         | n.                                | 11 p.                         | m.                                 | 12 p.                               |                                   | ailv                                      |
| Date  | Direct<br>and<br>veloci            |                            | Direct<br>and<br>velocit             |                                  | Direct:<br>and<br>veloci            |                            | Direct<br>and<br>velocit            |                            | Direct<br>and<br>veloci             |                            | Directi<br>and<br>velocit          |                            | Directi<br>and<br>velocit          |   | Directi<br>and<br>velocit          |                            | Direction<br>and<br>velocity.                 | 1                          | irecti<br>and<br>elocit        |                                   | Direc<br>and<br>veloc         | di i                               | Direct<br>and<br>veloci             | ton ne                            | an vocity.                                |
| 1881.<br>Nov.                                       | E.                                 | 20                         | E.                                   | 16                               | E.                                  | 16                         | E.                                  | 16                         | ENE.                                | 20                         | ENE.                               | 20                         | ENE.                               | 20  | ENE.                               | 18                         | ENE. 1  | 6   E                      | NE.                            | 16                                | ENE.                          | 20                                 | ENE.                                | 20                                | 19. 7                                     |
| Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5<br>Nov. 6      | ENE.<br>ENE.<br>ENE.<br>ENE.       | 16<br>32<br>19<br>20<br>20 | E.<br>ENE.<br>ENE.<br>ENE.           | 20<br>30<br>14<br>20<br>20       | E.<br>ENE.<br>ENE.<br>ENE.          | 20<br>27<br>15<br>24<br>27 | ENE.<br>ENE.<br>ENE.<br>ENE.        | 20<br>30<br>19<br>31<br>24 | ENE.<br>ENE.<br>ENE.<br>ENE.        | 16<br>36<br>18<br>30<br>21 | ENE.<br>ENE.<br>ENE.<br>NE.        | 24<br>30<br>20<br>24<br>16 | ENE.<br>NE.<br>ENE.<br>ENE.<br>NE. | 28  <br>28  <br>20  <br>22  <br>20              | ENE.<br>ENE.<br>ENE.<br>NE         | 28<br>28<br>20<br>24<br>24 | ENE. 2<br>NE. 2<br>ENE. 1<br>NE. 2<br>NE. 2   | 8 N<br>8   E<br>4   N      | NE.                            | 26<br>26<br>18<br>24<br>24        | ENE.<br>ENE.<br>ENE.<br>ENE.  | 30<br>27<br>15<br>18<br>24         | ENE.<br>NE.<br>ENE.<br>ENE.         | 28<br>24<br>13<br>24<br>18        | 21, 2<br>31, 8<br>19, 6<br>23, 7<br>22, 4 |
| Nov 5<br>Nov 8<br>Nov 10<br>Nov 10                  | NE.<br>ENE.<br>NE.<br>ENE.         | 18<br>14<br>28<br>23<br>12 | NE.<br>ENE<br>NNE.<br>NE.<br>ENE.    | 16<br>13<br>24<br>21<br>13       | NE.<br>ENE.<br>N.<br>NE.<br>ENE.    | 20<br>20<br>26<br>20<br>18 | NE.<br>ENE.<br>NNE.<br>NE.<br>ENE.  | 16<br>16<br>26<br>21<br>14 | NE.<br>ENE.<br>NNE<br>NE.<br>ENE.   | 24<br>14<br>24<br>22<br>14 | NE.<br>ENE.<br>NNE.<br>NE.<br>ENE. | 18<br>15<br>21<br>18<br>12 | NE.<br>NE.<br>NNE.<br>NE.<br>ENE.  | $\frac{20}{16}$ $\frac{20}{20}$ $\frac{20}{13}$ | NE.<br>NNE.<br>NNE.<br>NE.<br>ENE. | 24<br>14<br>21<br>16<br>12 | ENE. 2<br>NNE. 1<br>NNE. 2<br>NE. 1<br>ENE. 1 | 6 N<br>1 N<br>8 N          | NE.<br>NE.<br>NE.<br>E.<br>NE. | 20<br>24<br>24<br>16<br>12        | ENE.<br>NE.<br>NN.<br>ENE.    | 20<br>25<br>22<br>20<br>13         | ENE.<br>NNE.<br>NNE.<br>NE.<br>ENE. | 20 + 24   20   17   11            | 19. 6<br>15. 7<br>25. 7<br>20. 4<br>15. 0 |
| Nov 12<br>Nov 13<br>Nov 14<br>Nov 15<br>Nov 16      | ENE.<br>E.<br>ESE.<br>SW.<br>NW.   | 8<br>6<br>18<br>26<br>16   | ENE.<br>E.<br>ESE.<br>SW.<br>NW.     | 10<br>6<br>16<br>24<br>15        | ENE.<br>ESE.<br>SW.<br>NW.          | 7<br>6<br>15<br>26<br>15   | ENE.<br>E.<br>SE<br>SW.<br>NNW.     | 8<br>7<br>14<br>28<br>15   | ENE.<br>E.<br>SE.<br>WNW.           | 8<br>8<br>16<br>28<br>9    | ENE.<br>E.<br>SE.<br>NW.<br>NNW.   | 8<br>12<br>20<br>14        | ENE.<br>E.<br>S.<br>NW.<br>NNW.    | 6<br>9<br>20<br>18<br>14                        | ENE.<br>E.<br>S.<br>W.<br>N.       | 5<br>16<br>13<br>12<br>14  | E. 1<br>S. 1                                  | 8 E<br>6 S.<br>7 W         |                                | 5<br>18<br>17<br>20<br>10         | LNE<br>E.<br>S.<br>W<br>NNE   | 5<br>18<br>20<br>17<br>12          | ENE.<br>ESE.<br>S.<br>WNW<br>NNE.   | 5<br>16<br>20<br>. 24             | 8. 6<br>17. 23. 4<br>16.                  |
| Nov 17<br>Nov 18<br>Nov 19<br>Nov 20<br>Nov 21      | NE.<br>NE.<br>E<br>S<br>W          | 9<br>35<br>28<br>12<br>20  | NE.<br>NE<br>E.<br>S.<br>W.          | 9<br>34<br>25<br>19<br>29        | NE.<br>NE.<br>E.<br>WSW.<br>WNW.    | 10<br>35<br>27<br>20<br>19 | NE.<br>NE.<br>E.<br>WSW.            | 40<br>32<br>25<br>12<br>18 | NE.<br>NE.<br>E.<br>WSW.            | 9<br>34<br>25<br>24<br>14  | NE.<br>NE.<br>E.<br>W.<br>WNW.     | 8<br>36<br>24<br>20<br>11  | NE.<br>NE<br>E.<br>W.<br>WNW.      | 10<br>40<br>24<br>24<br>12                      | NE.<br>NE.<br>E.<br>WNW.<br>WNW.   | 14<br>40<br>22<br>20<br>16 | NE. 1<br>NE. 4<br>E. 2<br>W. 2<br>WNW. 1      | 0 N<br>3 E<br>0 W          | E.                             | 14<br>40<br>20<br>20<br>14        | NE.<br>NE.<br>E<br>WNV<br>NW. | 19<br>43<br>15<br>V. 24<br>12      | NE.<br>NE.<br>E<br>WNW<br>NW.       | 20<br>40<br>24<br>- 22<br>11      | 11. 32.4<br>28. 16. 16. 20.               |
| Nov 22<br>Nov 23<br>Nov 24<br>Nov 25<br>Nov 26      | SSW.<br>SSE,<br>ENE.<br>E.<br>ENE. | 6<br>4<br>18<br>32<br>19   | SSW.<br>SSE.<br>ENE.<br>ENE.<br>ENE. | 5<br>6<br>12<br>30<br>15         | SSW.<br>E<br>ENE.<br>ENE.<br>ENE.   | 3<br>11<br>15<br>34<br>15  | SSW.<br>E.<br>ENE.<br>E.            | 4<br>14<br>16<br>33<br>11  | SSW.<br>E.<br>ENE.<br>E.            | 7<br>13<br>15<br>30<br>13  | SSW.<br>E.<br>ENE.<br>E.           | 5<br>14<br>16<br>30<br>12  | SSW.<br>E.<br>ENE.<br>E.           | 12<br>20<br>28<br>12                            | SSW.<br>E.<br>ENE.<br>E.           | 4<br>12<br>18<br>28<br>11  | ENE. 1  | 2   E<br>6   E<br>8   E    | NE.<br>NE.                     | $^{\frac{4}{12}}_{\frac{20}{28}}$ | SSW.<br>ENE<br>ENE<br>E.      | 3<br>16<br>20<br>28<br>9           | SSW.<br>ENE.<br>ENE.<br>E.          | 4<br>18<br>20<br>31<br>9          | 5. 1<br>8. 4<br>16. 2<br>27. 4<br>18. 3   |
| Fan 11"   | ENE.                               | 7                          | ENE.<br>SSE.                         | 5                                | ENE                                 | 6                          | ENE.                                | 12                         | E.<br>SSW.                          | 12                         | E.                                 | 11                         | E.<br>8.                           | 7   | E.                                 | 5<br>18                    |   | 5 S.<br>4 S.               |                                | 7                                 | SSW.                          | 7                                  | SW.                                 | 10<br>12                          | 18, 1<br>13-1                             |
| Nov 27<br>Nov 28<br>Nov 10<br>Nov 10                | SSE<br>N.W.<br>N.                  | 24<br>10                   | NW.<br>N.                            | 24<br>10                         | NW.                                 | 20<br>10                   | NW.                                 | 18                         | SSW.<br>NW.<br>N.                   | 13                         | NW.<br>N.                          | 14<br>16                   | NW.<br>N.                          | 15<br>12  | S.<br>NW.<br>N.                    | 13                         | NW. 1   | 4 N<br>7 N                 | W.                             | 10 8                              | XW.                           | 12                                 | NW.<br>NW.                          | 9<br>14                           | 13.<br>10.                                |

Statement showing the direction and velocity of the wind at Uglaumie from October, 1881, to August, 1883-Continued

[Height of anomometer above surface of ground, 21 feet. Washington mean time. Correction to reduce to mean local time. - 5% 17%. Velocity given in miles per large. 6 a. m. Date. Direction Direction Direction Direction Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and and velocity. NW NW. wsw. wsw. wsw. WNW NE. ENE. NE. Calm. 16 41 7 16 N. NE. ENE. NE. Calm. 7 42 4 12 8 W. W. SSW. S. Calm. W. W. SE. W. SSE. W. SSW. S. Calm. SW. W. SSW. S. Calm SSW. SSW. S. Calm. W. W. SSW. S. Calm. 11 12 4 3 7 8 5 4 11 6 8 5 5 49 7 NNW, WNW, WNW, SSW, SSW, NNW. WNW. 8. 88W. 88W. NNW. WNW. 8. 88W. 88W. NW. W. WNW. 88W. NW. W. WNW. SSW. NNW. WNW 8. 88W. 88W. 14 11 5 4 8  $^{11}_{12}_{5}_{4}$ 10 8 5 4 10 SW. NNW. WNW. SSW. SSW. Dec. Dec. Dec. Dec. 8 9 15 12 8 8 12 12 4 6 8 12 12 3 8 14 11 NE. NE. Calm. S. W. NE. NE. Calm. S. W. NE. ENE. Calm. S. W. NE, ENE. Calm. Calm. W. ESE. ENE. Calm. S. W. ESE. E S. S. WNW 5 12 5 14 5 13 4 11 4 13 2 10 22 23 24 25 26 ESE. Caln WNW WNW SSE. SE. SSW. 6 4 14 12 12 S. WSW 12 8.61 8.16 7.83 7.38 9,25 Means

|   | 1 p. m.  | . 2 p.                                | m.                       | 3 р. г                             | n.                     | 4 p. n                               | n.                              | 5 p. n                               | n.                    | 6 p. n                               | n.                             | 7 p. u                             | n.                       | 8 p. m.                            |                         | 9 p. r                           | n.                       | 10 p. m.                                      | 11 p.                 | m.                         | 12 p. s                              |   |
|---|--|---------------------------------------|--------------------------|------------------------------------|------------------------|--------------------------------------|---------------------------------|--------------------------------------|-----------------------|--------------------------------------|--------------------------------|------------------------------------|--------------------------|------------------------------------|-------------------------|----------------------------------|--------------------------|---|-----------------------|----------------------------|--------------------------------------|---|
| Date.   | Direction<br>and<br>velocity.                  | Direc<br>an<br>veloc                  | d                        | Direct<br>and<br>veloci            |                        | Directi<br>and<br>velocit            |                                 | Direct<br>and<br>veloci              |                       | Direct<br>and<br>velocit             |                                | Direct<br>and<br>veloci            |                          | Directio<br>and<br>velocity        |                         | Direct<br>and<br>veloci          |                          | Direction and velocity.                       | Direc<br>and<br>veloc | 1                          | Directi<br>and<br>velocit            | locity  |
| 1881.<br>Dec. 1                                     | 88W. 10  | w.                                    | 18                       | wsw.                               | 15                     | w.                                   | 23                              | wnw.                                 | 12                    | w.                                   | 10                             | WNW.                               | . 7                      | ssw.                               | 9                       | ssw.                             | 16                       | wsw. 1:                                       | sw.                   | 12                         | SSW.                                 | 17 124.   |
| Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5<br>Dec. 6      | NE. 28<br>N. 35<br>ENE. 7<br>NE. 4             | NE.                                   | 29<br>26<br>8<br>12<br>1 | ENE,<br>N.<br>NE.<br>NE.<br>Calm.  | 31<br>24<br>9<br>10    | ENE.<br>N.<br>NE.<br>NE.<br>NNE.     | $\frac{31}{22} \\ 8 \\ 10 \\ 3$ | ENE.<br>N.<br>NE.<br>NE.<br>Calm.    | 34<br>18<br>10<br>11  | ENE.<br>N.<br>NE.<br>NE.<br>SE.      | 84<br>16<br>10<br>10<br>5      | NE.<br>NE.<br>NE.<br>SE.           | 39<br>16<br>8<br>10<br>8 |                                    | 36<br>16<br>7<br>9<br>8 | ENE.<br>N.<br>NE.<br>NE.<br>SE.  | 38<br>12<br>10<br>4<br>8 | ENE. 46<br>N. 10<br>NE. 13<br>NE. 5<br>SE. 4  | NE.<br>NE.<br>NE.     | 40<br>6<br>12<br>4<br>5    |                                      | 40 23.7<br>6 23.46<br>12 7.9<br>4 11.6<br>8 3.9 |
| Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10<br>Dec. 11    | W SW. 8<br>SE 4<br>WNW. 7<br>SSE. 7            | SW.<br>SSW.<br>NW.<br>SSE,            | 8<br>7<br>4<br>7         | W.<br>SW.<br>S.<br>NW.<br>SSE.     | 12<br>8<br>4<br>9<br>5 | W.<br>SW.<br>SSE.<br>NW.<br>SSE.     | 10<br>8<br>6<br>8<br>14         | W.<br>SW.<br>SSE.<br>NW.<br>SSE.     | 8<br>4<br>7<br>22     | W.<br>SW.<br>SSE.<br>NW.             | 6<br>6<br>5<br>12              | SW.                                | 7<br>4<br>4<br>3<br>12   | W.<br>SW.<br>SSE.<br>N.            | 8<br>4<br>3<br>4<br>16  | W.<br>SW.<br>SSE.<br>N.<br>S.    | 7<br>4<br>2<br>7<br>16   | W. SW. 4<br>SSE. 4<br>N. 5                    | SW.<br>SSE.<br>N.     | 7<br>3<br>7<br>6<br>15     | W.<br>SW.<br>SSE.<br>N.<br>S.        | 11 8,9<br>4 5,6<br>8 434<br>3 50<br>12 7,6      |
| Dec. 12 'Dec. 13 Dec. 14 Dec. 15 Dec. 16            | NNW. 4<br>WNW. 7<br>SSW. 5<br>SSW. 3<br>SSW. 6 |                                       | . 4<br>4<br>3<br>5       | NNW.<br>WNW.<br>SSW.<br>SSW.       | 5<br>5<br>4<br>7       | NNW.<br>WNW.<br>85W.<br>85W.<br>85W. | 6<br>6<br>2<br>4<br>3           | NNW,<br>WNW,<br>SSW,<br>SSW,<br>SSW, | 6<br>5<br>3<br>5<br>4 | NNW.<br>WNW.<br>SSW.<br>SSW.<br>SSW. | 6<br>2<br>5<br>1               | NNW.<br>WNW.<br>SSW.<br>SSW.       | 6<br>4<br>6<br>5         | NNW.<br>WNW.<br>SSW.<br>SSW.       | 5<br>7<br>4<br>7<br>5   | NNW.<br>WNW<br>SSW.<br>SSW.      |                          | NNW. 6<br>WNW. 6<br>88W. 2<br>88W. 6<br>Calm. | SSW.                  |                            | NNW,<br>WNW,<br>SSW,<br>SSW,<br>SSW, | 7 7.8<br>5 2.3<br>3 3.6<br>8 4.6<br>3 5.8       |
| Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20<br>Dec. 21 | NNE. 3<br>ENE. 7<br>ENE. 6<br>NE. 13<br>NE. 12 | NE.<br>ENE.<br>NE.<br>NE.             | 3<br>6<br>7<br>14<br>12  | NE.<br>ENE.<br>ENE.<br>NE.<br>NE.  | 5<br>8<br>11<br>7      | NE<br>ENE.<br>ENE.<br>NE.            | 4<br>8<br>12<br>8               | NE.<br>ENE.<br>ENE.<br>NE.           | 5<br>8<br>12<br>8     | ENE.<br>ENE.<br>ENE.<br>NE.<br>NE.   | 4<br>8<br>11<br>8              | ENE.<br>ENE.<br>ENE.<br>NE.<br>NE  | 6<br>3<br>8<br>9<br>6    | ENE.<br>ENE.<br>ENE.<br>NE.<br>NE. | 5<br>7<br>9<br>4        | ENE.<br>ENE.<br>NE.<br>NE.       | 6<br>4<br>7<br>9<br>3    |   | ENE.                  | 3<br>4<br>9<br>13<br>4     |                                      | 4 4.7<br>4 4.7<br>10 7.8<br>11 11.2<br>3 9.6    |
| Dec. 25   | ESE 4<br>ENE, 10<br>S 11<br>Calta,<br>Calta,   | ESE.<br>Calm.<br>S.<br>Calm.<br>Calm. | 3<br>12                  | ESE<br>ENE.<br>S.<br>Calm.<br>WSW. |                        | ESE.<br>Calm.<br>S.<br>Calm.<br>WSW  | 5<br>6<br>4                     | ENE.<br>Calm.<br>S.<br>W.<br>W.      | 10                    | ENE.<br>ENE.<br>S.<br>W.             | 8<br>6<br>10<br>6<br>8         | ENE.<br>ENE.<br>S.<br>W.           | 7<br>6<br>10<br>6<br>9   | ENE.<br>ENE.<br>S.<br>W.<br>W.     | 8<br>4<br>8<br>4<br>9   | ENE.<br>ENE.<br>S.<br>W.<br>WNW. | 9<br>2<br>6<br>4         | ENE. 12<br>Calm.<br>S. 4<br>W. 6<br>WNW. 8    | Calm.<br>S.<br>W.     | 13<br>6<br>4<br>7, 10      | NE.<br>Calm.<br>S.<br>W<br>WNW.      | 14 6.4<br>6.6<br>1 12<br>11 42                  |
| Dec. 30   | WNW, 14<br>WNW, 7<br>SE, 26<br>S, 9<br>WSW, 6  | WNW<br>WNW<br>SE.<br>S.<br>Calm.      |                          | WNW.<br>WNW.<br>SE.<br>S.<br>Calm. | 10<br>4<br>22<br>10    | WNW.<br>WSW.<br>SE.<br>S.<br>Calm.   | 12<br>6<br>20<br>11             | WNW.<br>SW.<br>SE.<br>S.<br>Calm.    | 12<br>3<br>22<br>13   | WNW.<br>SSW.<br>SE.<br>S.<br>Calm.   | $\frac{14}{2}$ $\frac{20}{12}$ | WNW.<br>SSW.<br>SE.<br>S.<br>Calm. | 10<br>3<br>21<br>12      | S.<br>ESE. 2                       | 8<br>24<br>12           | WNW.<br>S.<br>SE.<br>S.<br>Calm. | 12<br>8<br>20<br>11      | WNW. 12<br>Calm.<br>SE. 24<br>SW. 17<br>Calm. | SSE.                  | 7. 6<br>3<br>23<br>12<br>4 | ESE.<br>SSW                          | 6 (5)<br>19 (2)<br>15 (8)<br>12 (4)<br>5 (6)    |
| Means   | 8. 93  | 8.2                                   | 5                        | 8, 29                              |                        | 8, 48                                |                                 | 8.70                                 |                       | 8.48                                 | -                              | 8.58                               | 3                        | 8.48                               |                         | 8. 25                            | _                        | 8. 29   | 8, 3                  | 2                          | 8. 54                                | 8.6.  |

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# Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

883—Continued. given in miles per lo 11 a. m.

Direction Direction velocity.

8 SW

19 | NE 38 | N. 7 | ENE 16 | NE 3 | NNE

2 NNE 6 LNE 8 ENE 45 NE 9 NE

ESE Calu S. Cale, Cale

12 WNW 6 Calu 20 SE 15 S. 7 WSW.

12 p. m. ection Direction mean vo and velocity. nd city.

12 SSW 17

W. SW. SSE. N.

V. 6 WNW, 6 3 SSE 10 23 ESE, 15 12 SSW 12 4 E, 5

6.16

WSW

NE. NNE. ENE. NNE. W. SE. W. SSE. NNW. WNW. SSE. NNW. WNW. SSW. SSW.

ESE. E S. S. WNW

WNW WNW SE. S. WSW.

12 1.

|  | 1 n. t                               | 11.                        | 2 a.                               | m.                         | 3 a. t                            | m.                          | 4 a. r                             | n.                         | 5 a. n                              | 1.                         | 6 a. n                              | 1.                         | 7 n. n                              | n.                         | ¥ n. n                                | ik.                        | 9 a. n   |                       | 10 a.                               | m.                                 | H n                                | 111.                               | 12                                     | in.  |
|--|--------------------------------------|----------------------------|------------------------------------|----------------------------|-----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|---------------------------------------|----------------------------|--|-----------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|--|
| Dati .   | Direct<br>and<br>veloci              | l                          | Direct<br>and<br>veloci            | 1                          | Direct<br>and<br>veloci           |                             | Direct<br>and<br>veloci            |                            | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit           |                            | Direct<br>and<br>velocit            |                            | Direct<br>and<br>velocit              |                            | Directi<br>end<br>elocit                         |                       | Direct<br>and<br>veloci             | l                                  | Director No.                       | d                                  | Direc<br>ar<br>velo                    | id   |
| 1852.<br>(m = 1<br>an. = 2<br>an. = 3<br>an. = 4 | ESE<br>E.<br>ENE.                    | 7<br>14<br>13<br>10        | ESE.<br>E.<br>ENE<br>ENE           | 9<br>12<br>11<br>10<br>8   | ESE.<br>E.<br>E.<br>ENE.<br>E.    | 10<br>10<br>13<br>8<br>8    | ESE.<br>E.<br>E.<br>ENE.<br>E.     | 17<br>10<br>12<br>8<br>8   | ESE.<br>E.<br>E.<br>ENE.<br>ENE.    | 10<br>12<br>12<br>12<br>10 | ESE.<br>E.<br>E.<br>ENE.<br>ENE.    | 16<br>10<br>12<br>11<br>5  | ESE.<br>F<br>ENE.<br>ENE.<br>ENE.   | 18<br>14<br>12<br>11<br>5  | ESE.<br>E.<br>ENE.<br>ENE.<br>ENE.    | 12<br>12<br>14<br>11       | E.<br>ENE.                                       | 9<br>15<br>11         | ESE.<br>E.<br>ENE.<br>ENE.<br>ENE.  | 12                                 | ESE.<br>E.<br>ENE.<br>ENE.         | 16<br>14<br>19<br>4<br>5           | ESE.<br>E.<br>ENE.<br>ENE.             | 17<br>12<br>15<br>6<br>4                     |
| an 6 an 7 an 8 an 8 an 8 an 8 an 8 an 8 an 8     | C dus.<br>Calm.<br>NE.<br>NE.<br>NE. | 4<br>11<br>6               | Calm.<br>NE.<br>NE.<br>NE.<br>NE.  | 4<br>4<br>8<br>6           | Calm. Calm. NE. NE. NE.           | 4<br>7<br>6                 | Calm.<br>NE.<br>NE.<br>NE.<br>NE.  | 4<br>4<br>6<br>8           | Calm.<br>Calm.<br>NE.<br>NE.<br>NE. | 4<br>8<br>8                | Calm.<br>NE.<br>Calm<br>NE.<br>NE.  | 4<br>3<br>4                | Calm.<br>NE.<br>NE.<br>Calm.<br>NE. | 6<br>5                     | Calm.<br>N.E.<br>N.E.<br>N.E.<br>N.E. | 4<br>6<br>5<br>6           | NE.  | 4                     | Calm.<br>NE.<br>NE.<br>NE.<br>NE.   | 10<br>8                            | Calm.<br>NE.<br>NE.<br>NE.<br>NE.  | 4<br>7<br>8<br>8                   | Calm.<br>Calm.<br>N.E.<br>N.E.<br>N.E. | #<br>7<br>8                                  |
| and 11<br>and 12<br>at 13<br>at 14<br>att 15     | FNE.<br>ENE.<br>W.<br>W.<br>Calm.    | 18<br>28<br>46<br>48       | ENE.<br>ENE.<br>W.<br>W.<br>Calm.  | 18<br>28<br>48<br>40       | ENE.<br>ENE.<br>W.<br>Calm.       | 18<br>27<br>43<br>38        | ENE.<br>ENE<br>W.<br>W.<br>Cal.a.  | 18<br>26<br>46<br>42       | ENE.<br>ENE.<br>W.<br>W.<br>Calm.   | 20<br>28<br>48<br>38       | ENE.<br>ENE.<br>W.<br>W.<br>WNW.    | 20<br>24<br>52<br>38<br>7  | ENE.<br>E.<br>W.<br>W.<br>WNW.      | 18<br>24<br>52<br>32<br>7  | ENE.<br>E.<br>W.<br>W.<br>NW.         | 19<br>24<br>52<br>32<br>10 | ENE.<br>WSW.<br>W.                               | 52<br>32              | ENE.<br>SE.<br>W.<br>W.<br>NNE.     | 24 . :<br>52<br>32                 | ENE.<br>S.<br>W.<br>W.<br>NNE.     | 24<br>30<br>52<br>24<br>20         | ENE.<br>SSW.<br>WSW<br>W.<br>NNE.      | 24<br>28<br>52<br>24<br>9                    |
| an 16<br>an 17<br>an 18<br>an 19<br>an 20        | NNE.<br>ENE.<br>ESE.<br>E.<br>Calm.  | 10<br>32<br>20<br>10       | NNE.<br>ENE.<br>E.<br>Calm.        | 12<br>25<br>20<br>13       | NE.<br>ENE.<br>E.<br>WNW.         | 10<br>26<br>16<br>12<br>9   | NE.<br>ENE.<br>E.<br>WNW.          | 10<br>28<br>12<br>14<br>8  | NE.<br>ENE.<br>E.<br>WNW.           | 16<br>28<br>13<br>14<br>8  | NE.<br>ENE.<br>E.<br>WNW.           | 14<br>25<br>11<br>14<br>10 | NE.<br>ENE.<br>E.<br>WNW.           | 14<br>28<br>12<br>16<br>12 | NE.<br>ENE.<br>E.<br>WNW.             | 16<br>28<br>12<br>16<br>14 | ENE.<br>E.<br>E.                                 | 32<br>12              | NE.<br>E.<br>E.<br>E.<br>WNW.       | 32<br>16<br>12                     | NE.<br>E.<br>E.<br>WNW             | 14<br>36<br>20<br>8<br>7. 10       | NE.<br>E.<br>E.<br>WNW                 | 14<br>02<br>6<br>8                           |
| in 21<br>an 22<br>an 23<br>an 24<br>an 25        | SSW.<br>W.<br>W.<br>SW               | 14<br>40<br>31<br>34<br>4  | S.<br>W.<br>W.<br>SW               | 12<br>46<br>28<br>34<br>7  | S.<br>S.<br>W.<br>W.<br>S.W.      | 14<br>54<br>28<br>86<br>6   | S.<br>W.<br>W.<br>SE               | 14<br>54<br>28<br>34<br>5  | SSE.<br>W.<br>W.<br>SE.             | 17<br>56<br>28<br>32<br>4  | SSE.<br>W.<br>W.<br>SE.             | 24<br>52<br>27<br>32<br>6  | SSE.<br>S.<br>WSW.<br>W.<br>SE.     | 24<br>52<br>28<br>32<br>14 | SSE.<br>W.<br>W.<br>SE.               | 24<br>52<br>28<br>28<br>20 | S.<br>W.   | 56<br>28<br>28        | SSE.<br>SW.<br>W.<br>W.<br>SE.      | 52<br>30<br>32                     | SSE.<br>SW.<br>W.<br>W.<br>SSE.    | 28<br>64<br>28<br>24<br>18         | SSE.<br>WSW.<br>W.<br>SSE.             | 28<br>100<br>28<br>20<br>16                  |
| an 26<br>an 27<br>an 28<br>an 29<br>an 19        | W<br>W.<br>WNW.<br>NNE<br>N.         | 1,7<br>24<br>7<br>9        | W.<br>W.<br>WNW<br>NNE.<br>Calm.   | 14<br>24<br>6<br>10        | W.<br>W.<br>WNW.<br>NNE.<br>Calm. | 12<br>22<br>4<br>8          | W.<br>W.<br>WNW.<br>NNE.<br>N.     | 16<br>24<br>6<br>10<br>4   | W.<br>W.<br>WNW.<br>NNE.<br>N.      | 24                         | WNW.<br>W.<br>WNW.<br>NNE.<br>Calm. | 24<br>22<br>5<br>8         | WNW.<br>W.<br>WNW.<br>NNE.<br>Calm. | 26<br>22<br>4<br>8         | WNW.<br>W.<br>WNW.<br>NNE.            | 24<br>24<br>4<br>8         | W.<br>WNW.<br>NNE.                               | 24<br>5 i<br>8        | WNW.<br>W.<br>WNW.<br>NNE.<br>Calm. | 20<br>5<br>8                       | WNW.<br>W.<br>WNW<br>NNE.<br>Calm. | 10                                 | WNV<br>W<br>Wl. V<br>NNE<br>Calm.      | V. 3<br>8                                    |
| in 51  | ESD.                                 | 6                          | ESE.                               | 2                          | ENE.                              | 8                           | ENE.                               | 8                          | ENE.                                | 9                          | NE.                                 | 10                         | NE.                                 | 12                         | NE.                                   | 14                         | NE.  |                       | NE.                                 |                                    | NE.                                | . 61                               | NE.                                    | 16<br>7. 64                                  |
| Me. ns.  | ( p. n                               |                            | 2 p. n                             |                            | 8 p. m                            |                             | 4 p. m                             |                            | 5 p. m                              |                            | 6 p. m                              |                            | 7 p. m.                             | -                          | 8 p. m.                               | _                          | 9 p. m.  |                       | p. m.                               | li p.                              |                                    | 12 p. r                            |  |  |
| Pati   | Din et                               | ion                        | Direct<br>and<br>veloci            | ion                        | Direct<br>and<br>veloci           | ion                         | Direct<br>and<br>veloci            | ion                        | Directi<br>and<br>velocit           | on                         | Directi<br>and<br>velocit           | on                         | Directi<br>and<br>velocit           | on                         | Directio<br>and<br>velocity           |                            | Direction<br>and<br>velocity.                    | Dire                  | ection<br>nd<br>ocity.              | Direct<br>and<br>veloc             | ion                                | Directi<br>and<br>veloci           | on   m                                 | Daily<br>ean ve<br>ecity.                    |
| 1882<br>n 1<br>n 2<br>n 2<br>n 4                 | LSE.<br>F.<br>ENE.<br>ENE.<br>ENE.   | 17<br>9<br>13<br>6<br>4    | ESE.<br>E.<br>ENE.<br>ENE.         | 14<br>8<br>10<br>4<br>3    | E.<br>E.<br>ENE.<br>ENE.<br>Calm. | 15<br>12<br>14<br>10        | E.<br>E.<br>ENE.<br>ENE.<br>Calm.  | 20<br>12<br>11<br>5        | E.<br>E.<br>ENE.<br>ENE.<br>Calm.   | 16<br>12<br>10<br>8        | E.<br>E.<br>ENE.<br>E.<br>Calm      | 16<br>12<br>11<br>4        | E.<br>E.<br>E.<br>E.<br>Calm.       | 12<br>10<br>12<br>4        | E.<br>E.<br>ENE.<br>E.<br>Calm.       | 12<br>5<br>12<br>7         | E. 10<br>E. 9<br>ENE. 12<br>E. 7                 | E.<br>E.<br>E.<br>Cal | 6                                   | E.<br>E.<br>ENE.<br>E.<br>Calm     | 12<br>11<br>10<br>11               | E.<br>E.<br>ENE.<br>E.<br>Calm.    | 12<br>12<br>10<br>10                   | 13, 83<br>10, 95<br>12, 00<br>8, 04<br>4, 12 |
| an. 7<br>an. 8<br>n. 9<br>an. 10                 | Calm.<br>NF.<br>NE.<br>NE.<br>NE.    | 4<br>5<br>5<br>10          | Calm.<br>NE.<br>NE.<br>NE.<br>NE.  | 4<br>4<br>4<br>12          | NE.<br>NE.<br>NE.<br>NE.<br>NE.   | 3<br>4<br>8<br>13           | Calm.<br>NE.<br>NE.<br>NE.<br>ENE. | 3<br>4<br>6<br>16          | Calm.<br>NE.<br>NE.<br>NE.<br>ENE.  | 4<br>5<br>6<br>16          | Calm.<br>NE.<br>NE.<br>NE.<br>ENE.  | 3<br>4<br>7<br>16          | Calm,<br>NE,<br>NE<br>NE,<br>ENE,   | 3<br>7<br>8<br>14          | Calm.<br>NE.<br>NE.<br>NE.<br>ENE.    | 3<br>11<br>7<br>14         | Calm.<br>NE. 4<br>NE. 8<br>NE. 7<br>ENE. 13      | Cal<br>NE<br>NE<br>NE | . 5<br>. 6                          | Calm.<br>NE.<br>NE.<br>NE.<br>ENE. | 3<br>6<br>6<br>6                   | Calm.<br>NE.<br>NE.<br>NE.<br>ENE. | 3<br>9<br>6<br>17                      | 3 16<br>5, 50<br>6, 41<br>10, 70             |
| an. 11<br>an. 12<br>an. 13<br>an. 14<br>an. 15   | ENE.<br>88W.<br>W.<br>W.<br>NNE.     | 28<br>36<br>52<br>24<br>8  | ENE.<br>SSW.<br>WSW.<br>W.<br>NNE. | 28<br>38<br>48<br>13<br>10 | ENE.<br>SSW.<br>W.<br>W.<br>NNE.  | 28<br>86<br>48<br>14<br>8   | ENE.<br>WSW.<br>W.<br>W.<br>NNE.   | 30<br>40<br>52<br>15<br>9  | ENE.<br>WSW.<br>W.<br>WNW.<br>NNE.  | 24<br>37<br>52<br>13<br>8  | ENE.<br>WSW.<br>W.<br>WNW.<br>NNE.  | 26<br>44<br>50<br>12<br>11 | ENE.<br>WSW.<br>W.<br>WNW.<br>NNE.  | 32<br>48<br>48<br>23<br>11 | ENE.<br>W.<br>W.<br>WNW.<br>NNE.      | 40<br>40<br>48<br>4<br>12  | ENE. 36<br>WSW, 44<br>W. 45<br>WNW. 2<br>NNE. 11 | 11.3                  | SW. 47<br>NW. 46<br>NW. 6           | ENE<br>W.<br>WNV<br>WNV            | V.146<br>V.146<br>V.10             | ENE.<br>W.<br>W.<br>Calm.<br>NNE.  | 30<br>52<br>118                        | 25 34<br>34 64<br>49 19<br>10.58<br>7 80     |
| an. 16<br>ap. 17<br>an. 18<br>an. 19<br>an. 26   | ENE.<br>E.<br>E.<br>WNW.             | 16<br>36<br>9<br>7         | ENE.<br>E.<br>E.<br>WNW.           | 16<br>36<br>9<br>6<br>6    | ENE.<br>E.<br>E.<br>WNW.          | 16<br>32<br>12<br>5<br>4    | ENE.<br>E.<br>E.<br>WNW.           | 17<br>35<br>20<br>4<br>3   | ENE.<br>E.<br>E.<br>WNW.            | 120<br>32<br>20<br>3<br>4  | ENE.<br>E.<br>E.<br>WNW.            | 123<br>28<br>22<br>4<br>5  | ENE.<br>E.<br>E.<br>WNW.            | 26<br>30<br>22<br>4<br>4   | ENE.<br>E.<br>F.<br>SE.<br>WNW.       | 24<br>24<br>17<br>8<br>4   | ENE. 24<br>E. 20<br>E. 15<br>SE 7<br>WNW. 4      | E.                    | 16<br>15<br>7                       | ENE<br>ESE.<br>SE.<br>SSW          | 220<br>13<br>14<br>4               | ENE<br>ESE<br>SE<br>SSW.           | 24<br>20<br>11<br>3<br>16              | 17, 08<br>28, 97<br>17, 15<br>5, 75<br>7, 65 |
| n 21<br>an 22<br>an 23<br>an 24                  | 88E.<br>8W.<br>W.<br>W.<br>88E       | 36<br>80<br>32<br>20<br>20 | SSE.<br>SW.<br>WSW.<br>V<br>SSE.   | 36<br>96<br>32<br>20<br>18 | S.<br>WSW.<br>WSW.<br>W.          | 42<br>188<br>38<br>16<br>16 | S.<br>WSW.<br>WSW.<br>W.           | 45<br>80<br>40<br>15<br>12 | 8.<br>W.<br>WSW.<br>W.              | 41<br>72<br>40<br>16<br>19 | W.<br>WSW.<br>W.<br>S.              | 37<br>64<br>38<br>11<br>20 | SSE.<br>W<br>WSW.<br>W.<br>SSW.     | 41<br>60<br>37<br>13<br>19 | SSE.<br>W<br>WSW.<br>W.<br>SSW.       | 40<br>44<br>39<br>12<br>20 | SSE. 30<br>W. 40<br>WSW. 40<br>W. 3<br>SW. 10    | W.                    | 44<br>36<br>8W. 9                   | WSW.                               | 35<br>40<br>36<br>7. 6<br>12       | S.<br>WSW<br>WSW                   | 34                                     | 23,50<br>59,60<br>• 31,70<br>21,54<br>13,51  |
| n. 25  |                                      | 24                         | WNW.                               | 24                         | W.                                | 124                         | W.                                 | 123                        | W.<br>WNW.                          | 23<br>16                   | W.<br>WNW.                          | 21<br>13                   | W.<br>WNW.                          | 19                         | W.<br>WNW.                            | 20<br>11                   | W. IS  |                       | 23<br>N.W. 12                       | W.N                                | 21                                 | 11.7.11                            | 22                                     | 21 19<br>17, 70                              |
| an 26<br>an 27<br>an 27<br>an 28<br>an 19        | WNW.<br>W<br>WNW.<br>NNE.<br>Calta.  | 16 2 8                     | WNW.<br>WNW.<br>NNE.<br>Calm.      | 14<br>3<br>8               | WNW.<br>WNW.<br>N.<br>NE.         | 15<br>2<br>9<br>3           | WNW.<br>WNW.<br>N.<br>ESE.         | 16<br>4<br>8<br>3          | WNW.<br>N.<br>ESE.                  | 8 6                        | WNW.<br>N.<br>ESE.                  | 7 8 3                      | N.<br>N.<br>ESE.                    | 10<br>7<br>8<br>5          | N.<br>N.<br>ESE.                      | 6 7                        | NNE. 8   | N.<br>N.<br>ES        | 7 8                                 | NNE<br>N.<br>ESE                   | , 10<br>, 10<br>, 6                | NNE.                               | 9 4 6                                  | 5, 04<br>7, 91<br>2, 70                      |

! Interpolated.

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August. 1883-Continued.

|   | t a. r                               | n.                         | 2 a. ı                               | m.                        | 3 а. т                               | n.                        | I a. n                               | 1.                         | 3 a. n                                | ).                         | 6 a. m                              |                            | 7 a. n                              |                           | 8 a. m.  |                        | 0 a. m   |                            | 10 a,                                     | m.                             | 11 8                            | i. m.                               | 12 n   |                                  |
|---|--------------------------------------|----------------------------|--------------------------------------|---------------------------|--------------------------------------|---------------------------|--------------------------------------|----------------------------|---------------------------------------|----------------------------|-------------------------------------|----------------------------|-------------------------------------|---------------------------|--|------------------------|--|----------------------------|---|--------------------------------|---------------------------------|-------------------------------------|--|----------------------------------|
| Date.   | Direct<br>and<br>veloci              | ı                          | Direct<br>and<br>veloci              | ι                         | Direct<br>and<br>volori              |                           | Dircet<br>and<br>velocit             |                            | Directi<br>and<br>velocit             |                            | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit           |                           | Directio<br>and<br>velocity                    |                        | Direction and velocity                                     |                            | Direct<br>and<br>veloci                   | 1 .                            | 81                              | etion<br>nd<br>ocity,               | Direct<br>and<br>veloci  | rl                               |
| 1882.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | N.<br>SW.<br>SSW.<br>Calm.           | 12<br>9<br>14              | N.<br>SW.<br>SSW.<br>Calm.           | 11<br>9<br>14             | N.<br>SW.<br>SSW.<br>Calm.           | 11<br>8<br>13             | N.<br>SW.<br>SSW.<br>Calm.           | 0<br>11<br>10              | N.<br>SW.<br>SSW.                     | 6<br>9<br>8                | N.<br>SW.<br>SSW.<br>Calm.          | 7<br>10<br>9               | N.<br>SW.<br>SSW.<br>Calm.          | 6<br>9<br>7               | N.<br>SW.<br>SSW.<br>Calm.                     | 2<br>9<br>6            | Calm.<br>SW.<br>SSW.<br>Calm.                              | 10                         | Calm.<br>SW.<br>SSW.<br>Calm.             | 12<br>6                        | SW.<br>SW.<br>SSW.              | 10                                  | SW.<br>SW.<br>SsW.<br>Calin.   | 5<br>10<br>2                     |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | SW.<br>WSW.<br>WSW.<br>SW.<br>WSW.   | 10                         | SW.<br>WSW.<br>W.<br>SW.<br>WSW.     | 10<br>24<br>9<br>8<br>18  | SSW.<br>WSW.<br>WSW.<br>SW.<br>WSW.  | 10<br>22<br>15<br>9<br>16 | SSW.<br>WSW.<br>WSW.<br>SW           | 14<br>21<br>15<br>10<br>13 | 8W.<br>8W.<br>W8W.<br>8V.             | 16<br>22<br>14<br>10<br>22 | SSW.<br>SSW.<br>WSW.<br>SW.<br>WSW. | 16<br>24<br>12<br>12<br>16 | SSW.<br>WSW.<br>WSW.<br>VSV.        | 10                        | SSW.<br>WSW<br>VSW                             | 10<br>13<br>18<br>19   | 85\V.<br>W \ W.<br>W \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 20<br>20<br>10<br>12<br>18 | SSW,<br>W<br>W>W,<br>WSW,<br>W.           | 20<br>21<br>12<br>12<br>18     | 88W.<br>                        | 7. 11                               | S<br>NSW<br>WSW<br>W.  | 18<br>21<br>- 10                 |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 13<br>Leb. 14 | Calm.<br>WNW.<br>N. W.<br>S.<br>WSW. | . 6<br>4<br>8<br>14        | SSW.<br>WNW<br>NW.<br>S.<br>WSW.     | . 6<br>4<br>7<br>16       | SSW.<br>WNW.<br>NW.<br>S.<br>WSW.    | 10<br>4<br>3<br>7<br>19   | SSW.<br>WNW.<br>NW.<br>S.<br>WSW.    | 13<br>4<br>3<br>6<br>19    | SSW.<br>WNW.<br>NW.<br>S.<br>WSW.     | 11<br>5<br>4<br>8<br>18    | SSW.<br>WNW.<br>WSW.<br>S.<br>WSW.  | 7<br>6<br>4<br>7<br>18     | SSW.<br>WNW.<br>WSW.<br>S.<br>WSW.  | 8<br>7<br>2<br>8<br>18    | Wsw.   | 3<br>4<br>8<br>18      | SSW.<br>WNW.   | 6<br>8<br>7<br>13          | WSW.<br>WNW.<br>WSW.<br>S.<br>WSW.        | 8<br>5<br>7<br>16              | WSW<br>WSW<br>S.<br>WSW         | Y. 4<br>7. 7                        | WSW,<br>WSW,<br>SSE,<br>S.<br>WSW,   | 10                               |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | WSW.<br>SW.<br>NE.<br>NE.<br>NNE.    | 15<br>13<br>23<br>9<br>23  | WSW.<br>SW.<br>NE.<br>NE.<br>N.      | 43<br>9<br>24<br>10<br>20 | WSW.<br>SSW.<br>NE.<br>Calm.<br>N.   | 13<br>6<br>24<br>22       | WSW.<br>SSW.<br>NE.<br>NE.<br>N.     | 13<br>7<br>25<br>10<br>20  | WSW.<br>SSW.<br>NNE.<br>NE.<br>NNE.   | 14<br>11<br>24<br>14<br>22 | WSW.<br>SSW.<br>NNE.<br>NE.<br>NNE. | 10<br>4<br>25<br>15<br>22  | SSW.<br>SSW.<br>NNE.<br>NE.<br>NNE. | 20<br>3<br>22<br>18<br>23 | SSW.<br>SSW.<br>NNE.<br>NNE.<br>NNE.           | 18<br>18<br>20<br>24   | SSW.<br>SSW.<br>NNE.<br>NNE.<br>NNE.                       | 20<br>5<br>16<br>22<br>26  | SSW.<br>SSE.<br>NNE.<br>NNE.<br>NNE.      | 18<br>6<br>16<br>20<br>25      | SW.<br>SSE.<br>N.<br>NNE<br>NNE | 26<br>8<br>14<br>22<br>28           | SW.<br>SSE.<br>N.<br>NNE.<br>NNE.  | 1 2 2 2                          |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | NNE.<br>NNE.<br>NNE.<br>NNW.<br>WNW. | 26 :<br>6 :<br>2 :<br>10   | NNE.<br>NNE.<br>NNE.<br>Caim.<br>WNW | 24<br>5<br>5              | NNE.<br>NNE.<br>NNE.<br>NNW.<br>WNW. | 26<br>6<br>5<br>4<br>8    | NNE.<br>NNE.<br>NNE.<br>NNW.<br>WNW. | 25<br>6<br>7<br>3<br>5     | NNE.<br>NNE.<br>NNE.<br>Calm.<br>WNW. | 26<br>4<br>5               | NNE.<br>NNE.<br>SW.<br>WNW.         | 25<br>3<br>4<br>5<br>8     | NNE.<br>NNE.<br>NNE.<br>SW.<br>WNW. | 22<br>6<br>5<br>5<br>6    | NNE.<br>NNE.<br>NNE.<br>SW.<br>WNW.            | 24<br>5<br>3<br>6<br>7 | NNP.<br>NNE.<br>NNE.<br>SW.<br>WNW.                        | 24<br>4<br>4<br>8          | NNE,<br>NNE,<br>NNE,<br>SW,<br>WNW,       | 24<br>6<br>4<br>8<br>7         | NNE<br>NNE<br>NNE<br>SW.<br>WNV | . 4                                 | NNE.<br>NNE.<br>NNE.<br>SW.<br>WNW   | 7.                               |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | SW.<br>S.<br>SW.                     | 9<br>13<br>8<br>11         | SW.<br>S.<br>SW.                     | 8<br>12<br>8<br>16        | SW.<br>S.<br>SSW.                    | 8<br>10<br>8<br>17        | 88W.<br>88W.<br>88W.                 | 11<br>4<br>9<br>24         | SSW.<br>SSW.<br>SSW.                  | 10<br>12<br>8<br>24        | SSW.<br>S.<br>SW.<br>SSW.           | 8<br>6<br>10<br>25         | SSW.<br>S.<br>SW.<br>SSW.           | 6<br>9<br>11<br>26        | 88W.   | 5<br>6<br>16<br>27     | SSW.<br>S.<br>NW.<br>SSW.                                  | 9<br>8<br>18<br>28         | SSW.<br>S.<br>NW.<br>SSW.                 | 7<br>19<br>32                  | SSW.<br>NW.<br>SSW.             | 8<br>24<br>31                       | 88W.<br>8.<br>NW.<br>88W.  | 2                                |
| Means   | 10. 90                               | }<br>                      | 11.9                                 | !                         | 10, 8                                | j<br>                     | 11.32                                |                            | 11. 85                                |                            | 11. 35                              |                            | 11.6                                | 4                         | 11.64  |                        | 11. 85   | :                          | 12. 2                                     | 21                             | 13                              | .00                                 | 11.  | 82                               |
|   | 1 p. n                               | 11.                        | 2 p. n                               | 0.                        | 3 р. п                               | 1.                        | 4 p. n                               | 1.                         | 5 р. п                                |                            | 6 р. в                              |                            | 7 p. m                              |                           | 8 p. m.  |                        | 9 p. m.  | 10                         | p. m.                                     | 11 р                           | m.                              | 12 p.                               |  | Daily                            |
| Date.   | Directi<br>and<br>velocii            |                            | Direct<br>and<br>veloci              |                           | Directi<br>and<br>velocit            | 1                         | Directi<br>and<br>velocit            |                            | Directi<br>and<br>velocit             |                            | Directi<br>and<br>velocit           |                            | Direction and velocity              | - 1                       | Direction<br>and<br>velocity.                  |                        | Direction<br>and<br>velocity.                              | ' 1                        | ection<br>and<br>locity.                  | Direc<br>an<br>veloc           | d                               | Direct<br>and<br>veloci             | iou B  | ean vi<br>ocity.                 |
| 1882,<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | SW.<br>SW.<br>SSW.<br>SSW.           | 8<br>12<br>2<br>2          | SW.<br>SW.<br>Calm.<br>SSW.          | 7 12 2                    | SW.<br>SW.<br>Cahn.<br>WSW.          | 8<br>12<br>2              | SW.<br>SSW.<br>Calm.<br>Calm.        | 9<br>12                    | SW.<br>SSW.<br>Calm.<br>Calm.         | 8<br>12                    | SW.<br>SSW<br>Calm.<br>Calm.        | 8<br>12                    | SW.<br>SSW.<br>Calm.<br>WSW.        | 9 14 4                    | SW. 8<br>SSW. 12<br>Calm.<br>WSW. 4            | 1 8                    | SW. 8<br>SSW. 12<br>Calm.<br>WSW. 7                        | SW<br>SSV<br>Cal<br>WS     | V. 16                                     | SW.<br>SSW<br>Calm<br>WSW      |                                 | SW.<br>SSW.<br>Calm.<br>SW.         | 10<br>20<br>6  | 7.<br>11.;<br>4.1                |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | S.<br>WSW.<br>WSW.<br>WSW.           | 22<br>24<br>10<br>12<br>22 | S.<br>W.<br>SW.<br>WSW.              | 22<br>12<br>12<br>8<br>22 | SSW.<br>W.<br>SW.<br>WSW.<br>W.      | 20<br>22<br>8<br>7<br>22  | 88W.<br>W.<br>8W.<br>W.              | 20<br>24<br>9<br>12<br>22  | SW.<br>W.<br>WSW.<br>W.               | 27<br>26<br>8<br>8<br>20   | SW.<br>W.<br>WSW.<br>WSW.           | $^{24}_{20}_{7}_{8}_{16}$  | SW.<br>W.<br>WSW.<br>WSW.<br>W.     | 24<br>24<br>12<br>7<br>16 | 8W. 23<br>W. 16<br>WSW. 11<br>WSW. 20<br>W. 12 | 3 1                    | SW. 20<br>WSW. 22<br>WSW. 12<br>WSW. 22<br>W. 12           | WS                         | 3W. 24<br>3W. 24<br>5W. 12<br>5W. 20<br>6 | WSW<br>WSW<br>SW.<br>Calm      | 7. 17<br>7. 10                  | WSW.<br>WSW.<br>WSW.<br>Calm.       | 12   | 18 :<br>21.<br>10.<br>12.<br>16. |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>teb. 13<br>Feb. 14 | W.W.W.<br>SSE.<br>S.<br>WSW.         | 10<br>5<br>4<br>10<br>16   | W.<br>NW.<br>SSE.<br>SSW.<br>WSW.    | 9<br>6<br>4<br>9<br>16    | WNW.<br>NW.<br>S.<br>SSW.<br>WSW.    | 10<br>4<br>4<br>12<br>14  | WNW.<br>NW.<br>S.<br>SSW.<br>WSW.    | 10<br>4<br>6<br>12<br>16   | WNW.<br>Caim.<br>S.<br>SW.<br>WSW.    | 10<br>5<br>11<br>14        | WNW.<br>NW.<br>S.<br>SW.<br>WSW.    | 11<br>5<br>5<br>10<br>14   | WNW.<br>NW.<br>S.<br>SW.<br>WSW.    | 12<br>5<br>4<br>11<br>15  | WNW. 16<br>NW. 3<br>S. 6<br>SW. 12<br>WSW. 16  | 3 3                    | WNW. 10<br>NW. 5<br>S. 6<br>SW. 14<br>WSW. 14              | NY<br>S.<br>SW             | . 16                                      | WNV<br>NW.<br>8.<br>SW.<br>WSV | 4<br>7<br>13                    | WNW.<br>NW.<br>S.<br>SW.<br>WSW.    | 5<br>10<br>12  | 9.<br>4.<br>4.<br>9.<br>15.      |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | SW.<br>ENE.<br>N.<br>NNE.<br>NNE.    | 18<br>10<br>9<br>22<br>23  | SW.<br>ENE.<br>NE.<br>N.<br>NNE.     | 15<br>8<br>24<br>22       | SW.<br>ENE.<br>NE.<br>N.             | 20<br>14<br>9<br>22<br>23 | SW.<br>ENE.<br>NE.<br>N.             | 21<br>16<br>10<br>24<br>25 | SW.<br>NE.<br>NE.<br>N.               | 20<br>18<br>7<br>28<br>24  | SW.<br>NE.<br>NE.<br>N.             | 18<br>18<br>5<br>22<br>22  | SW.<br>NR.<br>NE.<br>N.             | 18<br>18<br>5<br>22<br>26 | SW. 16<br>NE. 26<br>NE. 4<br>N. 24<br>N. 26    |                        | SW. 20<br>NE. 20<br>NE. 5<br>N. 18<br>N. 25                | SW<br>NE<br>NE<br>N.       | . 18<br>20<br>10<br>24<br>24              | SW.<br>NE.<br>NE.<br>N.        | 12<br>20<br>12<br>24<br>24      | SW.<br>NE.<br>NE.<br>NNE.<br>NNE.   | $     \begin{array}{c}       14 \\       24 \\       9 \\       20 \\       26     \end{array} $ | 17<br>12<br>13.<br>19.<br>23.    |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | NNE.<br>NNE.<br>NNE.<br>SW.<br>Calm. | 22<br>3<br>4<br>4          | NNE.<br>NNE.<br>N.<br>SW.<br>Calm.   | 22<br>3<br>4<br>5         | NNE.<br>NYE.<br>N.<br>WSW.<br>WNW.   | 20<br>3<br>4<br>5<br>3    | NNE.<br>NNE.<br>N.<br>WSW.<br>WNW.   | 22<br>2<br>5<br>4<br>4     | NNE.<br>NNE.<br>N.<br>WSW.<br>WSW.    | 22<br>4<br>4<br>8<br>3     | NNE.<br>NNE.<br>N.<br>WSW.          | 18<br>4<br>5<br>3          | NNE.<br>NNE.<br>N.<br>WSW.<br>WSW.  | 19<br>4<br>4<br>4<br>3    | NNE. 18<br>NNE. 8<br>N. 4<br>WSW. 4<br>WSW. 3  |                        | NNE. 14<br>NNE. 4<br>N. 4<br>WSW. 2<br>WSW. 4              | NN<br>NN<br>N.<br>W.       | E. 4<br>4<br>7                            | NNE<br>NNE<br>NNV<br>W.<br>SW. | 7. 3<br>6<br>8                  | NNE.<br>NNE.<br>Calm.<br>WNW<br>SW. | 7<br>4<br>6<br>7   | 21.<br>4.<br>4.<br>4.<br>5.      |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | SSW.<br>S.<br>NW.<br>SSW.            | 10<br>9<br>22<br>32        | SSE<br>NW.<br>SW.                    | 12<br>6<br>20<br>28       | SSW.<br>SSE.<br>NW.<br>SW.           | 12<br>6<br>16<br>24       | SSW.<br>SSR.<br>NW.<br>SW.           | 12<br>6<br>16<br>24        | SSW.<br>SSE.<br>NW.<br>SW.            | 12<br>9<br>16<br>22        | SSW.<br>SSE.<br>NW.<br>SW.          | 14<br>9<br>12<br>26        | SSW.<br>SSE.<br>NW.<br>SW.          | 14<br>9<br>12<br>25       | S. 12<br>SSE. 11<br>NW. 14<br>SW. 25           | 1 3                    | 8. 14<br>SSE. 10<br>NW. 12<br>SW. 22                       | S.<br>NV<br>SW             | 7. 24                                     | 8.<br>8.<br>W.<br>8W.          | 14<br>14<br>8<br>24             | 8.<br>8.<br>8W.<br>8W.              | 12<br>8<br>12<br>22  | 10.<br>8.<br>13.<br>24.          |
|   |                                      |                            | 11.70                                |                           | 11.64                                |                           | 12, 39                               | _                          | 12. 17                                |                            | 11, 39                              | -                          | 12, 14                              | _                         | 12, 17   | _                      |  | -                          | 2, 85                                     | 11.                            | _                               | 11.2                                |  | 11.                              |

State:

Date.

Mat. 7 | 1 | Mar. 8 | F | Mar. 9 | S | Mar. 10 | S | Mar. 11 | Mar. 12 | Y | Mar. 13 | S | Mar. 14 | S | Mar. 14 | S | Mar. 16 | F | Mar. 18 | F | Mar. 19 | Mar. 20 | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | S | Mar. 21 | Mar. 21 | S | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21 | Mar. 21

Mar. 22 S Mar. 23 S Mar. 24 Mar. 25 Mar. 25 Mar. 26 Mar. 27 S Mar. 28 Mar. 29 Mar. 29 Mar. 30 Mar. 31 Means

Date:

Mar. 5 | Mar. 6 | Mar. 7 | Mar. 8 | Mar. 8 | Mar. 10 | Mar. 11 | Mar. 12 | Mar. 13 | Mar. 14 | Mar. 15 | Mar. 16 | Mar. 16 | Mar. 17

Mar. 12 Mar. 13 Mar. 14 Mar. 16 Mar. 16 May. 16 May. 16 May. 19 May. 20 May. 21 May. 21 May. 22 May. 24 May. 25 May. 2

Mar. 30 Mar. 31 Means Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

883-Centinued

ty given in miles per hour! 11 a. m.

Direction and velocity.

NNE. NNE. NNE. SW. WNW. SSW. SSW.

13,00 12 p. m. ty. Daily Daily Bean ve locity.

10 SW. 10 16 SSW. 20 Calm. 2 SW. 6

21 WSW, 18 17 WSW, 12 10 WSW, 8 19 SW, 20 Calm.

11, 21

7.41 11.58 4.16 1.54

18 95 21 83 10.58 12.16 16.28

9, (A 4, 79 4, 79 4, 70 9, 54 15, 70

17 or 12.12 13.91 10.00 24.54

10 .33 5,75 13,79 24,5%

11 81

12 m.

Direction and Velocity

6 SW 10 SW 2 SSW 2 Calm 20 S 24 SW 11 WSW 12 WSW 20 W.

10 WSW, 4 WNW, 7 SSE, 6 S, 16 WSW,

26 SW. 8 SSE. 14 N. 22 NNE. 28 NNE

22 NNE 6 NNE 4 NNE 6 SW 5 WNW

6 SSW. 8 S. 24 NW. 32 SSW.

| La. m.   | 2 a. at.                      | 3 a. m.                       | 4 a. m.                          | 5 a. m.  | 6 a. m.  | 7 a. m.  | 4 a. m.  | " 9 a. m.   | 10 a. m.  | 11 a. m.   | 13 m.  |
|--|-------------------------------|-------------------------------|----------------------------------|--|--|--|--|---|---|--|--|
| Direction<br>and<br>velocity.                  | Direction<br>and<br>relocit   | Direction<br>and<br>velocity. | Direction<br>and<br>velocity.    | Direction<br>and<br>velocity   | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity,   | Direction and velocity.   | Direction and velocity.  | Direction<br>and<br>velocity.  |
| sw. 24   | sw. 17                        | 8W. 20                        | WSW. 20                          | SW. 16   | WSW. 14  | W. 23  | W. 18  | WSW. 19   | WSW. 20   | W8W. 16  | WSW. 17  |
| ENE 29   | SE. 10<br>NE. 0<br>E. 20      | SE. 1-<br>NE. 10<br>E. 20     | SE. 17<br>NE 11<br>ENT           | WSW. 20<br>SE. 16<br>E. 15<br>E. 20<br>ESE. 12   | W. 22<br>SE. 10<br>NE. 16<br>ENE. 25<br>ESE. 12  | W. 22<br>SE. 16<br>NE. 14<br>E. 27<br>ESE. 11  | W. 22<br>SE. 12<br>NE. 16<br>E 28<br>ESE. 10   | W. 16<br>SE. 6<br>NE. 20<br>E. 32<br>ESE. 10  | WSW. 14<br>SE. 8<br>NE. 2:<br>ESE. 32<br>ESE. 13  | WSW, 12<br>SE, 8<br>NE, 20<br>E, 32<br>ESE, 12   | SW. 12<br>SE. 4<br>NE. 20<br>ESE 24<br>ESE. 10   |
| ESE 11<br>S 11<br>S 12                         | ESE. 13<br>SSW. 13<br>S. 11   | 88W. 11<br>88W. 11            | ESE. 19<br>88W. 14<br>8W 4       | ESE. 15<br>ESE. 18<br>S. 18<br>SSW. 6<br>W. 24   | ESE 18<br>ESE, 16<br>S, 16<br>S, 6<br>W, 23  | ESE. 16<br>ESE 19<br>SSE. 16<br>S 4<br>W. 24   | ESE. 13<br>ESE 20<br>SSE. 17<br>S 8<br>W. 20   | ESE. 16<br>ESE. 19<br>SSE. 16<br>S. 8<br>W. 24  | ESE. 16<br>ESE. 16<br>SSE 19<br>SSW. 8<br>W. 20   | ESE 8<br>ESE 15<br>SSE 15<br>SSW. 6<br>W. 26   | ESE. 18<br>SE. 16<br>SSE. 16<br>SSW. 3<br>W. 26  |
| WSW. 10<br>W 20<br>SW. 14<br>N <sub>1</sub> 11 | WSW. I                        | WNW. 2:<br>1 WSW. 19          | WNW. 22<br>WSW. 18<br>N. 8       | SSW. 10<br>WNW. 20<br>WSW. 12<br>N. 6<br>ENE 16  | SSW. 12<br>W. 24<br>SW. 12<br>N. 6<br>ENE. 16  | S 14<br>W. 20<br>SW. 8<br>N. 6<br>ENE, 16  | S 48<br>W. 17<br>SW. 10<br>N 6<br>E. 18  | SSE. 20<br>WSW. 13<br>SW. 8<br>N. 5<br>E. 18  | 88" 22<br>WSW. 13<br>SSW.<br>N  | SSE. 20<br>SW. 10<br>SSW. 6<br>6<br>1 20   | S. 16<br>SSW. 12<br>SSW. 6<br>E. 18  |
| ESE. O<br>WNW. 17                              | ESE. 6<br>WNW. 10             | SE. SE. WNW. 2                | ESE. 24<br>SE. 4<br>WNW, 16      | ESE. 30<br>ESE. 28<br>Calm.<br>WNW. 19<br>SSW. 4   | ESE. 26<br>ESE. 27<br>SW. 3<br>NW. 16<br>Calm.   | ESE. 34<br>ESE. 26<br>SW. 4<br>NW. 16<br>SSW. 3  | ESE, 34<br>ESE, 28<br>W. 6<br>NW. 13<br>SSW. 3   | ESE. 36<br>ESE 24<br>W. 6<br>NW. 11<br>SSW. 4   | ESE. 36<br>ESE. 25<br>W. 6<br>NW<br>SS U.   | 50 36<br>22<br>1 4<br>N 7<br>SSW. 3  | ESE. 32<br>ESE. 22<br>W. 3<br>WNW. 7<br>SSW. 3   |
| W. 21<br>W. 24                                 | SSW. 16<br>W. 24<br>W. 29     | 88W. 10<br>W. 21<br>W. 21     | SSW. 15<br>W. 24<br>W. 19        | SSE, 18<br>SSW, 14<br>W, 25<br>W, 18<br>W, 16  | SSE, 12<br>SSW, 12<br>W, 22<br>W, 16<br>W, 16  | S. 18<br>SW. 10<br>W. 24<br>W. 29<br>W. 14   | SSW. 12<br>WSW. 21<br>W. 26<br>WNW. 22<br>W. 14  | SSW. 12<br>W. 18<br>W. 18<br>WXW. 18<br>W. 12   | 88 a . 12<br>W  | $\begin{array}{cccc} 8 & & 9 \\ V_{\odot} & & 22 \\ W_{\odot} & & 22 \\ W_{\rm NW}, & & 20 \\ W_{\odot} & & 18 \\ \end{array}$ | S. 14<br>W. 23<br>W. 25<br>W.N.W. 18<br>W. 14  |
| W. 32<br>WNW. 24                               | N.W. 12<br>W. 32<br>W.N.W. 23 | NW. 1:<br>W. 30<br>WNW. 23    | WSW. 28<br>WNW. 23               | SSE. 4<br>NW. 8<br>W. 32<br>WNW. 18<br>WNW. 9  | SSE. 3<br>NW. 10<br>WSW. 32<br>WNW. 14<br>WNW. 8   | SSE. 4<br>NW. 10<br>W. 30<br>WNW. 18<br>WNW. 8   | W. 4<br>NW. 10<br>W. 32<br>WNW. 13<br>WNW. 9   | W. 5<br>NW. 12<br>W. 30<br>WNW. 14<br>WNW. 10   | NW. 13<br>W. 30<br>WNW. 16<br>WNW. 12   | W. 5<br>NW. 16<br>WSW. 28<br>WNW. 12<br>WSW. 12  | NW. 6<br>NW. 16<br>WSW. 32<br>WNW. 12<br>WSW. 12   |
| 16, 29   | 16. 22                        | 16, 85                        | 16. 83                           | 15, 70   | 15. 19   | 15, 96   | 16, 12   | 15. 48  | 15, 90  | 15. 09   | 14, 90   |
| 1 p. m.  | 2 p. m.                       | 3 p. m.                       | 4 p. m.                          | 5 p. m.  | 6 p. m.  | 7 p. m.  | 8 p. m.  | 9 p. m. 1   | 0 p. m. 11 p  | . m 12 p. r  |  |
| Direction<br>and<br>velocity.                  | Direction<br>and<br>velocity. | Direction<br>and<br>velocity. | Direction<br>and<br>volocity.    | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  | and   | and a   | ad and   | meny.  |
| WSW. 16  | SW. 13                        | sw. 1                         |                                  | SW. 12   | SSW. 14  | SSW. 20  | 8W. 20   | SW. 24 8  | W. 26 SW.   | 28 SW.   | 32 18.95   |
| SE. 3  | ENE. 24                       | SE.<br>ENE. 2<br>ESE. 2       | SE. 8<br>NE. 22<br>ESE. 27       | SSW.   11<br>  SE   8<br>  NE.   24<br>  ESE.   18<br>  E.   19  | SSW. 16<br>SE. 5<br>ENE. 24<br>ESE. 32<br>E. 22  | SSW. 8<br>S. 6<br>ENE. 28<br>ESE. 24<br>ESE. 16  | SSW. 5<br>SSW. 8<br>ENE. 24<br>ESE. 24<br>ESE. 20  | ENE. 28 E<br>ESE. 24 E  | NE. 25 ENI<br>SE. 20 ESE  | 28 ENE.<br>20 ESE.   | 10 14, 70<br>2 8, 75<br>30 19, 91<br>23 26, 15<br>14 14, 54  |
| SSE. 10<br>S. 15<br>SSW. 3                     | SSE. 20<br>SSW. 16<br>SW. 4   | S. 1<br>SW. 2<br>WSW.         | 9 S. 16<br>8 WSW, 27<br>8 WSW, 3 | SE. 14<br>S. 16<br>WSW. 24<br>WSW. 3<br>WSW. 22  | SE. 14<br>SSW. 12<br>SW. 18<br>WSW. 2<br>W. 18   | SE. 14<br>SSW. 12<br>SW. 12<br>W. 4<br>W. 23   | SE. 9<br>SSW. 14<br>SW. 16<br>WNW. 6<br>W. 18  | SSW. 16 S:<br>WSW. 19   S:<br>WNW. 7 W  | SW. 22 SSW<br>SW. 16 SSW<br>VNW. 4 WN   | . 19   SSW.<br>. 12   SSW.<br>W. 10   W N W  | 11 10 87<br>16 16.79<br>11 16.45<br>10 8.25<br>9 20.45   |
| SW. 10<br>SSW. 0<br>N. 8                       | SSE.                          | Calm.                         | S. 16<br>NNW. 3<br>3 N. 8        | S. 12<br>S. 19<br>N. 4<br>N. 8<br>E. 28  | S. 16<br>S. 22<br>NNE. 14<br>N. 8<br>E. 28   | 8. 16<br>8. 24<br>NNE. 15<br>ENE. 8<br>E. 32   | S. 12<br>S. 24<br>N. 16<br>ENE. 8<br>E. 30   | N 21 N<br>NE. 12 E  | NE. 12 ENI  | 22 W.<br>19 SW.<br>11 N.<br>2. 13 ENE.<br>28 E.  | 28 15, 33<br>18 19 44<br>14 10, 66<br>12 7 95<br>31 22, 29   |
| ESE. 2:<br>W. (<br>NW. (                       | ESE. 10<br>S.<br>NW.          | ESE. 1<br>S.<br>NW.           | 8 ESE. 18<br>8 SW. 7<br>7 NW. 6  | ESE. 30<br>ESE. 15<br>SW. 6<br>NW. 10<br>SSE. 4  | ESE. 34<br>ESE. 20<br>SW. 7<br>NW. 8<br>SSE. 12  | ESE. 32<br>ESE. 16<br>SW. 9<br>NW. 3<br>SW. 4  | ESE. 20<br>ESE. 16<br>SW. 12<br>NW. 3<br>S. 6  | ESE. 6 E<br>SW. 11 S<br>NW. 4 S   | SE. 9 ESE<br>W. 11 SW.<br>SW. 8 SSW   | 9 ESE.<br>10 W.<br>7 SSW.  | 23 <b>32 0</b> 3<br>8 20,62<br>15 6,54<br>8 10,04<br>16 5,66   |
| W. 22<br>W. 25<br>W.N.W. 20                    | W. 2:<br>W. 2:<br>W. W. 1:    | W. 1<br>W. 2<br>W.W. 2        | W. 20<br>W. 24<br>W. W. 18       | S. 14<br>W. 17<br>W. 24<br>W. 20<br>W. 15  | S. 14<br>W. 19<br>W. 24<br>W. 17<br>W. 11  | SSW. 14<br>W. 23<br>W. 24<br>W. 16<br>W. 7   | SSW 9<br>W. 23<br>W. 28<br>W. 18<br>W. 3   | W. 24 W<br>WNW.24 W<br>W. 14 W  | V. 24 W.<br>VNW.28 W.N<br>V. 16 W.  | W. 26 W.NW<br>16 W.  | 12 14 04<br>23 19 64<br>24 23,58<br>13 18 66<br>5 11,41  |
|  | W. 1                          | W. 2                          | WSW. 22                          | NW. 10<br>W. 24<br>W. 32   | NW. 11<br>W. 31<br>W. 32<br>WNW. 11  | NW. 12<br>W. 28<br>W. 32<br>WNW, 12  | NW. 13<br>WSW. 28<br>W. 26<br>WNW. 10  | WSW. 27 V<br>W. 30 V  | V. 32 W.  | 32 WSW.<br>25 WNW  | 13 8, 04<br>31 18 79<br>25 30, 00  |
|  | SW. 24                        | Direction and velocity.       | Direction and velocity.          | Direction and velocity.   Direction and velocity.   Sw.   24   Sw.   17   Sw.   20   WsW.   20   WsW | Direction and velocity.   Direction and velocity.   Direction and velocity.   Direction and velocity.   Direction and velocity.   SW. 24   SW. 16   SW. 25   SW. 16   SW. 26   SW. 26   SW. 27   SW. 26   SW. 27   SW. 27   SW. 28   SW. 29   SW. 20   Direction and velocity   Direction   Direction and velocity   Direction   Direction and velocity   Direction   Direction   Direction and velocity   Direction   Directi | Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Direction and velocity   Velo | Direction and order    Direction and order | Direction   Direction   Direction   Direction   Direction   Direction   Direction   Direction   Direction   Direction   and   velocity. |  | Direction   Dire |

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883—Continued.
[Height of anemometer above surface of ground, 21 feet. Washington mean time. Correction to reduce to mean local time, -58 17%. Velocity given in miles for how

|   | 1 a. m.  | 1   | 2 a. m.  |   | 3 a. n  | 16.   | ₽a. m  | 1.   | 5 a. m   | u.   | 6 s. m   | 1.   | 7 a. m.  |  | 8 a. m.  | , 9 њ г  | n.   | 10 a.  | 113.   | H a.  | TH  | 12 II.   | 1   |
|---|--|---|--|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|--|---|
| Date.   | Direction and velocity.  |   | Directio<br>and<br>velocity  |   | Directi<br>and<br>velocit   | ł .   | Directi<br>and<br>velocit  | 1  | Directi<br>and<br>velocit  | 1  | Directi<br>and<br>volocit  |  | Directic<br>and<br>velocity  |  | Direction<br>and<br>velocity.  | Direct<br>and<br>veloci  | 1  | Direct<br>and<br>veloci  | d .  | Directant veloci  | (I  | Directi<br>atal<br>velocit   | ling  |
| 1882.<br>Apr. 1<br>Apr. 2<br>Apr. 3<br>Apr. 4<br>Apr. 5   | SSW.<br>S.<br>ESE.   | 14  <br>8  <br>6  <br>4  <br>5  | WNW.<br>W.<br>SSW.<br>S.<br>ESE.   | 14<br>7<br>5<br>2<br>5  | WNW.<br>WSW.<br>SSW.<br>S.<br>ESE.  | 20<br>9<br>3<br>5   | WNW.<br>WSW.<br>SSW.<br>S.<br>ESE.   | . 18<br>7<br>3<br>10   | WNW.<br>WSW.<br>SSW.<br>S.<br>ESE  | . 18<br>7<br>5<br>4  | WNW.<br>WSW.<br>SSW.<br>S.<br>ESE.   | 8   3   7  | WNW.<br>WSW.<br>SSW.<br>S.<br>ESE.   | 16<br>7<br>2<br>2<br>6   | Calm.<br>ESE.  | 0 WNW.<br>7 WSW.<br>2 SSW.<br>Calm.<br>6 ESE.  | 7  | WNW.<br>WSW.<br>Calm.<br>S.<br>ESE.  | 3  | WNW.<br>WSW.<br>Calm.<br>ESE.<br>ESE.                         | 12<br>4<br>3<br>8   | WNW.<br>WSW.<br>ESE.<br>ESE  |   |
| Apr. 6<br>Apr. 7<br>Apr. 8<br>Apr. 9<br>Apr. 10   | SSE. 1<br>WNW.   | 14<br>17<br>18<br>3<br>3  | ESE.   | 11<br>20<br>17<br>4<br>3  | ESE<br>SE.<br>SE.<br>WNW.<br>WOW  | 9<br>20<br>14<br>   | ESE.<br>SE.<br>SE.<br>WNW.<br>WSW.   | 0<br>20<br>13<br>7   | ESE.<br>SE.<br>SE.<br>WNW.<br>WSW.   | 7<br>19<br>14<br>3   | ESE.<br>SF<br>SE.<br>WNW.<br>WSW.  | 14   | ESE.<br>SE<br>SE.<br>WNW.<br>SSW.  | 11<br>7<br>7<br>2<br>3   | SE. 2<br>E.<br>WNW.  | 9 ESE.<br>8 SE.<br>4 ESE.<br>4 WNW.<br>8 Calm.   | 13  <br>23<br>8<br>3   | ESE.<br>SE<br>ESE.<br>WNW.<br>SE.  | 13<br>24<br>10<br>3  | ESE.<br>SE.<br>ESE.<br>WNW<br>ENE                             | 8<br>24<br>12<br>3<br>5   | ESE.<br>SE<br>ESE.<br>WXW  | 8<br>24<br>12<br>5<br>4   |
| Apr. 11<br>Apr. 42<br>Apr. 13<br>Apr. 14<br>Apr. 15   | SE SE WNW. 1   | 3<br>21<br>4<br>19<br>12  | SE.  | 10 10 7   | S<br>SE.<br>SE.<br>WNW<br>SE.   | 4<br>24<br>6<br>19<br>8   | SE.<br>SE.<br>WNW<br>ESE.  | 1<br>20<br>7<br>10<br>12   | SE.<br>SE.<br>Calm.<br>WNW.<br>ESE.  | . 18<br>. 8  | SE.<br>SE.<br>SE.<br>WNW.<br>ESE.  | 3<br>22<br>4<br>14<br>8  | SE.<br>SE.<br>Calm.<br>WNW.<br>ESE.  | 6<br>19<br>10<br>8   | SE. I  | 3 SE.<br>0 WNW.  | 17<br>2<br>10<br>11  | SE.<br>SE.<br>WNW.<br>ESE.   | 8<br>12<br>4<br>6<br>11  | SE.<br>SE.<br>E.<br>WNW.<br>ESE.                              | 5<br>12<br>4<br>7<br>9  | SE.<br>SE.<br>WAW<br>WSW<br>ESE  | 5<br>14<br>12<br>12   |
| Apr. 16<br>Apr. 17<br>Apr. 18<br>Apr. 19<br>Apr. 20   | WNW.<br>WNW. 1<br>WSW.   | 13<br>4<br>15<br>6<br>6   | ESE.<br>WNW.<br>WNW.<br>WSW.<br>NNE.   | 12<br>12<br>12<br>5   | ESE.<br>WNW.<br>WNW.<br>WSW.<br>NNE   | 11<br>7<br>11<br>5<br>5   | SE.<br>WNW.<br>WNW.<br>W.  | 10<br>12<br>8<br>5   | SE.<br>WNW.<br>WNW.<br>W.  | 10<br>15<br>. d<br>6<br>. 3  | SE.<br>WNW.<br>WNW.<br>W.<br>NNE.  | 8<br>16<br>7<br>4<br>2   | SE.<br>WNW.<br>SSW.<br>W.<br>NNE.  | 14<br>11<br>4  | SSW. 1   | 0   SSW.<br>2   WNW.<br>2   SSW.<br>5   W.<br>3   NNE.   | 4<br>13<br>12<br>6<br>3  | SSW.<br>WNW.<br>WSW.<br>W.<br>NNE.   | . 16<br>10<br>8<br>4   | SE.<br>WNW.<br>WSW.<br>W<br>NNE.                              | 6<br>12<br>7<br>8<br>5  | SE<br>WNW.<br>WSW.<br>NNE.   | . 16<br>9   |
| Apr. 21<br>Apr. 22<br>Apr. 23<br>Apr. 24<br>Apr. 25   | WNW.   | 4<br>10<br>22<br>18<br>15   | N.<br>W.<br>WNW.   | 4<br>8<br>17<br>23<br>9   | W.<br>W.<br>W.N.W.<br>S.<br>S.W.  | . 10<br>23<br>7   | N.<br>W.<br>WNW.<br>S.   | 11<br>17<br>22<br>7  | N.<br>W.<br>WNW.<br>S.<br>SW.  | 3<br>10<br>13<br>20<br>6   | N.<br>W.<br>WNW.<br>SSW.<br>Calm   | 2<br>10<br>12<br>20  | W.<br>W.<br>WNW.<br>SSW.<br>SSE.   | 1<br>12<br>10<br>21<br>5   | SSW. 2   | Calm.<br>0 W.<br>0 W.N.W.<br>8   SSW.<br>5 SSE.  | 12<br>9<br>28<br>7   | Calm.<br>W.<br>WNW.<br>SSW.<br>ESE.  | 15<br>7<br>28<br>10  | Calm.<br>W.<br>SW.<br>SSW.<br>ESE.                            | 16<br>6<br>50   | Calm.<br>W<br>SW.<br>SSW.<br>ESE.  | 16<br>7<br>28<br>12   |
| Apr. 26<br>Apr. 27<br>Apr. 28<br>Apr. 29<br>Apr. 30   | E. 2<br>S.<br>SSW. 1<br>S. 1   | 28<br>9<br>15<br>15<br>10   | S.<br>SSW.   | 20  <br>10  <br>16  <br>7  <br>29   | ESE.<br>S.<br>SSW.<br>S.<br>WNW.  | 24<br>13<br>16<br>15<br>. 29  | ESE.<br>SSW.<br>SSW.<br>WNW.   | 24<br>9<br>17<br>12  | ESE.<br>SSW.<br>SW.<br>SSW.<br>WNW.  | 26<br>10<br>16<br>11<br>34   | ESE<br>SSW.<br>SW.<br>SSW.<br>WNW.   | 27<br>12<br>14<br>14<br>14   | ESE.<br>S.<br>SW.<br>SSW.<br>WNW.  | 26<br>9<br>14<br>12<br>26  | · SSW. 1   |  | 18<br>14<br>15<br>15<br>28   | ESE.<br>S.<br>WSW.<br>SSW.<br>WNW.   | 20<br>12<br>15<br>10<br>. 22   | ESE.<br>S.<br>WSW.<br>SSW.<br>WNW.                            | 16<br>12<br>12<br>12  | ESE.<br>S.<br>SSW.<br>SSW.<br>WNW  | 12<br>16<br>9   |
| Means.  | 11.76  | ,   | 11.40  |   | 11.83   | 3   | 11. 63   | 3  | 10. 80   | 0  | 10.63  | 3  | 9. 93  |  | 10. 23   | 10. 2  | 23   | 10   | - 4  | 0.6   | 33  | 9, 9   | (a)   |
|   | 1 p. m.  |   | 2 p. m.  |   | 3 p. m  | n.  | 4 p. m   | n.   | 5 p. n   | n.   | 6 p. n   | n.   | 7 p. m.  |  | 8 p. m.  | 9 p. m.  | 16   | 0 p. m.  | ii p   | . m.  | 12 p. i   |  |   |
| Date.   | Direction<br>and<br>velocity.  |   | Direction<br>and<br>velocity.  | 1   | Directic<br>and<br>velocit  | t   | Directic<br>and<br>velocit   | l l  | Directi<br>and<br>velocit  | l  | Directi<br>and<br>velocit  |  | Directio<br>and<br>velocity  | - 1  | Direction<br>and<br>velocity.  | Direction<br>and<br>velocity.  |  | rection<br>and<br>el-city.   | ar   | Del   | Din et<br>and<br>veloci   | tion lo  | Daily<br>wan ve-<br>locity.   |
| 1882.<br>Apr. 1<br>Apr. 2<br>Apr. 3<br>Apr. 4<br>Apr. 5   | S.<br>ESE.   | 6   | WSW.<br>Calm.<br>ESE.  | 13<br>4 ,<br>1<br>6   | W.<br>WSW.<br>S.<br>ESE.<br>ESE.  | 12<br>4  <br>2  <br>4  <br>6  | W.<br>WSW.<br>Calm.<br>ESE.<br>ESE.  | 14<br>6<br>3<br>10   | W.<br>SW.<br>Calm.<br>ESE.<br>ESE.   | 12<br>4<br>2<br>8  | W.<br>SW.<br>S.<br>ESE.<br>ESE.  | 11<br>4<br>3<br>6<br>10  | SW.<br>S.<br>ESE.  | 7  | W. 10<br>SW. 5<br>Calm.<br>ESE. 7<br>ESE. 9  | W. 12<br>SW. 6<br>Calm.<br>ESE. 8  | 8 S.<br>8 ES   | 4 .  | W.<br>SSW.<br>S.<br>ESE.   | . 7 5<br>3 5<br>5 1   | W.<br>SSW.<br>S.<br>ESE.<br>ESE.  | 8<br>5<br>4<br>5   | 13 67<br>5 92<br>2 20<br>3 66<br>8 16   |
| Apr. 6<br>Apr. 7<br>Apr. 8<br>Apr. 9  | ESE. 2   | 8 24  | ESE.   | 8<br>20   | ESE.<br>SE  | 12  | ESE.   | 16   | 1  | 11   |  |  |  | **   |  | ESE. 1   |  |  | ESE.   | . 11 1  | ******  |  | 40  |
| Apr. 10   | WNW.   | 5 4   | Calm.<br>WNW.  | 4   | ESE.<br>WNW.<br>ESE.  | 4   | SE.<br>ESE.<br>WNW.<br>ESE.  | 18   | ESE.<br>ESE.<br>WNW.<br>ESE.   | 22   | ESE.<br>WNW.<br>ESE.   | 14<br>22<br>6<br>3<br>5  |  | 14<br>18<br>7<br>2   | ESE. 15<br>SSE. 14<br>Calm.<br>WNW. 3<br>ESE, 4  | ESE. 12<br>SSE. 16<br>WNW. 4<br>Calm.<br>ESE. 2  | 1 ES<br>2 ES<br>6 S<br>4 W   | SE. 13<br>E. 16<br>NW. 2<br>SW. 2  |  | . 13 1<br>20 8<br>W. 3  | ESE<br>SSE.<br>WNW<br>SW<br>S.  | 12<br>16<br>V. 3<br>3<br>6   | 11 12<br>19 92<br>7 58<br>3 42<br>4 42  |
|   | WNW.<br>ENE.<br>SE.<br>SE.<br>WNW. 2   | 5<br>4<br>7<br>9<br>22<br>6   | SE.<br>SE.<br>WNW.<br>WNW.   | 4<br>4<br>8<br>10<br>22<br>5<br>14  | ESE.<br>WNW.  | 4<br>6<br>8<br>12<br>20   | SE.<br>ESE.<br>WNW.  | 18<br>4<br>6<br>6<br>12  | SE.<br>ESE.<br>WNW.  | 22<br>2<br>4<br>8  | SSE.<br>E.<br>WNW.   | 22<br>6<br>3<br>5  | SSE. E. WNW. ESE. SE. SE. WNW. SW.   | 14<br>18<br>7<br>2<br>5<br>16<br>15<br>21<br>8   | ESE. 15<br>SSE. 14<br>Calm.<br>WNW, 3  | ESE. 15<br>SSE. 16<br>WNW. 4<br>Calm.<br>ESE. 4  | ES ES ES ES ES ES ES ES ES ES ES ES ES E   | SE. 12<br>SE. 13<br>E. 16<br>NW. 2<br>SE. 7  | ESE.<br>SSE.<br>WNV<br>SSW<br>WSV  | . 13 1<br>W. 3 7<br>V. 2 8<br>W. 5 8<br>W. 10 8<br>W. 18 12 8 | ESE<br>SSE.<br>WNW<br>SW  | V. 3<br>3<br>6<br>21   | 19 92<br>7 58<br>3 42   |
| Apr. 10<br>Apr. 11<br>Apr. 12<br>Apr. 13<br>Apr. 14   | WNW.<br>ENE.<br>SE.<br>SE.<br>WNW. 2<br>WSW.<br>ESE. 1<br>SE.<br>WNW. 1<br>SW.   | 5<br>4<br>7<br>9<br>22<br>6<br>12<br>5  | Calm. WNW. E.  SE. SE. WNW. ESE. 1 SE. WNW. ESE. 1 SE. WNW. SW. W.   | 8<br>10<br>22<br>5  | ESE.<br>WNW.<br>ESE.<br>SE.<br>SE.<br>WNW.<br>WSW.                              | 4<br>6<br>8<br>12<br>20<br>6<br>12  | SE.<br>ESE.<br>WNW.<br>ESE.<br>SE.<br>SE.<br>WNW.<br>WSW.  | 18<br>4<br>6<br>6<br>12<br>12<br>5   | SE.<br>WNW.<br>ESE.<br>SE.<br>SE.<br>WNW.<br>SW.   | 22<br>2<br>4<br>8<br>13<br>11<br>22<br>7<br>8  | SSE.<br>E.<br>WNW.<br>ESE.<br>SE.<br>SE.<br>WNW.<br>SW.  | 22<br>6<br>3<br>5<br>11<br>12<br>20<br>5   | SSE.<br>E.<br>WNW.<br>ESE.<br>SE.<br>WNW.<br>SW.<br>ESE.   | 14<br>18<br>7<br>2<br>5<br>16<br>15<br>21<br>8<br>10<br>5<br>14<br>8<br>3  | ESE. 15<br>SSE. 14<br>Calm.<br>WNW. 3<br>ESE. 4<br>SE. 16<br>SE. 8<br>WNW. 23<br>SSW. 4  | ESE. 13<br>SSE. 16<br>WNW. 6<br>Calm.<br>ESE. 4<br>SE. 18<br>SE. 6<br>WNW. 22<br>SSW. 8  | 1   ES<br>2   ES<br>4   W<br>5   ES<br>8   SE<br>8   SE. 12<br>SE. 13<br>SE. 16<br>NW. 2<br>WW. 2<br>SE. 7<br>SE. 7<br>SE. 16<br>SE. 10<br>NW. 20<br>NW. 20<br>SE. 14                                     | ESE.<br>SSE.<br>WNV<br>SSW<br>WSV<br>SE.<br>SE.<br>WNV<br>SSE.   | W. 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                      | ESE<br>SSE.<br>WNW<br>SW<br>S.<br>SE.<br>SE.<br>WNW<br>SSE.   | V. 3<br>6<br>21<br>10<br>V. 18<br>12<br>12<br>V. 3<br>V. 15  | 19 92<br>7 58<br>3 42<br>4 42<br>9 04<br>14 42<br>12 67<br>10 12                                  |
| Apr. 10<br>  Apr. 11<br>  Apr. 12<br>  Apr. 13<br>  Apr. 14<br>  Apr. 15<br>  Apr. 16<br>  Apr. 17<br>  Apr. 18<br>  Apr. 18<br>  Apr. 18 | WNW.<br>ENE.<br>SE.<br>WNW. 2<br>WSW.<br>ESE. 1<br>SE.<br>WNW. 1<br>SW.<br>NNE<br>Calm.<br>W. 1<br>SW. 3   | 5<br>4<br>7<br>9<br>12<br>6<br>12<br>5<br>16<br>8<br>6<br>8<br>16<br>8<br>8<br>18 | Calm. WNW. E.  SE. SE. WNW. ESE. 1 WSW. ESE. 1 SW. W. W. W. W. W. SW. W. SW. W. SW. SW   | 5<br>10<br>22<br>5<br>14<br>4<br>14<br>9<br>8                             | ESE.<br>WNW.<br>ESE.<br>SE.<br>WNW.<br>WSW.<br>ESE.<br>SE.<br>WNW.<br>SW.<br>W. | 4 6 1 9 12 4 16 9 5 8   | SE.<br>ESE.<br>WNW.<br>ESE.<br>SE.<br>WNW.<br>WSW.<br>ESE.<br>SE.<br>WNW.<br>SW.                   | 18<br>4<br>6<br>6<br>12<br>12<br>5<br>17<br>22<br>5<br>17  | SE. ESE. WNW. ESE. SE. WNW. ESE. SE. WNW. ESE.   | 22<br>2<br>4<br>8<br>13<br>11<br>22<br>7<br>8  | SSE.<br>E.<br>WNW.<br>ESE.<br>SE.<br>WNW.<br>SW.<br>ESE.<br>WNW.<br>SW.<br>W.  | 22<br>6<br>3<br>5<br>11<br>12<br>20<br>5<br>8<br>5<br>14<br>8<br>2<br>7                    | SSE   E.   WNW.   ESE   SE   WNW.   ESE   SW.   ESE   SW.   WNW.   SW.   WNW.   SSE   WNW.   SSE   SSW.   WNW.   SSW.   WNW.   SSW.   14<br>18<br>7<br>2<br>5<br>16<br>15<br>21<br>8<br>10<br>5<br>14<br>8<br>3<br>8<br>9<br>9<br>14<br>24<br>24<br>24   | ESE. 15<br>SSE. 14<br>Calm.<br>WNW. 3<br>ESE. 4<br>SE. 16<br>SE. 8<br>WNW. 23<br>SSW. 4<br>ESE. 11<br>SE. 4<br>WNW. 14<br>SW. 8  | ESE. 15 SSE. 16 WNW. 6 Calm. ESE. 4 SE. 18 SE. 6 WNW. 22 SSW. 8 ESE. 14 SE. 5 WNW. 15 SW. 8  | 1 ES ES ES ES ES ES ES ES ES ES ES ES ES   | SE. 12<br>SE. 13<br>SE. 16<br>N.W. 2<br>SE. 7<br>SE. 7<br>SE. 10<br>S. 10<br>N.W. 20<br>10<br>SE. 14<br>SE. 10<br>S. 10<br>N.W. 20<br>SE. 7<br>SE. 7 | ESE. SSE. WNV SSW WSV SE. SE. WNV SSE. ESE. WNV WW   | 13 1 20 20 25 25 25 25 25 25 25 25 25 25 25 25 25             | ESE<br>SSE.<br>WNW<br>SW<br>S.<br>SE.<br>SE.<br>WNW<br>SSE.<br>ESE.<br>WNW<br>WNW<br>WSW<br>W.  | V. 3<br>3<br>6<br>21<br>10<br>V. 18<br>12<br>12<br>V. 3<br>V. 15<br>4<br>4                                       | 10 92<br>7 58<br>3 42<br>4 42<br>0.04<br>14 42<br>12.67<br>10 12<br>10.79<br>6 21<br>1.00<br>4 60 |
| Apr. 16   1   | WNW. ENE. SE. SE. WNW. 2 WSW. ESE. 1 SW. NNE Calm. W. W. SW. SSW. 3 ESE. 1 S. SSW. 3 ESE. 1 S. SSW. 1 SSW. 1 SSW. 2 SSW. 3 ESE. 1 S. SSW. 3 ESE. 3 | 5 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7   | Calm. WNW. E. SE. SE. SE. WNW. 1 SE. WNW. 1 SW. WW. SW. WW. 1 SSW.  8<br>10<br>22<br>5<br>14<br>4<br>14<br>9<br>8<br>8<br>7<br>22<br>10<br>30 | ESE. WNW. SE. SE. WNW. WSW. WNW. WSW. WSW. WSW. SSW. SSW                        | 4 6 8 9 12 20 6 12 4 16 9 5 8 8 32 12 12 12 12 12 12 12 12 12 12 12 12 12 | SE. ESE. WNW. ESE. SE. WNW. WSW. ESE. SE. WNW. WSW. ESE. SE. WNW. WNW. SW. WNW. SW. WSW. SSW. SSW. | 18<br>4<br>6<br>6<br>12<br>22<br>5<br>17<br>24<br>10<br>5<br>9<br>7<br>24<br>26<br>16<br>7<br>19<br>12<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19 | SE. WNW. ESE. SE. WNW. SW. ESE. WNW. W. W. W. W. W. W. S. W. W. S. W. W. S. W. S. W. S. W. S. W. S. S. W. S. W. S. S. W. S. W. S. S. W. S. S. W. S. W. S. S. | 22<br>2<br>4<br>8<br>13<br>11<br>22<br>7<br>8<br>7<br>16<br>8<br>1<br>7<br>16<br>8<br>17<br>18<br>18<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19<br>19 | SSE.<br>WNW.<br>ESE.<br>SE.<br>SE.<br>WNW.<br>ESE.<br>SW.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W | 22<br>6<br>3<br>5<br>11<br>12<br>20<br>5<br>8<br>28<br>14<br>28<br>10<br>6<br>18<br>6<br>6 | SSE. E. WNW. ESE. SE. SE. SE. SW. SW. NNE WNW. SSE. SE. WNW. SE. SE. SE. SE. SE. SE. SE. SE. SE. SE  | 14<br>18<br>7<br>2<br>5<br>16<br>15<br>21<br>8<br>10<br>5<br>14<br>8<br>3<br>8<br>9<br>24<br>14<br>22<br>14<br>22<br>16<br>17<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7 | ESE. 15<br>SSE. 14<br>Calm. WNW. 3<br>ESE. 16<br>SE. 8<br>WNW. 25<br>SSW. 4<br>ESE. 11<br>SE. 4<br>WNW. 14<br>SW. 8<br>WN. 8<br>WN. 6<br>W. 8<br>WN. 6<br>W. 8<br>WNW. 21<br>SSE. 18 | ESE. 12<br>SSE. 16<br>Calm. ESE. 2<br>SE. 4<br>WNW. 22<br>SSW. 8<br>WNW. 15<br>SW. 8<br>WNW. 15<br>SW. 8<br>WNW. 15<br>SW. 8<br>WNW. 15<br>SW. 8<br>WNW. 15<br>SSW. 8<br>WNW. 15<br>SSW. 8<br>WNW. 22<br>SSE. 18<br>SSW. 18<br>SSW. 28<br>SSE. 18<br>SSW. 28<br>SSE. 18<br>SSW. 28<br>SSW. 28<br>SSW. 28<br>SSW. 28<br>SSW. 28<br>SSW. 28<br>SSW. 38<br>SSW. 3 | 1 ES ES ES ES ES ES ES ES ES ES ES ES ES   | SE. 12, 13   | ESE. SSE. WNV SSE. SE. WNV SSE. WNV SSE. WNV WNV WNV WNV SSE. WNV WNV WNV SSE. WNV WNV WNV SSE. WNV WNV WNV SSE. WNV WNV WNV SSE. WNV WNV WNV WNV SSE. WNV WNV WNV WNV WNV WNV WNV WNV WNV WNV | W. 13 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1                     | ESE<br>SSE.<br>WNW<br>SW<br>S.<br>SE.<br>SSE.<br>WNW<br>WNW<br>WSW<br>WSW<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W. | V. 3<br>3<br>6<br>21<br>10<br>V. 18<br>12<br>12<br>V. 3<br>V. 15<br>V. 15<br>V. 20<br>15<br>20<br>15<br>21<br>17 | 19 92 8 8 4 8 9 15 8 8 4 8 14 12 15 15 15 15 15 15 15 15 15 15 15 15 15                           |

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Means

Statement showing the direction and velocity of the wind at Uylaamie from October, 1881, to August, 1883-"ontinued.

383—Continued,

given in miles per hour

Direction and velocity

WNW. WSW. S. ESE. ESE.

8 ESE. 24 SC. 12 ESE. 3 WNW 5 ENE.

5 SE. 12 SE. 4 WNW. 7 WSW 9 ESE.

Calm.
16 W.
6 SW.
30 SSW.
11 ESE.

16 ESE, 12 S. 12 SSW, 12 SSW, 20 WNW.

> 13.67 5.92 2.20 3.66 8.16

11. 12 19 92 7. 58 3. 42 4. 42

6, 21 13, 08 9, 00 4, 83 5, 54

4. 91 17. 04 13. 21 21.17 12 62

15, 41 14, 67 12, 25 13, 96 20, 79

Direction and velocity.

WNW, WSW. Calm. ESE. ESE. SE. WNW ENE SE. WNW ENE WNW. WSW. WNW. WSW. WNN.

Calin. W. SW. SSW. ESE.

ESE. S. WSW. SSW. WNW.

tion d ity.

9. 63 m. | 12 p. m.

5 W. 7 SSW. 3 S. 5 ESE. 11 ESE.

Direction and velocity.

SE. 21 SE. 10 WNW.18 SSE. 12 ESE. 12

W. 10 WNW. 20 SSE 20 SW. 15 E. 24 [Height of anemometer above surface of ground, 21 feet. Washington mean time. Correction to reduce to mean local time, —3b 17°. Velocity given in miles per hour.

|  | 1 11. 10  |   | 2 a. n                                     |   | 8 a. n   |  | 4 a. n   | h j  | ā a. n                             | ) ·  | 6 a. u                               | h 1  | 7 a. m                                       |  | S a. s                               | n.                                     | 9 14. 1                              | ш.   | 10 a.  | m.   | ii a.  | m.                                   | 12  | 111.                                 |
|--|---|---|--|---|--|--|--|--|------------------------------------|--|--------------------------------------|--|--|--|--------------------------------------|--|--------------------------------------|--|--|--|--|--------------------------------------|---|--------------------------------------|
| Date.  | Directi<br>and<br>velocit                                     |   | Directi<br>and<br>velocit                  |   | Directi<br>and<br>velocit                                  |  | Directi<br>and<br>velocit                        |  | Directi<br>und<br>velocit          |  | Directi<br>and<br>velocit            |  | Direction and velocit                        |  | Directi<br>and<br>veloci             |  | Direct<br>and<br>veloci              |  | Direction number of the property of the proper | d  | Direc<br>an<br>veloc                                       | d                                    | Direc<br>ni<br>velo                         |                                      |
| 1982<br>fay 1<br>fay 2<br>fay 3  | SSW.<br>NNW.<br>N.<br>NE.<br>ENE.                             | 11<br>12<br>13<br>9<br>14   | SW.<br>NNW.<br>N.<br>NE.<br>ENE.           | 11<br>11<br>18<br>9<br>15                               | SW.<br>NNW.<br>N.<br>NE.<br>ENE.                           | 13<br>11<br>10<br>7                                | SW.<br>NNW.<br>NNE.<br>NE.<br>ENE.               | 12<br>13<br>15<br>13<br>17                         | SW.<br>NNW.<br>NE.<br>NE.<br>ENE.  | 12<br>12<br>17<br>13<br>16                   | SW.<br>NNW.<br>NE.<br>NE.<br>ENE.    | 12<br>14<br>18<br>8<br>14                    | SW.<br>NNW.<br>NE.<br>NE.<br>ENE.            | 8<br>16<br>18<br>8<br>18                                 | SW.<br>NNW.<br>NE.<br>NNE.<br>ENE.   | 9<br>22<br>16<br>8<br>16               | SW.<br>NNW.<br>NE.<br>NNE.           | 10<br>20<br>11<br>11<br>18                           | SW.<br>NNW.<br>NE.<br>NE.<br>ENE.  | . 20<br>5<br>7                                     | SW.<br>NNW<br>NE.<br>NE.<br>ENE.                           | . 20<br>5<br>8<br>16                 | SW.<br>NNW<br>NNE.<br>NE.<br>ENE.           | . 16<br>14<br>16<br>16               |
| lay 5<br>lay 6<br>lay 7<br>lay 8<br>lay 0  | NE.<br>NE.<br>NE.<br>NE.<br>NE.                               | 17<br>23<br>20<br>11  | NE.<br>NE.<br>NE.<br>NE.<br>SW.            | 17<br>22<br>19<br>9                                     | NE.<br>NE.<br>NE.<br>S.W.                                  | 20<br>23<br>23<br>7<br>2                           | NE.<br>NE.<br>NE.<br>NE.<br>SW.                  | 20<br>18<br>19<br>8                                | NE.<br>NE.<br>NE.<br>NNE.<br>SW.   | 22<br>18<br>18<br>7                          | NE.<br>NE.<br>NE.<br>NNE.<br>SW.     | 12<br>16<br>18<br>8<br>2                     | NE.<br>NE.<br>NE.<br>NNE.<br>SW.             | 13<br>19<br>16<br>10<br>2                                | NE.<br>NE.<br>NE.<br>NNE.<br>SSW.    | 14<br>18<br>17<br>16<br>4              | NE.<br>NE.<br>NE.<br>NNE.<br>SSW.    | 20<br>19<br>15<br>13<br>5                            | NE.<br>NE.<br>NE.<br>NNE.<br>SSW.  | 19<br>22<br>18<br>16<br>6                          | NE.<br>NE.<br>NE.<br>NNE.                                  | 16<br>18<br>18<br>16<br>8            | NE.<br>NE.<br>NE.<br>NNE.<br>NNE.           | 16<br>18<br>20<br>13                 |
| Fay 10<br>Fay 11<br>Fay 12<br>Fay 13<br>Fay 14<br>Fay 15   | SE.<br>S.<br>SW.<br>W.<br>ESE                                 | 18<br>11<br>7<br>7<br>5   | SE.<br>SW.<br>W.<br>SSE.                   | 17<br>10<br>8<br>8<br>4                                 | 8E.<br>8W.<br>W.<br>58E.                                   | 13<br>9<br>9<br>10<br>5                            | SE.<br>SW.<br>W.<br>SSE.                         | 10<br>9<br>6<br>10<br>8                            | SE.<br>SW.<br>W.<br>SSE.           | 8<br>9<br>9<br>8                             | SE.<br>S.<br>WSW.<br>W.<br>SE.       | 7<br>7<br>10<br>10<br>6                      | SE.<br>S.<br>WSW.<br>W.<br>SSE.              | 10<br>8<br>17<br>10<br>9                                 | SE.<br>S<br>W.<br>W.<br>SSE.         | 12<br>5<br>11<br>10<br>10              | 88E.<br>84E.<br>W.<br>W.             | 13<br>9<br>12<br>9<br>8                              | SE.<br>W.<br>W.  | 12<br>8<br>7<br>10<br>9                            | 8.<br>SE.<br>W.<br>W.<br>S5W.                              | 8<br>8<br>2<br>9<br>6                | SSE.<br>W.<br>W.<br>SSW.                    | 1                                    |
| lay 16<br>Lay 17.<br>Lay 18 .<br>Lay 19 .  | SW.<br>WSW.<br>SSE<br>ESIL<br>SE.                             | 8<br>15<br>5<br>21<br>10  | SSW.<br>WSW.<br>SSE.<br>ESE.<br>SE.        | 8<br>14<br>4<br>20<br>12                                | 88W.<br>W8W.<br>88E.<br>ESE.<br>8E.                        | 10<br>12<br>4<br>21<br>7                           | SSW.<br>WSW.<br>SSE.<br>ESE.<br>FM.              | 8<br>11<br>6<br>24<br>3                            | 88W.<br>W.<br>83E.<br>ESE.<br>8E.  | 8<br>14<br>3<br>12<br>4                      | SSW.<br>W.<br>SSE.<br>ESE.<br>Calm.  | 3<br>9<br>4<br>24                            | SE.<br>W.<br>SSE.<br>ESE.<br>ESE.<br>SE.     | 4<br>10<br>4<br>22<br>4                                  | SE.<br>W.<br>SSE.<br>ESE.<br>SE.     | 3<br>8<br>4<br>24<br>6                 | SE<br>W.<br>E.<br>ESE.<br>SE.        | 3<br>8<br>12<br>23<br>9                              | SE.<br>W.<br>ESE.<br>SSE.  | 3<br>9<br>15<br>24<br>12                           | SE<br>W.<br>E.<br>ESE.<br>SSE.                             | 2<br>6<br>18<br>28<br>10             | 8E.<br>W.<br>E.<br>ESE.<br>SSE.             | 1-2                                  |
| fav 23<br>fav 24<br>fav 24<br>fav 25   | SW.<br>W.<br>ENE.<br>ENE.<br>ENE.                             | 19<br>6<br>22<br>21<br>21   | S.V.<br>W.<br>ENE.<br>ENE.<br>ENE.         | 10<br>7<br>22<br>20<br>24                               | SW.<br>W.<br>ENE.<br>ENE.<br>ENE.                          | 16<br>6<br>23<br>20<br>25                          | SW.<br>W.<br>ENE.<br>ENE.<br>ENE.                | 16<br>7<br>19<br>20<br>22                          | WSW.<br>W.<br>ENE.<br>ENE.<br>ENE. | 14<br>7<br>21<br>15<br>19                    | WSW.<br>WNW.<br>ENE.<br>ENE.         | 16<br>7<br>22<br>16<br>20                    | WSW.<br>WNW.<br>E.<br>ENE.<br>ENE.           | $\begin{array}{c} 14 \\ 7 \\ 24 \\ 21 \\ 22 \end{array}$ | WSW.<br>WNW.<br>E.<br>E.<br>ENE.     | 12<br>6<br>17<br>23<br>22              | WSW.<br>NNW.<br>ENE.<br>ENE.<br>ENE. | 12<br>5<br>20<br>23<br>23                            | WSW<br>NNW<br>ENE<br>ENE<br>ENE.   | . 12<br>6 21<br>22<br>22                           | WSW<br>NNE.<br>ENE.<br>ENE.<br>ENE.                        | . 12<br>7<br>18<br>22<br>24          | WSW<br>NNE<br>ENE.<br>ENE.                  | 7. 1<br>10<br>2<br>2                 |
| day 26<br>day 27<br>day 28<br>day 20<br>day 50   | ENE.<br>ENE.<br>ENE.<br>E.                                    | 21<br>16<br>18<br>18<br>16  | ENE.<br>ENE.<br>E.<br>E.                   | 20<br>19<br>16<br>17<br>16                              | ENE.<br>ENE.<br>NE.<br>E.                                  | 20<br>20<br>17<br>18<br>18                         | ENE.<br>E.<br>NE.<br>ENE.<br>E.                  | 21<br>13<br>16<br>15<br>17                         | ENE.<br>ENE.<br>NE.<br>ENE.<br>E.  | 10<br>11<br>14<br>18<br>17                   | ENE.<br>ENE.<br>NE.<br>ENE.          | 19<br>11<br>12<br>22<br>18                   | ENE.<br>ENE.<br>NE<br>ENE.<br>E.             | 20<br>12<br>14<br>18<br>16                               | ENE.<br>ENE.<br>NE.<br>ENE.<br>E.    | 20<br>12<br>12<br>16<br>16             | ENE.<br>ENE.<br>NE.<br>ENE           | 19<br>13<br>14<br>16<br>15                           | ENE.<br>ENE.<br>ENE.<br>ENE.   | 20<br>13<br>16<br>18<br>14                         | ENE.<br>ENE.<br>ENE.<br>ENE.                               | 12<br>16<br>14<br>14                 | NE.<br>ENE.<br>ENE.<br>ENE.                 | 1 1                                  |
| May 31.  | Е.  | 10  | Е.   | 13  | Е.   | 10   | E.   | 10   | Е.                                 | 11   | E.                                   | 10   | E.   | 12   | Е.                                   | 11                                     | E.                                   | 9  | Е.   | 11   | E.   | 10                                   | ESE   | 1                                    |
| Means  | 10, 77  |   | 13, 81                                     | l   | 13. 7  |  | 13. 16   | 5  | 12.8                               | 1  | 12.10                                | 3  | 13. 06                                       | -  | 12. 9                                |  | 13.4                                 | ia   | 13.  | 74   | 13.  | 06                                   | 18  | 55                                   |
|  | <b>1</b> p = 0  | 1.  | 2 p. r                                     | и.  | 3 р. т   | n.   | 4 p. 1   | n.   | 5 p. 1                             | n.   | 6 p. i                               | 33.  | 7 p. n                                       | ١.   | 8 p. m                               | la.                                    | 9 p. m.                              | 1  | 0 p. m.  | 11   | p. m.  | 12 p.                                | ın.   | D                                    |
| Date.  | Direct<br>and<br>velocit                                      |   | Direct<br>and<br>veloci                    |   | Direct<br>and<br>veloci                                    |  | Direct<br>and<br>veloci                          | l  | Direct<br>and<br>veloci            | ì  | Direct<br>and<br>veloci              | l  | Directi<br>and<br>velocit                    |  | Direction and velocit                | -                                      | Directio<br>and<br>velocity          | 1  | orection<br>and<br>elocity.  |  | rection<br>and<br>locity.                                  | Direc<br>and<br>veloc                | l   | Daily<br>lean vo<br>locity.          |
| 1882.<br>May 1.<br>May 2.<br>May 3.<br>May 4.<br>May 5   | SSW.<br>NNW.<br>NNE.<br>ENE.<br>ENE.                          | 5<br>16<br>14<br>4<br>16  | W.<br>NNW.<br>NNE.<br>S.<br>ENE.           | 10<br>12<br>12<br>3<br>16                               | W.<br>NNW.<br>NNE.<br>S.<br>NE.                            | 8<br>11<br>12<br>3<br>22                           | WNW.<br>NNW.<br>NNE.<br>Colm.<br>NE.             | . 18<br>12<br>12<br>12                             | WNW<br>NNW.<br>N.<br>ISE.<br>NE.   | . 14<br>15<br>14<br>4<br>20                  | NW.<br>NNW.<br>N.<br>E.<br>NE.       | 18<br>12<br>13<br>10<br>20                   | NNW.<br>NNW.<br>NNE.<br>ENE.<br>NE.          | 20<br>14<br>12<br>13<br>24                               | NNW.<br>NNE.<br>NNE.<br>ENE.<br>NE.  | 18<br>16<br>12<br>11<br>20             | NNW. I<br>NNE. I<br>ENE. I           | 5 N<br>11 N<br>13 E                                  | NW. 18<br>L. 10<br>E. 10<br>NE. 14<br>E. 20  | N.<br>NE   | E. 16  | NNW<br>NE.<br>ENE.<br>NE.            | . 14<br>16<br>10<br>14                      | 12 :<br>14 :<br>12 :<br>9 :<br>17 :  |
| May 6.<br>May 7.<br>May 8.<br>May 9.<br>May 10.  | NE.<br>NE.<br>NE.<br>NNE.<br>SSE.                             | 20<br>18<br>16<br>12<br>12  | NE.<br>NE.<br>NE.<br>NNE.<br>SE.           | 22<br>20<br>16<br>10<br>14                              | NE.<br>NE.<br>NE.<br>NNE.<br>SSE.                          | 22<br>20<br>16<br>11<br>16                         | NE.<br>NE.<br>NE.<br>NNE.<br>SSE.                | 20<br>22<br>16<br>12<br>16                         | NE.<br>NE.<br>NE.<br>NNE.<br>SE.   | 22<br>20<br>15<br>12<br>16                   | NE.<br>NE.<br>NE.<br>N.<br>SE.       | 18<br>18<br>10<br>8<br>14                    | NE.<br>NE.<br>NE.<br>N.<br>SE.               | 20<br>20<br>12<br>11<br>16                               | NE.<br>NE.<br>NE.<br>N.<br>SE.       | 2)<br>20<br>11<br>11<br>18             | NE.<br>NE.<br>N.                     | 24   N<br>18   N<br>9   N<br>6   N<br>20   S         | E. 21<br>E. 16<br>E. 6<br>E. 18  | NE<br>NE<br>NE                                     | . 21   | NE.<br>NE.<br>NE.<br>NNE.<br>SE.     | 20<br>15<br>8<br>4<br>14                    | 19 (<br>19 )<br>15. )<br>10  <br>9 ( |
| May 11.<br>May 12.<br>May 13<br>May 14.<br>May 15.   | . W.  | 8<br>8<br>4<br>11<br>9  | SSE.<br>SE.<br>W.<br>WNW<br>SW.            | 10<br>8<br>4<br>8<br>10                                 | SSE.<br>SE.<br>W.<br>WNW<br>SW.                            | 12<br>8<br>4<br>7                                  | SSE<br>SSE.<br>W.<br>WNW<br>SW.                  | 12<br>9<br>4<br>7                                  | SSE.<br>W.<br>W.N.W.<br>SW.        | 12<br>8<br>2<br>8<br>14                      | SSE.<br>W.<br>W.N.W<br>SW.           | 11<br>7<br>5<br>4                            | SSE.<br>SSW<br>W.<br>NE.<br>SW.              | 16<br>8<br>9<br>4<br>16                                  | SSE.<br>SW.<br>W.<br>NNE.<br>SW.     | 14<br>7<br>10<br>2<br>14               | SW.<br>W.<br>Calm.                   | 8 S<br>14 V  | SE. 13<br>W. 13<br>W. 13   | 5 SW<br>5 W.<br>2 ES                               | E. 4   | S.<br>SW.<br>W.<br>ESE<br>WSW        | 10<br>5<br>8<br>5<br>5                      | 11.<br>7<br>8<br>7<br>7              |
|  | . ssw.  | 6   | SW.<br>W.<br>ESE.                          | 10<br>6<br>20<br>26                                     | WSW.<br>W.<br>ESE.<br>ESE.<br>S.                           | 12<br>6<br>20<br>24<br>16                          | WSW.<br>W.<br>ESE.<br>ESE.<br>S.                 | 12<br>4<br>22<br>24<br>16                          | WSW.<br>W.<br>ESE.<br>ESE.<br>SW   | . 14<br>4<br>24<br>24<br>9                   | WSW.<br>Calm.<br>ESE.<br>ESE.<br>SW. | 18<br>19<br>5                                | WSW.<br>Calm.<br>ESE.<br>ESE.<br>SSW.        | 20<br>24<br>20<br>9                                      | SW.<br>Calm.<br>ESE.<br>ESE.<br>SSW. | 15<br>18<br>18<br>9                    | W.<br>ESE<br>ESE.                    | 4 V<br>20 F<br>14 S                                  | VSW. 10<br>V. :<br>SE. 2:<br>E. 10<br>W. 2:  | S SS<br>E ES<br>S SE                               | E. 4<br>E 21<br>. 15                                       | WSW<br>SSE.<br>ESE.<br>SE.<br>SW.    | . 14<br>4<br>16<br>12<br>16                 | 9.<br>14.<br>21.<br>10               |
| May 16,<br>May 17,<br>May 18,<br>May 19,<br>May 20,  | . W.<br>. ESE.  | 20<br>24<br>16  | ESE.<br>S.                                 | 10  | 1.34   |  | *****  | . 8  | wsw.                               | 7  | WSW.                                 | . 5<br>11                                    | WSW.   | 5<br>16  | WSW.                                 | 6:<br>18<br>24                         | WSW.<br>ENE.                         | 18 F   | VSW.   | D EN   | SW. 7  | W.<br>ENE.                           | 6<br>18                                     | 10.<br>10.                           |
| May 17.<br>May 18.<br>May 19.  | W.<br>ESE.<br>ESE.<br>SSW.                                    | 24  | ESE.<br>S.<br>WSW.<br>NNE.<br>ENE.<br>ENE. | 10<br>9<br>22<br>22<br>26                               | WSW.<br>NNE.<br>ENE.<br>ENE.<br>NE.                        | 9<br>10<br>24<br>25<br>26                          | WSW.<br>NNE.<br>ENE.<br>ENE.<br>NE.              | 12<br>24<br>24<br>26                               | NE.<br>ENE.<br>ENE.                | 12<br>24<br>24<br>23                         | ENE<br>ENE.<br>ENE.                  | 20<br>20<br>20                               | ENE.<br>ENE.<br>ENE                          | 27<br>24<br>20   | ENE.<br>ENE.<br>ENE.                 | 24<br>20                               | ENE.                                 | 24 F   | NE. 2<br>L 2<br>ENE. 2   | EN<br>EN<br>EN                                     | (E. 23<br>(E. 24   | ENE<br>ENE<br>ENE                    | 20<br>19<br>20                              | 21.<br>21.<br>22.                    |
| May 17,<br>May 18,<br>May 19,<br>May 21,<br>May 22,<br>May 23,<br>May 24,<br>May 25,<br>May 26,<br>May 27,<br>May 28,<br>May 29, | W. ESE. ESE. SSW. WSW. NNE. ENE. ENE. ENE.                    | 24<br>16<br>10<br>8<br>20<br>22                                     | S.<br>WSW.<br>NNE.                         | 10<br>9<br>22<br>22                                     | WSW.<br>NNE.<br>ENE.<br>NE.<br>NE.<br>ENE.<br>ENE.<br>ENE. | 10<br>24<br>25                                     | NNE.<br>ENE.<br>ENE.                             | 12<br>24<br>24                                     | ENE.                               | 24   | ENE.                                 | 20<br>20                                     | ENE.   | 24   | ENE.                                 | 24                                     | ENE.<br>ENE.<br>ENE.<br>E.           | 24 H<br>25 H<br>22 H<br>22 H<br>20 H<br>20 H<br>16 H | NE. 2<br>NE. 2<br>NE. 2<br>NE. 2<br>NE. 2<br>NE. 2<br>NE. 1  | 4 E2<br>1 E2<br>2 E2<br>0 E2<br>6 E                | (E. 23<br>(E. 24   | ENE.<br>ENE.                         | 20<br>19<br>20<br>16<br>18                  | 21.                                  |
| May 17.<br>May 18.<br>May 19.<br>May 20.<br>May 21.<br>May 22.<br>May 23.<br>May 24.   | W. ESE. ESE. SSW. WSW. NNE. ENE. ENE. ENE. ENE. EXE. EXE. EXE | 24<br>16<br>10<br>8<br>20<br>22<br>26<br>22<br>15<br>16<br>16<br>14 | S. WSW. NNE. ENE. ENE. ENE. ENE. ENE. ENE. | 10<br>9<br>22<br>22<br>26<br>21<br>15<br>16<br>17<br>18 | WSW.<br>NNE.<br>ENE.<br>NE.<br>NE.<br>ENE.<br>ENE.<br>ENE. | 10<br>24<br>25<br>26<br>22<br>21<br>18<br>16<br>13 | NNE.<br>ENE.<br>NE.<br>NE.<br>LNE.<br>ENE.<br>E. | 12<br>24<br>24<br>26<br>20<br>10<br>17<br>16<br>12 | ENE. ENE. ENE. ENE. ENE. ENE.      | 24<br>24<br>23<br>21<br>20<br>17<br>17<br>12 | ENE<br>ENE.<br>NE.<br>ENE.<br>ENE.   | 20<br>20<br>20<br>16<br>18<br>16<br>17<br>12 | ENE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>ENE. | 24<br>20<br>20<br>21<br>20<br>16                         | NE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.  | 24<br>20<br>20<br>20<br>18<br>16<br>12 | ENE.<br>ENE.<br>ENE.<br>E.<br>E.     | 24 H<br>25 H<br>22 H<br>22 H<br>20 H<br>20 H<br>16 H | ENE. 2<br>ENE. 2<br>ENE. 2<br>ENE. 2<br>ENE. 2<br>ENE. 2<br>S. 1   | 4 E?<br>1 E?<br>2 E?<br>0 E?<br>0 E<br>6 E<br>0 E. | (E. 23<br>(E. 24<br>(E. 20<br>(E. 20<br>(E. 20<br>19<br>16 | ENE.<br>ENE.<br>ENE.<br>ENE.<br>ENE. | 20<br>19<br>20<br>16<br>18<br>18<br>16<br>9 | *                                    |

Height

July 5 July 6 July 6 July 7 July 9 July 10 July 12 July 12 July 12 July 13 July 13 July 14 July 15 July 14 July 15 July 14 July 17 July 18 July 17 July 18 July 19 Jul

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued,

|   | i a. n   | n   | 2 a. t   | n.   | 8 n. z   | n.   | 4 a. u  | a.  | 5 a. n  | n.   | 6 a. r   | n.   | T n. 1   | m.   | 8 a.   | m.  | 9   | a. m.   | 1  | 10 a.  | m.   | 11 1  | ), <b>10</b> ,   | 19 n  | b.        |
|---|--|---|--|--|--|--|---|---|---|--|--|--|--|--|--|---|---|---|--|--|--|---|--|---|-----------|
| Date.   | Direct<br>and<br>veloci  | 1   | Direct<br>and<br>veloci  | 1  | Direct<br>and<br>veluci  | 1  | Direct  |   | Direct<br>and<br>velocit  |  | Direct<br>and<br>veloc   | ı  | Direct<br>and<br>veloci  | 1  | Direc<br>and<br>veloc  | el.   | Dir   | rectio<br>and<br>locity   | m  | Direct<br>and<br>veloci  | rit .  | 13.   | etion<br>nd<br>neity,  | Direct<br>and<br>veloci   | lé:       |
| 1882.<br>nno 1<br>nno 2<br>nno 3<br>nno 4   | E.<br>NE.<br>N.  | 18<br>20<br>25<br>9   | E.<br>NE.<br>N.<br>E.  | 15<br>19<br>20<br>9  | E.<br>NE.<br>N.<br>E.  | 16<br>17<br>20<br>11   | E.<br>NE.<br>N.   | 16<br>16<br>20  | E.<br>NE.<br>N.<br>E.   | 18<br>18<br>20<br>11   | E.<br>NE.<br>N.<br>E.  | 14<br>18<br>19<br>10                                   | E.<br>NNE.<br>N.<br>E.   | 18<br>92<br>18<br>13                               | E.<br>NNE.<br>N.<br>E.   | 10<br>21<br>16<br>18                              | NNI<br>N.   | 16.   | 9 · 1<br>22 · 2<br>18   2<br>12  | E.<br>NNE.<br>N.   | 10 :<br>21<br>16 :<br>13 :   | E.<br>NNE<br>N.   | . 12<br>22<br>14<br>14   | E.<br>NNE.<br>N.<br>E.  |           |
| nne 5<br>ine 6<br>ine 7<br>ine 8  | SE.<br>SE.<br>NE.<br>E.  | 8<br>6<br>12<br>4<br>15   | 8W.<br>8E.<br>8E.<br>NE.   | 13<br>9<br>11<br>4<br>13                                       | SW.<br>SE.<br>SE.<br>NE.<br>E.   | 16<br>7<br>11<br>5<br>14   | WSW.<br>SE.<br>SE.<br>NE.<br>E.   | 16<br>8<br>18<br>6<br>15  | WSW.<br>SE.<br>SE.<br>NE.<br>E.   | 12<br>13<br>6<br>7<br>16   | WSW.<br>SE.<br>Calm.<br>ENE.<br>E.   | 11<br>12<br>6<br>16                                    | WSW.<br>SE.<br>NNE.<br>ENE.<br>E.  | 14<br>11<br>6<br>6<br>10                           | WSW.<br>SE.<br>NNE.<br>ENE.<br>E.  | . 12<br>10<br>6<br>10                             | 9 NE.<br>5 NE.<br>5 ENI   |   | 6 8<br>6 1 7<br>7 1  | WSW.<br>SE.<br>NE.<br>ENE.<br>E.   | 11<br>8<br>6;<br>16  | WSW<br>SE.<br>NE.<br>ENE.<br>E.   | - 0  | WSW.  |           |
| ne 10<br>ne 11<br>ne 12<br>ne 13<br>ne 14   | ENE.<br>NE.<br>ESE.<br>NE.<br>NNE.   | 19<br>15<br>8<br>9  | ENE.<br>NE.<br>ESE.<br>NE.<br>NE.  | 21<br>10<br>7<br>9   | E.<br>ENE.<br>ESE.<br>NE.<br>NNE.  | 21<br>7<br>7<br>12<br>11   | E.<br>ENE.<br>ESE.<br>NE.<br>NE.  | 20<br>5<br>6<br>11<br>8   | ENE<br>ENE.<br>ESE.<br>NE.<br>NNE.  | 4<br>4<br>4<br>9<br>11   | ENE.<br>ENE.<br>ESE.<br>NE.<br>NE.   | 20<br>4<br>8<br>10<br>9                                | E.<br>ESE.<br>NE<br>NE<br>NNE.   | 20<br>2<br>3<br>9<br>8                             | E.<br>ESE.<br>ESE.<br>ENE.<br>NNE.   | 20<br>4<br>6<br>9                                 | ESE<br>ESE<br>ENF   | ć.  | 3 I<br>7 I<br>8 I  | E.<br>ESE.<br>ENE.<br>ENE.   | 16<br>3<br>10:8<br>8:1   | E.<br>ESE.<br>E.<br>ENE.<br>NNE   | 1R<br>6<br>8   | ENE.<br>ENE.<br>ENE.<br>NNE.  |           |
| ne 15<br>ne 16<br>ne 17<br>ne 18<br>ne 19   | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 9<br>10<br>8<br>14<br>12  | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 9<br>9<br>15<br>14   | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 6<br>9<br>10<br>15<br>14   | NNE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 6<br>7<br>9<br>11<br>17   | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.  | 7<br>7<br>7<br>8   | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 8<br>9<br>10   | NE.<br>NNE.<br>NNE.<br>ESE.<br>SW.   | 8<br>6<br>10<br>9<br>13                            | NE.<br>NNE.<br>NNE.<br>SE.   | 7<br>8<br>8<br>7                                  | NNI<br>NNI<br>BE.   |   | H E  | NE.<br>NNE.<br>ENE.<br>SE.   | 9<br>7<br>8<br>12<br>13  | NE.<br>NNE<br>ENE.<br>SE.<br>SW.  | 9<br>9<br>9<br>10<br>14  | NE.<br>NNE<br>ENE<br>SE.<br>SW  |           |
| ne 20<br>ne 21<br>ne 22<br>ne 23<br>ne 24   | SW.<br>WSW.<br>NNW.<br>NNW.<br>N.  | 9<br>6<br>11<br>8<br>7  | 8W,<br>W8W,<br>NW,<br>N,<br>ENE,   | 9<br>5<br>10<br>9<br>7   | SW.<br>W.<br>NW.<br>N.<br>E.   | 9<br>5<br>8<br>9<br>5  | SW.<br>WNW.<br>NW.<br>N.<br>E.  | 12<br>5<br>8<br>6<br>5  | SW.<br>WNW.<br>NW.<br>N.<br>E.  | 15<br>8<br>9<br>9  | W.<br>NW.<br>NW.<br>NNE.<br>E.   | 13<br>6<br>7<br>5<br>4                                 | W.<br>NNW.<br>NW.<br>N.<br>ENE.  | 12<br>6<br>5<br>4<br>5                             | W.<br>NNW.<br>NW.<br>N.<br>ENE.  | . 11<br>6<br>7<br>7                               | N.<br>NNI<br>N.   |   | 8 2  | W.<br>NNE.<br>NW.<br>N.<br>E.  | 10<br>10<br>11<br>6<br>5   | SW.<br>NNE<br>NNW.<br>NW.   | 7. 11<br>8<br>3<br>4   | WSW<br>NNE.<br>NW.<br>NW.<br>ENE  |           |
| ne 25<br>ne 26<br>ne 27<br>ne 28<br>ne 29   | ENE.<br>WNW.<br>WNW.<br>NNW.<br>NNW.   | 9<br>9<br>15<br>8<br>13   | E,<br>WNW.<br>WNW.<br>NW.<br>NW.   | 8<br>12<br>15<br>9<br>7  | E.<br>NW.<br>W.<br>NNW.<br>NW.   | 7<br>15<br>14<br>6<br>7  | ESE.<br>NW.<br>WNW.<br>N.<br>NNW.   | 7<br>13<br>12<br>9  | E.<br>WNW.<br>NW.<br>NNW.<br>NE.  | 7<br>14<br>14<br>6<br>7  | ESE.<br>WNW.<br>NNW.<br>NNW.<br>NW.  | . 16<br>12<br>7<br>7                                   | ESE.<br>WNW.<br>NNW.<br>NNW.<br>NNW.   | 6<br>16<br>18<br>8<br>9                            | ESE.<br>WNW.<br>NNW.<br>NNW.<br>NNW.   | . 15<br>. 13<br>. 12                              | NNV<br>NNV  | W   | 18   V<br>11   2<br>10   2   | ESE,<br>WNW.<br>NNW.<br>NNW.<br>WNW.   | 18<br>18<br>18<br>9<br>5   | SE.<br>WNV<br>NNW<br>N.<br>NW.  | V. 19<br>7. 15<br>8<br>6   | SE<br>WNW<br>NNW<br>N.<br>NNW   | ١.        |
| ne 30<br>Ieans.   | N.   | 6   | NNE.   | 3  | NE.  | 8  | NE.<br>10, 47   | 9   | N.E.  | 6  | ENE.<br>9.6  | 7  | ENE.<br>10.0   |  | ENE.   | 0   | -   | 9. 53   | 6 2  | N N E.<br>10, 1  |  | NNE   | . 7  | NNE   | _         |
| contr.  | 11,00  |   | 10, 11   |  | 10. 7.   |  | 10.47   |   | 10, 10  | ,  | B. 0.  |  | 10. ()   |  | 9, 8   | T/13  |   | o. 00   |  | 10. 1  | . 1  | 10  | · 60   | 10.   | 1,        |
|   |  |   | -  |  |  |  |   | -   |   |  |  |  |  |  |  |   |   |   |  | 1  |  |   | 4.   |   |           |
| Date.   | 1 p. m<br>Directi  | lon   | 2 p. u   | ion  | 3 p. u<br>Direct   | ion  | 4 p. n<br>Directi   | ion   | 5 p. m<br>Directi   | ion  | 6 p. r<br>Direct   | ion  | 7 p. u<br>Direct   | ion  | S p. m<br>Directic   | ion   | 9 p. i  | ion !   | 10 p   | ction<br>nd  | II p   | etion   | 12 p.  | lion 1  | [le       |
|   | Directi  | lon   | Directi  | ion  | Directi  | ion  | Directi   | ion   | Directi   | ion  | Direct   | ion  | Direct   | ion  | Direction  | ion   | Direct  | ion !   | Dire   | ction  | Direc  | etion   | Direct   | lion 1  | [le       |
| 882<br>ne 1<br>ne 2<br>ne 3   | Directi  | lon   | Directi<br>and   | ion  | Directi  | ion  | Directi<br>and  | ion   | Directi   | ion  | Direct   | ion  | Direct:  | ion  | Direction and  | ion   | Direct  | ion !   | Dire   | ction<br>nd  | Direc  | etion<br>ed<br>eity.  | Direct   | lion 1  | [le       |
| 882<br>ne 1<br>ne 2<br>ne 3<br>ne 4<br>ne 5<br>ne 6   | Directi<br>and<br>velocit<br>E.<br>NNE.  | 16<br>20<br>13  | Directi<br>and<br>velocit<br>E.<br>NNE.  | ion<br>ty.<br>19<br>20<br>12                                   | Direction and velocity   | ion<br>ry, 16 1 20 12  | Directi<br>and<br>velocit<br>E.<br>NNE.<br>NE.  | ion   14   18   11  | Directi<br>and<br>velocit<br>ENE.<br>N.   | ion<br>ty.<br>12<br>24<br>10   | Direct<br>and<br>velocit<br>ENE.<br>N.   | ion<br>ty.   | Directi<br>and<br>velocit<br>ENE.<br>N.  | ion<br>ty.<br>14<br>27<br>13                       | Directic and velocit ENE. N. NE.   | ion<br>ty.  | Direct<br>and<br>veloci<br>ENE.<br>N.   | ion   | Director NE. N. NE.  | 18 25 11 3 6 9 5 18  | Direct and velocity NE.  | etion<br>ed<br>eity.  | Direct<br>alte<br>veloci<br>NE.<br>N.<br>ENE.  | lion 1<br>it<br>ity.<br>18<br>23<br>10  | [le       |
| 882<br>ne 1<br>ne 2<br>ne 3<br>ne 4<br>ne 5<br>ne 6<br>ne 6<br>ne 7<br>ne 8<br>ne 9   | Directi<br>and<br>velocit<br>E.<br>NNE.<br>N.<br>E.<br>WSW.<br>SE.<br>E.NE.  | 16<br>20<br>13<br>14<br>8<br>10<br>6<br>8   | Directif<br>and<br>velocit<br>E.<br>NNE.<br>N.<br>E.<br>WSW.<br>SE.<br>ENE.<br>E.  | 19 29 12 14 7 11 3 11  | Direction and velocity to the velocity  | 16 1 20 12 12 12 10 3 1 13   | Directi<br>and<br>velocit<br>E.<br>NNE.<br>NE.<br>E.<br>WSW.<br>SE.<br>ENE.<br>E-E.   | 14 18 11 16 . 5 10 4 16   | Directi<br>and<br>velocit<br>ENE.<br>N.<br>NE.<br>E.<br>SSW.<br>SE.<br>ENE.<br>ESE.   | 12<br>24<br>10<br>13<br>5<br>13<br>4                                       | Direct and velocity  ENE. N. N.E. E. SSW. SE. ENE. ENE.  | 13<br>23<br>11<br>12<br>5<br>12<br>4<br>13             | Directi<br>and<br>velocit<br>ENE.<br>N.<br>NE.<br>E.<br>SSW.<br>SE.<br>NE.<br>ESE.   | 14 27 13 9 5 12 7 15                               | Directic and velocity ENE. N. N.E. E. SSW. SE. NE. ESE.  | 13 24 11 7 5 9 8 15                               | Direct<br>and<br>veloci<br>ENE.<br>N.<br>NE.<br>E.<br>SSW.<br>SE.<br>NE.<br>ESE.  | 17 24 13 5 5 4 14   | Director NE. N. NE. E. SE. NE. E.  | 18 25 11 3 6 9 5 18 2 20 5 16 3  | Direction NE. N. N. E. N. Calm. S. S. N. E. R. E. N. E. R. E. N. E. R. E. N. E. R. Calm. S. Calm. N. E. R. Calm. S. Calm | 19 23 . 14  | Direct<br>and<br>veloci<br>NE.<br>N.<br>ENE.<br>SW.<br>SE.<br>SE.<br>NE.<br>E.   | 18 23 10 2 7 8 5 17   | [le       |
| 882<br>ne 1<br>ne 2<br>ne 3<br>ne 4<br>ne 5<br>ne 6<br>ne 7<br>ne 8<br>ne 11<br>ne 12<br>ne 13<br>ne 14<br>ne 13<br>ne 14   | Direction and velocit  E. NNE. N. E. WSW. SE. E.                                   | 16<br>20<br>13<br>14<br>8<br>10<br>6<br>8<br>20<br>20<br>7  | Directi<br>and<br>velocit<br>E.<br>NNE.<br>N.<br>E.<br>WSW.<br>SE.<br>E.<br>E.<br>E.<br>E.<br>E.   | 199 20 12 14 7 7 11 11 19 20 12 6 12                           | Directi<br>and<br>velocit<br>E.<br>NNE.<br>NE.<br>E.<br>WSW.<br>SE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E   | ion<br>ty. 16 12 12 12 12 13 13 20 19 10 6 13                        | Directi<br>and<br>velocit<br>E.<br>WNE.<br>NE.<br>E.<br>E.<br>E. E.<br>E. E.<br>E. E.<br>E. E.<br>E. E.<br>E. E.<br>E. N. E.<br>N. E.<br>N. E.<br>E. N. E.<br>E. N. E.<br>E. E. E.<br>E. E. N. E.<br>N. E. N.  14<br>18<br>11<br>16<br>5<br>10<br>18<br>16<br>18<br>18<br>11<br>16<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18 | Directi<br>and<br>velocit<br>N. N. E.<br>E. SSW.<br>SE. E. S. E. N.  12 24 10 13 14 14 12 18 17 11 12 12 18 18 18 18 18 18 18 18 18 18 18 18 18 | Direct and velocit N. N. N. E. E. SSW. SSE. ENE. ESE. ENE. SSW. N. E. N. | 13<br>23<br>11<br>12<br>5<br>12<br>4<br>13<br>18<br>18 | Directi<br>and<br>velocit<br>ENE.<br>N.E.<br>E.<br>SSW.<br>SE.<br>N.E.<br>E.E.<br>E.E.<br>E.E.<br>SSW.<br>N.E.<br>E.E.<br>E.E.<br>E.E.<br>E.E.<br>E.E.<br>E.E.<br>E. | 14 17 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10 | Directic and velocity  ENE. N. NE. E. SSW. SE. NE. E. E. ENE. SSW. NE. NE. NE. NE.   | 13 24 11 7 5 9 8 15 20 17 6 13 12                 | Direct and veloci ENE. N. NE. E. SSW. SE. NE. ESE. ENE. SSW. NE. NNE.   | 17 24 13 5 5 4 14 20 15 4 8 10                                    | Director of the second  | ction ad the state of the state | Direct and velocity velocity velocity. N.E. E.N.E. E.N.E. E.N.E. S.S.W. N.E. N.Y.E. N. | 19 23 . 14  | Direct and veloci NE. N. ENE. SW. SE. SE. NE. ENE. NE. ESE. ES   | 18 23 10 2 7 8 5 177 20 13 1 8 6  | [H        |
| 882 me 1 me 23 me 4 me 5 me 6 7 me 8 me 9 me 14 me 15 me 14 me 15 me 16 me 17 me 18 me 16 me 17 me 18 me 16 me 17 me 18 me 16 me 20 me 21 me 22 me 23 | Directi<br>and<br>velocit<br>E. NNE.<br>N. E.<br>WSW.<br>SE.<br>E. E. E.<br>E. E. E.<br>E. E. NNE.<br>NNE.<br>NNE      | 16<br>20<br>13<br>13<br>14<br>8<br>10<br>6<br>8<br>20<br>22<br>10<br>7<br>10<br>8<br>11<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 | Direction and velocity and velocity with the control of the contro | 199 200 121 141 199 200 122 6 122 9 10 6 12 8                  | E. NNE. NE. E. E. E. N.E. N.E. NE. N.E. N | 16 1 20 12 12 12 12 13 13 20 10 6 6 13 13 13 13 13 13 13 15 16 11 16 | Directi<br>and<br>velocit<br>E.<br>VNE.<br>NE.<br>E.<br>WSW.<br>SE.<br>E.NE.<br>E.SE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.  | 14 18 11 16 5 10 18 8 8 8 8 13 12 10 6 10 4   | Directi<br>and<br>velocit<br>ENE.<br>N. E.<br>SSW.<br>SSE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>N. E.<br>ENE.<br>ENE.<br>E  | 12 24 10 13 14 14 12 12 12 12 12 14 1                                      | Direct and velocit  ENE. N. NE. E. SSW. SE. ENE. ENE. ENE. ENE. NE. ENE. NE. ENE. NE.  | 133 233 11 12 5 12 4 4 13 18 18 16 12 9 1 6 13 3 3     | Directi<br>and<br>velocit<br>ENE.<br>N. N. E.<br>E.<br>SSW.<br>NE.<br>ESE.<br>E.<br>ENE.<br>NE.<br>ENE.<br>NE.<br>NE.<br>ENE.<br>NE.<br>NE.                          | 14 17 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10 | Directic and velocity | 13 24 11 7 5 9 8 15 20 17 6 13 12 10 9 6 15 6     | Direct and veloci ene. N. N. S. N. S. N. S. N. S.   | 17 24 13 5 5 4 1 1 20 1 5 4 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 | Direction velocities in veloci | 18 25 25 11 2 3 6 9 5 5 18 8 2 20 6 5 8 8 2 11 11 10 6 5 8 8 1 10 7 1 10 7 10 7 10 7 10 7 10 7 1   | Direct All Velocian Velocian Velocian Velocian N.E. S.E. E. E. E. E. S.S.W. N.E. N.Y.E. N.Y.E. S.W. S.W. S.W. S.W. S.W. S.W. S.W. S  | 2tion ad airy.  19 23 14 17 19 11 27 19 12 11 12 12 12 12 12 12 12 12 12 12 12                      | Direct and veloci NE. N. ENE. SW. SE. SE. ENE. ENE. NE. NE. NE. NNE. NNE   | 18 23 10 2 7 8 5 17 20 13 1 8 6 11 10 9 15 10 10 11 16 15 10 11 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | [le       |
| 882<br>ne 1<br>ne 2<br>ne 3<br>ne 4<br>ne 5<br>ne 6   | Directi<br>and<br>velocit<br>E. NNE.<br>N. E.<br>WSW.<br>SE. E. E.<br>E. E. E.<br>E. E. E.<br>E. E. E. E. NNE.<br>NNE. | 16 20 13 14 15 20 10 10 8 11 10 9 9 14 15 4   | E. NNE. N. E. E. E. E. E. E. NE. NNE. N  | 19 29 12 14 7 7 11 3 11 19 20 12 6 12 9 10 6 12 8 10 8 11 10 4 | E. NNE. E. E. E. E. E. E. E. N. E. E. N. E. E. N. E. E. N. E | 16 1 20 1 20 1 20 1 20 1 20 1 20 1 20 1                              | Direction and velocit E. N.M.E. E. E. E. E. E. E. E. E. E. N.E. N.  | 5 10 18 11 10 10 11 11 11 11 11 11 11 11 11 11  | Directi<br>and<br>velocit<br>N. NE.<br>E. SSW.<br>SE. ENE.<br>ENE.<br>ENE.<br>ENE.<br>SW.<br>ENE.<br>NE.<br>NE.<br>W. SW.<br>WSW.<br>NNE.<br>NNW.<br>NW.  | 12 24 10 13 14 14 12 12 12 14 14 14 14 14 14 14 14 14 14 14 14 14          | Direct and velocit and velocit N. N. N. E. S. S. S. E. S. E. E. S. E. E. S. E. S. S. W. S.   | 13 23 11 12 4 4 13 18 18 5 10 6 8 8 5 5                | Directi<br>and<br>velocit<br>E.N.E.<br>SSW.<br>SSE.<br>E.S.E.<br>E.N.E.<br>E.N.E.<br>E.N.E.<br>E.N.E.<br>N.E.  | 14 27 13 9 5 12 20 14 10 1 10 7 15 3 13 6 9 12 5 5 | Direction and velocity and velocity and velocity of the control of | 13 24 11 7 5 9 8 15 120 10 15 6 6 8 12 6 6 9 9 14 | Direct and veloci and veloci en R. N. N. E. E. SSW. SE. ESE. ENE. EN E. N. N. E. E. S. W. N. W. S. W. S. W. S. W. W. S. W. W. S. W. S. W. S. W. W. S. | 17 24 13 5 5 5 4 14 20 10 8 7 12 8 8 17 11 1                      | Direction of the control of the cont | 18 255 20 10 6 9 5 11 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15   | Direction velociation velociat | 23 14 2 2 14 17 19 19 14 17 19 19 14 17 19 19 12 19 12 19 12 19 19 19 19 19 19 19 19 19 19 19 19 19 | Direct and velocity v | 18 23 10 2 7 7 20 13 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  | I need lo |

<sup>4</sup> On and after June 15, 1882, anemometer cups 28 feet above the ground.

# Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

1883—Continued.

ty given in miles per hear

12 m

Direction

E. NNE.

11 Wsw 9 SE 4 NE

9 WSW 11 NNE 8 NW.

NXII.

7 NNE.

Direction hear o

12 p. m

velocity

11 ENE. 11

Hin. m.

Direction

velocity,

E. NNE. N. E.

E Ese.

> N. NW.

NNE.

). III.

ection

nd neity.

10, 23

Height of an encommeter shove surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, --5º 17º. Velocity given in miles per hour.] 2 a. m. Direction Direction Direction Direction Direction Direction Direction. Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity und velocity. and velocity. welocity. and volocity. velocity. NW. NW. E. E. WNW. 13 21 3 11 7 8. 5 W W. 8. 8W. W8W 8W. N. E. ENE. WSW SSE. 11 14 7 E. ENE. W. NNE. ENE. ENE. WSW SE. E. ESE. SE. ENE. SSE. 7 19 6 5 E. ESE. 19 9 7 18 9 5 10 ESE. E. WSW. NW. NNE. SE. 11 SSW. W. NNE. E. SW. WNW NNE. E. 16 12 8E. SE. 17 14 SE. 88W. 14 10, 35 10.19 Means 10, 65 10.16 10.06 10, 13 11.23 11.231 p. m. 7 p. m. 10 p. m. 11 p. m. [ p. m. Direction Direction Direction Direction Direction. Direction . Direction Pirection Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. velocity. and velocity. velocity. velocity. ESE. ESE. E. E. NW. ESE. WSW. WSW. E. E. NNE. SW. SW. E. E. WNW. SW. SW. WSW. 12 17 13 8 12 13 14 8 12 SW. ESE. ENE. ENE. X. W. SW. WSW WSW  $\frac{20}{14}$ NNE. ENE. NNE. NW. WNW. NNE. ENE. E. NW. WSW. NNE. 17 9 6 6 ENE. E. W. WSW. ENE. ENE. W. WSW E. ENE. W SW. 15 16 E. NW. WNW E. SE. WSW. SSE. SSE. E. NW. NW. N. E. NW. NNE. NW. WNW. E. NNW. E. SE. NNW. Calm. WSW SSE. S 7 16 16 5 16 15 SSE. WSW. WSW. NNE. ENE. ESE. WSW. SW. N. ENE. SE. SW. SW. NNE. NE. ESE. SW. WSW. N. E. SE. WSW. W. N. E. WNW WSW. NNE. E. SE. SW W. WSW N. W. WSW. 7 12 13 12 18 WSW. NNE. ENE. SE. ENE. SE. 12, 26 12, 71 13.10 11.87 10.87 10, 52 9, 61 10.52

Statement showing the direction and velocity of the wind at Uglaamic from October, 1881, to August, 1883—Continued.

[Height of anemometer above surface of ground, 28 feet. Washington mean time. Coresident to reduce to mean local time, 45% 17%. Velocity given in 1885, and

|  | 1 a. n  | n.  | 2 a. u   | n.  | 3 a. n   | n.  | 4 a. n   | 1.   | 5 a. a   |  | 6 a. m   |  | i il. 10   |  | 5 ii. i  | 1   | 9 a.  | 111.                                       | 10  | a. n   | 1.  | 11 a   | tu.   | 12   | 'u  |
|--|---|---|--|---|--|---|--|--|--|--|--|--|--|--|--|---|---|--|---|--|---|--|---|--|---|
| Date.  | Direct<br>and<br>veloci   |   | Direct<br>and<br>veloci  |   | Direct<br>and<br>veloci  |   | Directi<br>and<br>veloc t  |  | Directi<br>and<br>velocia  |  | Directi<br>and<br>velocit  |  | Directi<br>and<br>velocit  |  | Direct<br>and<br>veloci  |   | Direc<br>an<br>veloc  | d  |   | rectic<br>and<br>locity  |   | Dire-<br>at<br>velo  | ction<br>id<br>city   | Dio.   |   |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3  | ESE.<br>NW.<br>WSW.   | 16<br>1<br>10   | SSE.<br>NW.<br>WSW.  | 17<br>2<br>18   | SE.<br>N.<br>SW  | 14<br>1<br>20   | SSE.<br>NNE<br>SW.   | 17<br>5<br>28  | W NW.  | 28<br>6<br>28  | W.<br>F.<br>WSW.   | 20<br>6<br>16  | wsw.<br>E.<br>wsw.   | 21<br>8<br>24  | wsw.<br>E<br>wsw.  | 18<br>8<br>20   | WSW.  | 17<br>10<br>17                             | SW<br>EN<br>W.  | ie   | 13<br>72<br>20  | SW.<br>NE<br>W.  | 1 h   | SW<br>E.<br>WSW  | 10  |
| Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8   | NW.<br>N.<br>ESE.<br>SSW.<br>WSW.   | $\begin{array}{c} 7 \\ 10 \\ 41 \\ 32 \\ 17 \end{array}$      | XW.<br>N.<br>SE.<br>SSW.<br>WSW.   | 28<br>28<br>30<br>11  | WXW<br>N.<br>SE<br>SSW.<br>SW.   | 6<br>28<br>27<br>9  | E.<br>NE.<br>SE.<br>WSW.   | 7<br>32<br>28<br>16  | LSF.<br>ENE.<br>SE<br>W<br>WSW.  | 6<br>28<br>26<br>15  | ESE.<br>ENE.<br>SE<br>W.<br>WSW.   | 6<br>8<br>70<br>24<br>10   | ESE<br>FNE.<br>SE<br>W<br>SW.  | 11<br>7<br>20<br>28<br>5   | SE.<br>ENE.<br>SSE.<br>W.<br>S.  | 16<br>8<br>16<br>28<br>7  | SE.<br>ENE.<br>S.<br>W.   | 17<br>11<br>15<br>29<br>8                  | EN<br>S.<br>W.<br>SSI   | E.   | 19<br>12<br>14<br>32<br>12  | S.<br>E.<br>SSW.<br>W.<br>SSE.   | 17<br>16<br>13<br>32<br>13  | E.<br>W<br>SSE   | lit<br>in   |
| Aug. 9<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13   | S.<br>W.<br>SSE.<br>S.  | 20<br>18<br>24<br>9   | S.<br>W.<br>SSE.<br>SSW.   | 28<br>14<br>17<br>9   | SSW.<br>WSW.<br>SSE.<br>S.   | 24<br>14<br>15<br>10<br>24  | S.<br>W<br>SSE.<br>S.  | 26<br>9<br>19<br>16<br>24  | SSW.<br>NW.<br>SSE.<br>S.  | 24<br>4<br>14<br>16<br>18  | SSW.<br>ESE<br>SSE<br>SSW.<br>NW.  | 24<br>-4<br>-14<br>-0<br>-18   | SSW.<br>ESE.<br>SSE.<br>SW.<br>NW.   | 17<br>8<br>14<br>20<br>18  | 88W.<br>E.<br>8E.<br>8W.<br>NW.  | 28<br>7<br>16<br>20<br>18   | SSW.<br>ESE.<br>SSE.<br>SW.<br>NW.  | 26<br>10<br>16<br>22<br>17                 | SSV<br>SSF<br>SW<br>NW  | d<br>5.  | 27<br>10<br>12<br>22<br>16  | SSW.<br>.SE.<br>SSE<br>SW.<br>NW   | 10<br>0<br>24<br>15   | SW<br>SE:<br>SSE:<br>SW<br>SW  | 4   |
| Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18  | NNE.<br>E.<br>ESE.<br>ESE.<br>ENE.  | 5<br>16<br>24<br>22<br>19                                     | N<br>ESE.<br>ESE.<br>ESE.  | 3<br>16<br>25<br>20<br>15   | NE.<br>ESE.<br>ESE.<br>E.  | 4<br>15<br>20<br>20<br>13   | E.<br>SE.<br>ESE.<br>E.<br>ENE.  | 5<br>16<br>20<br>18<br>16  | E.<br>ESE.<br>E.<br>ESE.<br>ENE  | 8<br>14<br>19<br>17<br>15  | ENE.<br>ESE.<br>E.<br>ESE.<br>E.   | 6<br>14<br>20<br>16<br>13  | ENE.<br>ESE.<br>ESE.<br>E.   | 16<br>18<br>17<br>16   | ENE<br>ESE.<br>ESE.<br>E.  | 6<br>17<br>20<br>17<br>14   | ESE.<br>ESE.<br>ESE.<br>ENE.  | 8<br>20<br>17<br>12                        | E.<br>E.<br>ESI<br>E.   |  | 18<br>20<br>20<br>17  | SE.<br>SE.<br>E.<br>E.<br>ESE  | 20<br>18<br>20<br>16  | 1  | 4   |
| Aug. 19<br>Aug. 20<br>Aug. 21<br>Aug. 22<br>Aug. 23  | ENE.<br>SE.<br>ENE.<br>ENE.<br>WNW.   | 11<br>9<br>7<br>20<br>2                                       | ENE.<br>SE.<br>NE.<br>NE.  | 9<br>11<br>9<br>16<br>6   | NE.<br>SE<br>NE.<br>NE.  | 7<br>12<br>6<br>15  | NE.<br>SSE.<br>NE.<br>NE.  | 8<br>13<br>6<br>15<br>5  | ENE.<br>88E.<br>NNE.<br>NE.  | 9<br>12<br>13<br>16<br>4   | ENE.<br>SSE.<br>NNE.<br>NE.<br>Calm.   | 7<br>12<br>15<br>15  | ENE.<br>SSE<br>NNE.<br>NIL<br>ESE.   | 8<br>10<br>19<br>1+<br>4   | ENE.<br>SSE<br>NNE.<br>NE.<br>SE.  | 8<br>10<br>18<br>16<br>4  | E.<br>SSE.<br>NNE.<br>NE.<br>SE   | 11<br>18<br>14                             | N N   | E.   | 6<br>11<br>18<br>14<br>5  | E.<br>SSF.<br>NNE.<br>NE<br>ESE  | 10<br>16<br>11  | FSL<br>SSE<br>XXI  | 1   |
| Aug. 24<br>Aug. 25<br>Aug. 26<br>Aug. 27<br>Aug. 28  | NE<br>E.<br>NE.<br>N.   | 14<br>8<br>18<br>18   | NE.<br>ENE.<br>NE.<br>N.   | 12<br>9<br>18<br>18   | NE.<br>ENE.<br>NE.<br>NNE.<br>NE.  | 13<br>10<br>17<br>17  | NE<br>ENE<br>NE.<br>NNE.   | 12<br>10<br>17<br>17   | NNE<br>ENE<br>NE<br>NNE.   | 10<br>10<br>18<br>19<br>5  | NNE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 11<br>12<br>16<br>18<br>5  | NNE.<br>NE.<br>NE.<br>NNE.<br>ENE.   | 12<br>14<br>16<br>14<br>5  | NNE.<br>NE.<br>NE.<br>NE.  | 13<br>18<br>16<br>14  | NE.<br>NE.<br>NE.<br>NNE.   | 13<br>15<br>20<br>10                       | NE<br>NE  |  | 15<br>14<br>20<br>11<br>4   | NE.<br>NE.<br>NE.<br>NE.   | 11.   | NE<br>NE<br>NNE<br>NI<br>E   |   |
| Aug. 29<br>Aug. 30<br>Aug. 31  | E.<br>NE.<br>E.   | 7<br>10<br>9  | E.<br>NNE.<br>E.   | 6<br>12<br>5  | ENE.<br>NNE.<br>E.   | 6<br>12<br>6  | E.<br>NE.<br>E.  | 3<br>10<br>4   | ENE.<br>NE.<br>ENE.  | 6<br>10<br>4   | ENE.<br>NE.<br>NE.   | 6<br>10<br>6   | ENE.<br>NE.<br>NNE.  | 6<br>8<br>8  | ENE.<br>NNE.<br>NNE.   | 5<br>9<br>8   | ENE.<br>NE.<br>NE.  | 10   | NE  |  | 8<br>12<br>9  | ENE.<br>NE.<br>NE.   | 6<br>10<br>10   | ENI  | 13  |
| Means.   | 14. 81  | l .   | 13. 6  | 55  | 12.9   | 7   | 14, 0  | )  | 13. 8  | 1  | 12. 8  | 1  | 13. 4  | н  | 13. 8  | 4   | 14.   | ()()                                       |   | 14.48  | i   | 11   | . 65  | 1.   | 14.1  |
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|  | 1 p. n  | 1.  | 2 p. n   | n.  | 3 р. п   | n.  | 1 p. u   | 1.   | 5 p. u   | n.   | 6 p. 1   | ١.   | 7 p. n   | 1.   | 5 p. m   |   | 9 p. m.   | 1  | Юр. п   | n. (   | H p   | . m.   | 12 p.   |  |   |
| Date.  | 1 p. n  Directi and velocit   | ion   | 2 p. n Directi and velocit   | ion   | 3 p. n Direct and velocit  | ion   | I p. u<br>Direct<br>and<br>v eloci   | ion  | 5 p. u<br>Direct<br>and<br>veloci  | ion  | 6 p. 1<br>Direct<br>and<br>veloci  | on   | 7 p. n<br>Directi<br>and<br>velocit  | ion  | Sp. m Directi and velocit  | on  | 9 p. m. Directic and velocity   | n I  | iO p. n<br>Directi<br>und<br>relocit  | ion !  | Dire<br>an<br>veloc   | ction<br>id  | 12 p.<br>Director   | tion b   | He<br>Mali sa<br>oests  |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3  | Directi<br>and  | ion   | Directi  | ion   | Direct<br>and  | ion<br>ty.<br>16<br>17  | Direct   | ion  | Direct<br>and  | ion<br>ty.   | Direct   | on   | Directi  | ion<br>y.<br>12<br>17  | Directi  | on<br>y.  | Directic<br>and<br>velocity   | on : I                                     | Directi<br>and<br>relocit   | ion   y.   12   7  | Dire  | etion<br>id<br>city.<br>W. 8   | Direc   | etion 3  | este se   |
| 1882.<br>Aug. 1<br>Aug. 2  | Directi<br>and<br>velocit   | ion<br>y.  <br>16<br>14                                       | Directi<br>and<br>velocit  | ion<br>ty.  | Direct<br>and<br>velocit<br>SW.<br>E.  | ion<br>ty.<br>16<br>17  | Direct<br>and<br>veloci  | ion<br>ty.<br>17   | Direct<br>and<br>veloci<br>WSW.  | ion<br>ty.<br>   | Direct<br>and<br>velocis<br>WSW.   | on<br>y.<br>16   | Directi<br>and<br>velocit<br>WSW.<br>E.  | ion<br>y.<br>12<br>17  | Direction and velocit  WSW. ESE.   | 12<br>10<br>11<br>12<br>34<br>26<br>24  | Directic<br>and<br>velocity<br>W<br>ESE. :<br>NNW. !<br>ESE. :<br>SSW. :  | on   I                                     | Directi<br>and<br>celocit<br>VNW.   | ion   y.   12   7   12   13   10   32   20   | Dire<br>an<br>veloc<br>W N '  | etion<br>ad<br>city.<br>W. 8<br>12<br>W. 8<br>15<br>41<br>29<br>20   | Direct Alice Velocity N.W. S.E.   | etion 3  | orati sa<br>locity  |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3<br>Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7  | Directi<br>and<br>velocit<br>SW.<br>E.<br>W.<br>NW.   | 16<br>14<br>18<br>12<br>20<br>16<br>28                        | Directi<br>and<br>velocit<br>SW.<br>E.<br>W<br>NW.<br>E.<br>S.   | 16 13 17 24 14 19 24  | Direct<br>and<br>velocit<br>SW.<br>E.<br>WNW.<br>NW.<br>E.<br>SSW.<br>WSW.   | ion<br>ty.<br>16<br>17<br>19<br>13<br>28<br>28<br>28  | Direct<br>and<br>veloci<br>SW.<br>E.<br>W.<br>NNW<br>E.<br>SSW.<br>WSW.  | ion<br>ty.<br>17<br>16<br>17<br>20<br>34<br>26<br>24                             | Direct<br>and<br>veloci<br>WSW.<br>E.<br>W.<br>NNW.<br>E.<br>SSW.<br>WSW.  | ion<br>ty.<br>13<br>14<br>16<br>20<br>22<br>27   | Direct and velocity WSW. E. WNW. E. SSW. WSW.  | on<br>y.<br>16<br>16<br>12<br>18<br>32<br>34<br>26   | Directi<br>and<br>velocit<br>WSW.<br>E.<br>WNW.<br>NNW.<br>E.<br>SSW.  | 12<br>17<br>12<br>16<br>04<br>26<br>26   | Direction and velocit WSW. ESE. WNW. NNW. ESE. SSW. W.   | 12<br>10<br>11<br>12<br>34<br>26<br>24<br>27<br>28<br>18  | Directic and velocity  W   ESE.   NNW.   ESE.   SSW.     WNW.   S.     NNW.   | 15 VE V 15 V 15 V 15 V 15 V 15 V 15 V 15   | Directi<br>and<br>colocit<br>VNW.<br>VNW.   | 12<br>7<br>12<br>7<br>12<br>13<br>80<br>32<br>22<br>20<br>23<br>22<br>22<br>22   | Dire<br>an<br>veloci<br>W.N.<br>SE.<br>W.N.<br>E.SE.<br>SSW   | etion ad eity.  W. 8 12 W. 8 15 41 20 20 23 W. 22 20 V. 29   | Direction velocity NW SE. WNW NW ESE. SSW W   | 21 24 24   | Pall of the state |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3<br>Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8<br>Aug. 10<br>Aug. 11<br>Aug. 12   | Directi<br>and<br>velocit<br>SW.<br>E.<br>W.<br>NW.<br>E.<br>S.<br>W.<br>SSE.<br>SSW.<br>SE.<br>S.<br>W.  | 16<br>14<br>18<br>12<br>20<br>16<br>28<br>25<br>31<br>22<br>9 | Directi<br>and<br>velocit<br>SW.<br>E.<br>W.<br>YW.<br>S. W.<br>SSE.<br>SSW.<br>SE.<br>SW.   | 16 13 17 24 14 14 19 24 28 32 17 8 22   | Direct<br>and<br>velocit<br>SW.<br>E.<br>WNW.<br>E.<br>SSW.<br>WSW.<br>SSE.<br>SSE.<br>SSE.<br>NW.   | 166<br>177<br>19<br>13<br>28<br>28<br>30<br>36<br>16<br>9   | Direct<br>and<br>veloci<br>SW.<br>E.<br>W.<br>NNW<br>E.<br>SSW.<br>WSW.<br>SSE.<br>SSE.  | 17<br>16<br>17<br>16<br>17<br>20<br>34<br>26<br>24<br>28<br>30<br>16<br>13<br>26 | Direct<br>and<br>veloci<br>WSW.<br>E.<br>WNW.<br>E.<br>WSW.<br>WSW.<br>SSE.<br>8.                                  | 13 14 16 20 27 14 16 27 14 13 29   | Direct<br>and<br>velocit<br>WSW.<br>E.<br>WXW.<br>SSW.<br>WSW.<br>SSE.<br>S.<br>WXW.                       | 000<br>y.<br>16<br>16<br>16<br>12<br>18<br>32<br>34<br>26<br>23<br>28<br>15<br>22<br>26        | Directi<br>and<br>velocit<br>WSW.<br>E.<br>WNW.<br>E.<br>SSW.<br>W.<br>WSW.  | 12<br>17<br>12<br>16<br>34<br>26<br>22<br>28<br>10<br>20<br>32   | Directi<br>and<br>velocit<br>WSW.<br>ESE.<br>WNW.<br>SSW.<br>WNW.<br>S.<br>S.                                      | 12 10 11 42 34 27 28 17 18 28 9 15 33 16 20   | Directic and velocity  W ESE WNW. 1 ESE. 1 SSW. 1 SSW. 1 S. 1 SNW. 1 E. 1 E. 1 E. 1 E. 1  | 10 n   1                                   | Directi<br>and<br>volocit<br>VNW.<br>NW.<br>SE.<br>NW.<br>NW.   | 12 7 12 13 80 22 20 23 28 22 14 24 24 20 23  | Dire<br>MN SE.<br>WN SE.<br>WN SE.<br>SSW.<br>WN SE.<br>SSW.<br>WN SE.<br>SSW.<br>WN SE.<br>SSW.  | etion ad eity.  W. 8 12 W. 8 15 41 20 20 23 W. 22 20 V. 29   | Direct Aller Veloci NW SE. WNW SE. SSW W SSW. WNW SSW.  | tion 3 d d d d d d d d d d d d d d d d d d   | 17 10 17 17 17 17 17 17 17 17 17 17 17 17 17  |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3<br>Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 10<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13<br>Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18<br>Aug. 16<br>Aug. 17<br>Aug. 18<br>Aug. 18 | Directi<br>and<br>velocit<br>SW.<br>E.<br>W.<br>NW.<br>SSE.<br>SSE.<br>SSW.<br>SSE.<br>SSW.<br>NW.<br>NW.<br>EESE.<br>E.<br>E.<br>E.  | 16 14 18 122 29 16 28 25 23 14 22 24                          | Direction and velocities with  | 16 13 17 24 14 49 28 32 17 8 22 12 10 10 20 20  | Direct and velocit SW. E. WNW. S. W. SSW. SSE. SSE. SSE. NW. NNW. E.   | 16<br>17<br>19<br>13<br>28<br>28<br>28<br>30<br>36<br>16<br>9<br>21<br>13<br>12<br>22<br>22<br>21   | Direct<br>and<br>veloci<br>SW.<br>E.<br>W.<br>NNW<br>E.<br>SSW.<br>WSW.<br>SSE.<br>SSE.<br>NW.<br>NW.<br>ESE.<br>ESE.<br>ESE.<br>E.  | 17 16 17 20 34 26 24 28 30 16 13 26 12 11 23 22 25                               | Direct and veloci WSW. E. W. WSW. E. SSW. WSW. SSE. S. NW. NSE. S. F. E. F. E. | 13 144 16 20 27 14 16 27 14 12 12 12 12 12 12 12 12 12 12 12 12 12                           | Direct and velocit wsw. E. W.N.W. SSW. WSW. SSE. S. N.W. N.W. E. SE. E.  on<br>y.<br>166<br>12<br>182<br>34<br>26<br>22<br>26<br>22<br>21<br>22<br>22<br>22<br>22<br>22 | Directi<br>and<br>velocit<br>WSW. E.<br>WNW.<br>NNW. E.<br>SSW.<br>WSW.<br>WSW.<br>WSW.<br>NW.<br>SSE.<br>S.<br>NW.<br>NW.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.   | 32<br>17<br>12<br>16<br>34<br>26<br>22<br>20<br>32<br>40<br>15<br>15<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20 | Direction and velocit wsw. ESE. WXW. NNW. ESE. SW. WNW. S. S. NW. NNW. ESE. E. | 12 16 11 42 34 27 28 17 18 12 20 16 15 10 17 6  | Directic and velocity  William Velocity  WNW. Section 1988 SSW. SSW. SSW. SSW. SSW. SSW. SSW. SS  | 15 VEV V S V S S S S S S S S S S S S S S S | Directi<br>and<br>volocit<br>VNW.<br>NW.<br>SE.<br>NW.<br>NW.   | 12<br>7<br>12<br>7<br>12<br>13<br>40<br>22<br>20<br>23<br>22<br>28<br>14<br>24<br>22<br>23<br>17<br>15<br>12<br>18<br>21<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>10<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18 | Dire am veloo<br>WNN<br>SE, WNN<br>N, E SE SE SSW<br>WNN<br>SSW<br>WNN SSE, NNN<br>NN V<br>E, E,  | ction ad city.  W. 8 12 28 W. 8 15 441 29 20 20 13 W. 22 20 13 42 21 22 16 13 11 19 19 W. 5 5  | Direct and velocity NW SE. WNW ESE. SSW WNW SSW. NNW FSE. SW. NNW FSE. E. E.                                | tion 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 17 75 17 17 17 17 17 17 17 17 17 17 17 17 17  |
| 1882. 1 Aug. 1 Aug. 2 Aug. 3 Aug. 3 Aug. 5 Aug. 6 Aug. 7 Aug. 1 Aug. 2 Aug. 1 Aug. 2  | Directi<br>and<br>velocit<br>SW.<br>E.<br>E.<br>S.<br>W.<br>SSE.<br>SSW.<br>SSE.<br>SSW.<br>SE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>S.<br>W.<br>N.<br>W.<br>SE.<br>SE.<br>E.<br>SE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E | 16 14 18 220 16 28 23 22 24 16 8 9 15                         | Direction of the control of the cont | 16 13 17 24 14 19 24 28 32 17 8 22 12 10 .0 0 11 1 16 13 13   | Direct and velocit sw. E. W. N.W. E. SSW. SSE. SSE. SSE. SSE. SSE. E.  | 160 177 189 188 288 280 386 166 9 21 113 122 221 224 23 8 8 166 175 175 175 175 175 175 175 175 175 175   | Direct and veloci sw. E. W.  | 177 167 177 187 187 187 187 187 187 187 187 18                                   | Direct and veloci WSW. E. W.   | 13 14 16 20 27 14 16 27 14 18 29 12 13 29 12 16 17 10  | Direct and velocit wsw. E. E. Wsw. Ssw. wsw. Sse. S. W. W. W. E.       | on<br>y.<br>166 142<br>188 223<br>234 223<br>226 12<br>123 220<br>9 87<br>170                  | Direction and velocity wsw. E. W. N.W. SSW. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W. E.  | 12 17 12 16 04 226 22 28 10  | Direction and velocit WSW. ESE. WNW. NNW. ESE. SW. WNW. NNW. ESE. E. E. E. E. E. E. E. N.W. NNW.                   | 12 10 11 12 34 22 17 28 17 18 29 16 10 17 16 10 11 22 22 22 23 24 25 26 26 27 27 28 28 28 28 28 28 28 28 28 28 28 28 28 | Directic and velocity W ESE. WXW. ESE. ESE. SSW. S.   | 1  | Directi<br>and<br>clocit<br>VNW.<br>VNW.<br>VNW.<br>NW.<br>NW.<br>NW.<br>NW.  | 12 7 12 13 40 32 20 23 228 14 24 24 25 20 20 20 20 20 20 20 20 20 20 20 20 20  | Dire<br>an velocities with the velocities with th | etion of the city.  12 W. 8 12 20 20 20 23 W. 22 20 13 W. 22 16 16 16 19 W. 5 8 10 19 W. 5 8 10 19 W. 5 8 10 19 W. 5 10 1 | Direct and velocity NW SE. WNW SE. WNW WSSW. WNW SSW. NNW ESE. E.       | tion 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 17 20 117 12 12 14 14 15 17 17 17 17 17 17 17 17 17 17 17 17 17   |
| 1882   Aug. 1   Aug. 2   Aug. 4   Aug. 5   Aug. 7   Aug. 7   Aug. 11   Aug. 12   Aug. 13   Aug. 14   Aug. 12   Aug. 13   Aug. 14   Aug. 12   Aug. 13   Aug. 17   Aug. 17   Aug. 18   Aug. 19   Aug. 20   Aug. 20   Aug. 20   Aug. 21   Aug. 22   Aug. 24   Aug. 25   Aug. 26   Aug. 27   Aug. 26   Aug. 27   Aug. 26   Aug. 27   Aug. 26   Aug. 26   Aug. 27   Aug. 26   Aug. 27   Aug. 26   Aug. 27   Aug. 28   Aug. 28   Aug. 29   Aug. 20   Aug. 20   Aug. 27   Aug. 26   Aug. 27   Aug. 27   Aug. 26   Aug. 27   Aug   | Directif and velocit S.W. E. E. W. S.E. S. W. S.E. S. W. N.W. E.  | 16 14 18 22 28 23 22 24 16 8 9 15 13 20 29 5 6 9 11           | Direction of the control of the cont | 16 13 17 24 14 19 24 28 22 22 12 10 10 10 16 13 22 21 21 21 20 16 13 22 21 21 21 21 21 21 21 21 21 21 21 21 | Direct and velocit and velocit and velocit solutions. S.W. E. W.N.W. N.W. 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[Height of an ennounce to above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, -56 17m. Velocity given in miles per hour.] 11 a. m. 12 m. 1 a. m. Direction Direction Direction Direction Direction Direction Direct'on Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. velocity velocity. velocity. velocity. velocity. velocity. NNW. WSW. NAW.  $^{29}_{2}$ N. SSW. SW. SSW SSE. SE. ESE. SSE. SE. ESE. E. NNE. 14 9 11 6 10 16 6 11 SSE. ESE. SE. 14 6 10 5 16 10 12 5 13 SSE. 18 12 12 5 20 13 10 12 6 14 16 7 10 6 13 9 8 10 8 13 ESE. NNE. ESE. NE. ENE. NE. NE. ENE. 12 13 21 16 10 NE. ENE. ESE. WNW 12 12 11 N. NNE ESE. 10 13 4 19 28 12 14 4 15 27 5 16 24 17 18 E. NE. E. NE. E. NE. E. NE. WSW. NW. NNW. SE. NE. W. NW. NNW. E. ENE. WSW. WNW NW. WSW. 10 15 14 14 13 WSW. WNW W. ESE. 10 11 14 8 16 9 13 16 11 18 12 9 12 8 18  $14 \\ 5 \\ 13 \\ 7 \\ 16$ wsw 11 15 8 NW. W. NE. E. ENE. E. ENE. NE. ENE. ENE. 16 ENE. 16 16 E. NE. NNW. SSW. WSW. ENE. NE. NNW. SSW. WSW. ENE. NE. N. SSW. SSW. ENE. NE. NNW. ENE. NE. NNW. ENE. NE. NW. S. E. NE. NWW. SSW. W. 15 17 28 8 16 14 18 26 11 15 ENE N. S. SSW. SSW. SSW. 10 SSW SSW. WSW. S. SSW. W. SE. SSW. WSW. SE. SSW. SW. ENE. SSW. WSW. SSW. SW. 15 6 15 ENE. 13.97 14. 17 14.20 12.50 12, 47 12, 03 13, 17 14, 33 14, 27 14.30 13.97 5 p. m. 4 p. m. 1 p. m 2 p. m. 3 p. m 6 p. m 7 p. m 8 p. m. 10 p. m. 11 p. m. 12 p. m. Direction Direction Direction | Direction Direction Direction Direction Direction Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. velocity. velocity. NNW. SSE. NNW. SSE. NNW SSE. NW. NW SE. NNW ESE. 14 ESE. 15 13 SE. SSE. E. NNE. E. SE. SSE. E. ENE. 11, 96 9 68 19, 71 8, 79 15, 29 17 9 12 7 ENE. ESE. E. NE. WNW ENE. E. E. 16 16 22 7 13 NE. E. E. NNE. WNW. 14 21 22 6 11 14 23 23 5 11 12 22 23 5 8  $^{11}_{16}_{20}$ 14 NE. ESE. 13 20 24 5 12  $13 \\ 21 \\ 22 \\ 6 \\ 11$ 20 23 7 14 Calm. WNW. . 13 10 2 11 24 6 N. SSW. E. NE. NW. 14 2 10 22 713 N. WSW 14 5 11 26 4 14 2 11 26 5 ESE. ENE. NNW. 10 24 3 11 27 4 WSW. W. SE. NE. ENE. WSW NW. SE. NE. ENE. W. W. E. ENE. W. WNW SE. NE. ENE. W. 12 WNW. 18 SE. 8 NE. 14 NE. 15 WNW WNW ESE. NE. ENE. 12 16 4 10 16 . 12 . 15 . 11 . 10 . 15 10 16 11 17 15 12 15 5 12 16 10 16 7 E. NNE. WNW. SSW. ENE. NNE. WNW. SW. ENE. N. W. SW. SSW. ENE. N W. WNW. E. N. WNW WNW SSW. E. N. WSW. NW S. 16 26 9 20 14 20 28 8 20 15 20 28 10 16 16 99 98 19 99 99 21 36 12 24 21 ENE. NNW. WNW WNW SSW. 20 33 7 24 16  $\frac{17.29}{24.75}$ 88W 18 22 31 22 21 28 24 22 28 SSW SSIL 22.38 17.58 20.00 SSW E. SSW E. 14, 17

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883—Continued.

|   | I a.   | m.   | 2 a. 1   | n.   | 3 a. 1   | n.   | 4 a. n  | n.   | 5 a. n  | a.  | 6 a. 1   | n.   | 7 a. 1  | n.  | S a. n   | a.   | 9 a.   | m.   | 10  | 0 a. m  |   | 11 a  | ı. m.  | 12 la  | lu -  |
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| Date.   | Direc<br>an<br>veloc                                 | ıl   | Direct<br>and<br>veloci                                  | 1  | Direct<br>and<br>veloc   | l  | Direct<br>and<br>veloci   |  | Direct<br>and<br>veloci   |   | Direct<br>and<br>veloci  |  | Direct<br>and<br>veloci   | 1   | Direct<br>and<br>veloci  |  | Direct an veloci   | d  | 1   | rectio<br>and<br>locity   |   | 8.  | ection<br>nd<br>ocity.   | Direct   | ial . |
| 1882.<br>Oct. 1<br>Oct. 2   | ESE.<br>SSW.   | 11<br>12   | E.<br>SSW.   | 13<br>12   | E.<br>SSW.   | 19<br>15   | E.<br>SSW.  | 17<br>13   | ENE.<br>SSW.  | 20<br>14  | ESE.<br>SW.  | 14<br>14   | SE.<br>SSW.   | 8<br>14   | SE.<br>SSW.  | 8<br>11  | s.<br>s.   | 11<br>11   | 8.  |   | 6 12  | s.<br>ssw.  | 6 12   | s.<br>sw.  |       |
| let. 3<br>let. 4<br>let. 5<br>let. 6<br>let. 7  | NE.<br>ENE.<br>ENE.<br>ENE.                          | 17<br>25<br>32<br>29<br>24   | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.                       | 16<br>24<br>82<br>30<br>22   | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.   | 18<br>25<br>32<br>24<br>26   | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.  | 16<br>25<br>32<br>26<br>27   | ENE.<br>ENE.<br>ENE.<br>ENE.<br>NE.   | 18<br>24<br>32<br>26<br>24  | NE.<br>ENE.<br>ENE.<br>NE.<br>NE.                                      | 18<br>25<br>32<br>27<br>23   | NE.<br>ENE.<br>ENE.<br>NE.<br>NE.   | 17<br>26<br>35<br>24<br>23                              | NE.<br>ENE.<br>ENE.<br>NE.<br>NE.  | 17<br>26<br>34<br>25<br>23   | NE.<br>NE.<br>NE.<br>NE.   | 21<br>27<br>36<br>26<br>25   | NE.   | E.<br>E.  | 22<br>28<br>38<br>25<br>26  | NE.<br>ENE.<br>NE.<br>NE.<br>NE.                                | 20<br>28<br>36<br>24<br>26   | ENE.<br>NE.<br>NE.<br>NE.  |       |
| 0ct. 8<br>0ct. 9<br>0ct. 10<br>0ct. 11<br>0ct. 12   | NE.<br>ENE.<br>ENE.<br>E.<br>N.                      | 27<br>22<br>19<br>5<br>4   | NE.<br>NE.<br>NE.<br>E.                                  | 26<br>21<br>17<br>4<br>5   | NE.<br>NE.<br>NE.<br>ENE.<br>NNW.  | 27<br>22<br>17<br>7<br>3   | NE.<br>ENE.<br>NE.<br>E.<br>NNW.  | 28<br>24<br>15<br>6<br>3   | NE.<br>ENE.<br>NE.<br>E.<br>N.  | 28<br>22<br>15<br>6<br>3  | NE.<br>ENE.<br>ENE.<br>N.  | 20<br>22<br>14<br>8<br>3   | ENE.<br>ENE.<br>ENE.<br>ENE.<br>N.  | 28<br>22<br>12<br>5<br>3                                | NE.<br>NE.<br>NE.<br>NE.   | 28<br>19<br>11<br>3<br>4   | NE.<br>NE.<br>ENE.<br>NNW.<br>NNE.   | 28<br>21<br>11<br>4<br>3   | EN<br>NE.   | E.  | 28<br>20<br>10<br>6<br>3  | ENE.<br>ENE.<br>NE.<br>NW.<br>NE.                               | 28<br>20<br>9<br>5<br>2  | NE.<br>NE.<br>EXU.<br>NW.<br>Calm  |       |
| let. 13<br>let. 14<br>let. 15<br>let. 16<br>let. 17   | ESE,<br>E.<br>NE.<br>ENE.<br>E.                      | 20<br>15<br>13<br>14   | ESE.<br>E.<br>ENE.<br>ENE.<br>E.                         | 7<br>18<br>16<br>12<br>16  | ESE.<br>E.<br>ENE.<br>E.   | 6<br>19<br>15<br>16<br>16  | ESE.<br>ENE.<br>ENE.<br>E.  | 8<br>16<br>14<br>15<br>16  | ESE.<br>ENE.<br>ESE.<br>ESE.  | 7<br>13<br>16<br>15<br>13   | ESE.<br>ENE.<br>ENE.<br>ESE.<br>E.                                     | 8<br>15<br>16<br>15<br>14  | ESE.<br>ENE.<br>ENE.<br>E.<br>E.  | 9<br>11<br>16<br><b>16</b><br>17                        | ESE.<br>ENE.<br>E.<br>ENE.   | 8<br>12<br>14<br>11<br>15  | ESE.<br>ENE.<br>ENE.<br>ENE.   | 10<br>15<br>14<br>8<br>18  | ENI   | E.<br>E.  | 8<br>15<br>16<br>12<br>18   | ESE.<br>ENE.<br>ENE.<br>E.<br>ENE.                              | 7<br>15<br>16<br>12<br>18  | ESIL<br>ENE<br>ENE<br>E  |       |
| et. 18<br>et. 19<br>et. 20<br>et. 21<br>et. 22  | E.<br>ENE.<br>E.<br>S.                               | 14<br>13<br>5<br>4<br>6  | E.<br>ENE.<br>E.<br>SSW.                                 | 15<br>12<br>5<br>3<br>8  | E.<br>ENE.<br>ESE.<br>NW.<br>SSW.  | 15<br>12<br>5<br>3<br>8  | E.<br>ENE.<br>ESE.<br>NNW.<br>SSW.  | 14<br>11<br>4<br>4<br>6  | E.<br>ENE.<br>ESE.<br>NNW.<br>S.  | 15<br>10<br>2<br>5<br>7   | ESE.<br>NE.<br>E.<br>NW.<br>S.   | 11<br>11<br>2<br>5<br>8  | ESE.<br>ENE.<br>E.<br>NW.   | 10<br>10<br>3<br>4<br>8                                 | ESE.<br>ENE.<br>ESE.<br>NW.<br>S.  | 10<br>11<br>3<br>4<br>8  | ESE.<br>ENE.<br>SE.<br>NW.<br>S.   | 10<br>12<br>3<br>5   | SE.<br>NW   | ·<br>r.   | 8<br>9<br>3<br>5<br>10  | ESE.<br>E.<br>SE.<br>NW.<br>SSE.                                | 6<br>6<br>3<br>4<br>9  | E.<br>ENE.<br>ESE.<br>WNW<br>SSE.  | ć.    |
| et. 23<br>et. 24<br>et. 25<br>et. 26<br>et. 27  | ESE.<br>ENE.<br>N.<br>NW.                            | 5<br>6<br>12<br>14<br>7  | ESE.<br>E.<br>ENE.<br>NNW.<br>NNW.                       | 6<br>6<br>10<br>15<br>5  | E.<br>ENE.<br>N.<br>NNW.   | 6<br>9<br>20<br>7  | E.<br>ENE.<br>NE.<br>NNW.<br>NNW.   | 7<br>6<br>9<br>18<br>6   | E.<br>ENE.<br>NE.<br>NNW.<br>NNW.   | 6<br>6<br>7<br>17<br>6  | E.<br>ENE.<br>ENE.<br>NNW.   | 8<br>6<br>14<br>8  | ENE.<br>ENE.<br>NNW.<br>NNW.  | 8<br>5<br>6<br>11<br>7                                  | ENE,<br>ENE,<br>ENE,<br>NNW,<br>NNW,   | 6<br>6<br>6<br>14  | ENE.<br>ENE.<br>ENE.<br>NNW.   | 6<br>5<br>8<br>13<br>5   | ENI   | E.<br>E.<br>W.  | 6<br>6<br>6<br>15   | ENE.<br>E.<br>ENE.<br>NNW<br>NNW                                | 6<br>6<br>6<br>16  | ENE.<br>ENE.<br>NNW<br>NNW   |       |
| et. 28<br>et. 29<br>et. 30<br>et. 31  | NNW.<br>SSW.<br>SSE.<br>SSW.                         | 2<br>5<br>20<br>28   | NNW.<br>SSW.<br>SSE.<br>SSW.                             | 3<br>6<br>18<br>30   | S.<br>SE.<br>SSE.<br>SSW.  | 3<br>8<br>22<br>28   | S.<br>SSE.<br>SSW.  | 3<br>6<br>20<br>27   | S.<br>SSE.<br>SSE.<br>SSW.  | 4<br>5<br>19<br>28  | S.<br>SE.<br>SSE.<br>SSW.  | 3<br>7<br>18<br>25   | S.<br>SE.<br>SSE.<br>SSW.   | 2<br>3<br>18<br>30                                      | SSE.<br>SSE.<br>SSW.   | 5<br>3<br>18<br>22   | SSE.<br>SE.<br>SE.<br>SSW.   | 6<br>6<br>17<br>18   | SE.<br>SE.  |   | 6<br>9<br>21<br>20  | SSE.<br>SE.<br>SSW.   | 7<br>9<br>22<br>17   | S.<br>SE.<br>SE<br>SSW.  |       |
| Means.  | • 14.1   | 3  | 13. 98   |  | 14. 81   |  | 14. 26  | 3  | 13. 97  | 7   | 13. 8  | 4  | 13. 0   | 6   | 12. 61   |  | 13.  | 29   | 1   | 13. 65  |   | 13.   | . 16   | 12.  | . 9   |
|   | 1 p. 1   | 114  | 2 p. n   |  | 3 p. n   | ì.   | 4 p. n  | ı.   | 5 p. m  | 1.  | 6 p. r   | n  | 7 p. n  | 1.  | 8 p. m.  |  | 9 p. m.  | į  | 10 p. n   | n.  | 11 p  | . m.  | 12 p.  |  |       |
| Date.   | Direct<br>and<br>veloci                              |  | Directi<br>and<br>velocit                                |  | Directi<br>and<br>velocit  |  | Directi<br>and<br>velocit   |  | Directi<br>and<br>velocit   |   | Direct<br>and  |  | Direct<br>and<br>veloci   |   | Directio<br>and<br>velocity  | - 1  | Direction and velocity   |  | Direction and velocity  |   | Direc   | rd.   | Direct   | ion lu   | Dies  |
|   | -  |  | 101001   |  |  |  |   |  |   |   | veloci   | ty.  |   |   |  |  | resourcy   | . , '  | · crocit,   | y.  | veloc   | eity.   | veloc  |  |       |
| 18e2.<br>et. 1<br>et. 2   | s.<br>sw.  | 5 13   | s.<br>sw.  | 7 17   | s.<br>sw.  | 3 18   | s.<br>sw.   | 5<br>14  | SSE.<br>SW.   | 6<br>16   | s.<br>sw.  | 6<br>12  | SSE.<br>SW.   | 6 16  | SSE.<br>SW.  | 12   | SSE.   | 11 S   | SE.<br>V.   | 9 8   |   | 10  | SSE.<br>NNE.   |  |       |
| et. 1<br>et. 2<br>et. 3<br>et. 4<br>et. 5   | -<br>S.  | 5 .  | s.   | 7  | S.<br>SW.<br>ENE.<br>ENE.<br>NE.<br>ENE.<br>NE.  |  | S.<br>SW.<br>ENE.<br>ENE.<br>NE.<br>ENE.<br>NE.   |  | SSE.  | 6   |  | 6  | SSE.  | 6   | ENE.<br>NE.<br>NE.   | 12<br>12<br>12   | SSE.<br>SW.<br>ENE.<br>ENE.<br>ENE.  | 11 S<br>10 V<br>23 E<br>32 E   | SE.<br>V.<br>ENE.<br>ENE.   | 9 8 5 2 1 32 H 35 H   | veloc   | . 9   | SSE.   |  |       |
| ct. 1<br>ct. 2<br>ct. 3<br>ct. 4<br>ct. 5<br>ct. 6<br>ct. 7<br>ct. 8<br>ct. 9<br>ct. 10   | S.<br>SW.<br>ENE.<br>ENE.<br>NE.<br>ENE.             | 5<br>13<br>22<br>28<br>38<br>24  | S.<br>SW.<br>ENE.<br>ENE.<br>NE.<br>ENE.                 | 7<br>17<br>22<br>28<br>38<br>24  | ENE.<br>ENE.<br>NE.<br>ENE.  | 18<br>22<br>29<br>39<br>24   | ENE.<br>ENE.<br>NE.<br>ENE.   | 23<br>29<br>38<br>24   | SSE.<br>SW.   | 6<br>16<br>24<br>32<br>36   | S.<br>SW.<br>ENE.<br>ENE.  | 6<br>12<br>24<br>31<br>36<br>24  | SSE.<br>SW.<br>ENE.<br>ENE.<br>ENE.<br>NE.                                    | 6<br>16<br>21<br>32<br>38<br>24                         | SW. ENE. NE. NE. NE. NE.   | 12<br>12<br>22<br>30<br>35<br>24<br>22<br>26<br>20<br>7  | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE.  | 11 S<br>10 V<br>23 E<br>32 H<br>36 E<br>24 N<br>223 N<br>24 N<br>20 N<br>5 N             | SE.<br>V.<br>ENE.<br>ENE.<br>VE.<br>VE.<br>VE.  | 9 S 2 2 4 H 32 1 1 2 2 5 2 1 8 9 2 5  | veloc<br>SSE<br>NNE<br>ENE<br>ENE   | 10<br>9<br>24<br>33<br>33<br>23<br>24<br>24                     | SSE.<br>NNE.<br>ENE.<br>ENE.   | 15<br>22<br>31<br>31   |       |
| ct. 1<br>ct. 2<br>ct. 3<br>ct. 4<br>ct. 5<br>ct. 6<br>ct. 7<br>ct. 8<br>ct. 9<br>ct. 10   | S. SW. ENE. ENE. NE. NE. NE. NE. NE. NE. NE.         | 5<br>13<br>22<br>28<br>38<br>24<br>22<br>28<br>18<br>8                                       | S. SW. ENE. ENE. ENE. NE. NE.                            | 7<br>17<br>22<br>28<br>38<br>24<br>23  | ENE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.  | 18<br>22<br>29<br>39<br>24<br>24<br>27<br>17<br>8<br>6                         | ENE.<br>ENE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.  | 23<br>29<br>38<br>24<br>28<br>21<br>6<br>4   | SSE.<br>SW.<br>E.<br>ENE.<br>ENE.<br>NE.<br>NE.<br>NE.                          | 6<br>16<br>24<br>32<br>36<br>24<br>28<br>26<br>22<br>6                        | S. SW. ENE, ENE, NE, NE, NE, NE, NE, NE, NE, N                         | 0<br>12<br>24<br>31<br>36<br>24<br>28<br>26<br>22<br>7<br>5              | SSE.<br>SW.<br>ENE.<br>ENE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.               | 6<br>16<br>21<br>32<br>38<br>24<br>27<br>26<br>21<br>7  | ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E | 12<br>12<br>22<br>30<br>35<br>32<br>24<br>22<br>26<br>7<br>5<br>8  | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE. ENE. E   | 11 S<br>10 V<br>23 E<br>332 E<br>332 E<br>336 E<br>24 M<br>223 N<br>77 N<br>55 N<br>10 E | SE.<br>V.<br>CNE.<br>CNE.<br>CNE.<br>VE.<br>VE.<br>VE.<br>VE.<br>VE.<br>VE.<br>VE.<br>VE.<br>VE.<br>V | 9 5 5 24 H 322 H 322 H 325 H 32 H 32 H 32 H 32 H  | veloc<br>SSE<br>ENE<br>ENE<br>ENE<br>ENE<br>NNE.<br>NNE.<br>NNE.<br>NNE<br>ENE<br>E | 10 9 24 33 23 23 24 24 24 7 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | SSE.<br>NNE.<br>ENE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.                                   | 8<br>15<br>22<br>31<br>31<br>23<br>26<br>23<br>19<br>7<br>3                              |       |
| et. 1 2 et. 3 et. 4 et. 5 et. 5 et. 7 et. 8 et. 10 et. 11 et. 12 et. 12 et. 13 et. 15 et. 16 et. 16 et. 16 et. 17 et. 18 et. 19 et. 11 et. 11 et. 12 et. 13 et. 15 et. 15 et. 16 et. 16 | S. SW. ENE. ENE. NE. NE. NE. NE. NE. NE. NE.         | 5<br>13<br>22<br>28<br>38<br>24<br>22<br>28<br>18<br>5<br>6<br>14<br>16<br>19                | S. SW. ENE. ENE. NE. NE. NE. NE. NE. NE. NE.             | 7<br>17<br>22<br>28<br>38<br>24<br>23<br>26<br>18<br>7<br>7<br>7<br>7  | ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>ESE<br>E.<br>ENE.  | 18<br>22<br>29<br>39<br>24<br>24<br>27<br>17<br>86<br>7<br>5<br>20<br>16<br>11 | ENE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>E.<br>E.<br>E.<br>E.<br>E. | 28<br>29<br>38<br>24<br>28<br>21<br>6<br>4<br>4<br>4<br>16<br>12   | SSE. SW. E. ENE. ENE. NE. NE. NE. NE. NE. E. E. E. E. E. E. E. E.               | 6<br>16<br>24<br>32<br>36<br>24<br>28<br>26<br>5<br>2<br>29<br>29<br>11<br>12 | S. SW. ENE. ENE. NE. NE. NE. NE. NE. E. E. E. E. E. E. E. E. E.        | 0<br>12<br>24<br>31<br>32<br>32<br>28<br>22<br>75<br>4<br>80<br>11<br>12 | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE. E. E. E. E. E. E. E. E.               | 6<br>16<br>21<br>32<br>38<br>24<br>27<br>20<br>13<br>14 | SW. ENE. NE. NE. NE. NE. NE. NE. E.  | 12<br>12<br>22<br>230<br>335<br>24<br>22<br>20<br>7<br>7<br>5<br>8<br>9<br>19<br>12<br>14<br>3<br>2<br>4 | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE. E.                     | 23 E E 23  | SE.<br>V.<br>CNE.<br>CNE.<br>CNE.<br>CNE.<br>CNE.<br>CNE.<br>CNE.<br>CNE                              | 9 5 5 24 H H H H H H H H H H H H H H H H H H  | veloc<br>SSE<br>ENE<br>ENE<br>ENE<br>ENE<br>NNE.<br>NNE.<br>NNE.<br>NNE<br>ENE<br>E | 10 9 24 33 33 23 24 24 24 19 77 3 17 17 17 17 17 17 17          | SSE.<br>NNE.<br>ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>ESE.<br>E.<br>ENE.<br>EN | 8<br>15<br>22<br>31<br>31<br>23<br>26<br>23<br>19<br>7<br>3<br>6<br>10<br>17<br>14<br>16 |       |
| ot. 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2   | S. SW. ENE. ENE. NE. NE. NE. NE. NE. ESE. E. ENE. EN | 5<br>13<br>22<br>28<br>38<br>24<br>22<br>28<br>18<br>6<br>6<br>14<br>16<br>16<br>6<br>6<br>3 | S. SW. ENE. ENE. NE. NE. NE. NE. NE. NE. ESE. E. ENE. EN | 7<br>17<br>22<br>28<br>38<br>24<br>23<br>26<br>18<br>7<br>7<br>7<br>7<br>15<br>9<br>14<br>16<br>7<br>3<br>3<br>3 | ENE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E | 229<br>239<br>244<br>247<br>178<br>66<br>7<br>20<br>216<br>111<br>23           | ENE. ENE. NE. NE. NE. E.                                | 23<br>29<br>38<br>24<br>28<br>21<br>6<br>4<br>4<br>4<br>6<br>21<br>16<br>12<br>22<br>16<br>5<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16<br>16 | SSE. SW.  E. ENE. NE. NE. NE. NE. NE. NE. E.  6 16 24 82 26 22 6 5 2 9 23 14 12 22 18                                       | S. SW. ENE. ENE. NE. NE. NE. NE. E.  6 12 24 81 36 24 28 26 222 75 4 8 29 14 12 22 18 4 3                     | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE. E.  6 16 21 32 38 227 26 21 7 4 6 9 20 13 14 22 2 18 1 2 4  | SW.  ENE.  NE.  NE.  NE.  NE.  NE.  NE.  | 12 22 230 224 222 226 29 77 5 8 9 19 114 3 2 2 4 7 6 113 17 8  | SSE. SW. ENE. ENE. ENE. NE. NE. NE. NE. NE. ENE. | SV E E E E E E E E E E E E E E E E E E E   | SE. V. ENE. INE. INE. INE. INE. INE. INE. INE.  | 9 5 2 2 4 1 1 2 2 3 2 4 1 2 2 3 2 4 1 2 2 3 2 4 1 2 2 3 2 4 1 2 2 3 1 3 2 4 1 3 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | veloc<br>SSE<br>ENE<br>ENE<br>ENE<br>ENE<br>ENE<br>ENE<br>ENE<br>ENE<br>ENE         | 10 9 24 33 33 33 23 19 7 7 17 17 17 17 17 17 17 17 17 17 17 17  | SSE. NNE. ENE. ENE. NE. NE. NE. NE. NE. ESE. E. ENE. EN                                    | 8<br>15<br>22<br>31<br>31<br>23<br>26<br>23<br>19<br>7<br>3<br>6<br>10<br>17<br>14<br>16 |       |

Sta

Date.

Tov. 3 Tov. 4 Tov. 5 Tov. 6 Tov. 6 Tov. 9 Tov. 10 Tov. 11 Tov. 12 Tov. 12 Tov. 13 Tov. 14 Tov. 15 Tov. 15

v. 15 v. 16 v. 17 v. 18 v. 19 v. 20 v. 21 v. 22 v. 23 v. 24 v. 25 v. 26 v. 26 v. 27 v. 28

Date.

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

83—Continued.

given in miles per hour. 11 a.m.

Direction | Direction and and velocity.

6 S. 12 SW.

20 ENE. 28 ENE. 36 NE. 24 NE. 26 NE.

28 NE. 20 NE. 9 ENE. 5 NW. 2 Cala.

7 ESL 15 ENE 16 ENE 12 E 18 ENE

s. SSW.

SSE. SE. SE. SSW. 7 9 22 17 SE. SE. SSW

13, 16 12 p. m. tion Direction mean velocity.

10 SSE, 8 9 NNE, 15

12 m.

Height of an emometer above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, -54 17%. Velocity given in miles per hour.]

| THEIR   | 1 a. r                              |   | 2 a. r   |  | face of   |  | 4 a. n                                    |  | 5 a. r                                     | n.   | 6 a. n                                    | ).   | 7 a. p                                     | 1.  | S a. i                                      | n.   | 9 a  | m.                         | 1  | 0 8. 1   | 11.                                | 11 8  | . m.                                    | 12  | m.  |
|---|-------------------------------------|---|--|--|---|--|---|--|--|--|---|--|--|---|---|--|--|----------------------------|--|--|------------------------------------|---|---|---|---|
| Date.   | Direct<br>and<br>veloci             | tion  | Direct<br>and<br>veloci                              | ion  | Direct<br>and<br>veloci                         | ion  | Direct<br>and<br>veloci                   | ion  | Direct<br>and<br>veloci                    | ion  | Direct<br>and<br>veloci                   | ion  | Direct<br>and<br>veloci                    | ion   | Direct<br>and<br>veloci                     | ion  | Direc<br>ar<br>velo                                    | d                          |  | irect<br>and<br>eloci  |                                    | 8.1   | etion<br>ad<br>city.                    | Dire  | ection<br>nd<br>ocity.  |
| 1882.<br>Nov. 1<br>Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5                   | W.<br>W.<br>NW.<br>NNW.<br>E.<br>E. | 12<br>4<br>29<br>4<br>20<br>30                                      | W.<br>WSW.<br>NW.<br>ENE.<br>E.<br>ENE.              | 7<br>10<br>33<br>4<br>20<br>28   | WSW.<br>NW.<br>ENE.<br>E.<br>ENE.               | 8<br>14<br>32<br>6<br>21<br>26                                     | W.<br>WSW.<br>NW.<br>ENE.<br>E.<br>ENE.   | 6<br>13<br>28<br>6<br>23<br>28                               | WSW.<br>W.<br>NW.<br>ESE.<br>E.<br>E.      | 5<br>17<br>23<br>10<br>28<br>27                              | SSW.<br>W.<br>NW.<br>ESE.<br>E.<br>E.     | 7<br>20<br>20<br>10<br>27<br>25                        | SSW.<br>W.<br>NW.<br>ESE.<br>ENE.<br>ENE.  | 7<br>21<br>22<br>14<br>24<br>24                       | WSW.<br>WNW.<br>NW.<br>ESE.<br>ENE.<br>ENE. | 5<br>19<br>21<br>12<br>28<br>24                  | W.<br>W.<br>NW.<br>ESE.<br>ENE.<br>ENE.                | 1 1 2                      | 13 W.<br>21 W.<br>21 W.<br>13 ES<br>28 EN<br>24 EN | E.   | 18<br>13<br>24                     | WNV<br>WNV<br>NW,<br>ESE,<br>ENE,                   | 7. 10<br>7. 21<br>17<br>15<br>26<br>24  | NW.<br>NNV<br>NW.<br>ESE.<br>E.<br>ENE  | 16<br>15  |
| Nov. 6<br>Nov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11                | E.<br>ENE.<br>SW.                   | 24<br>30<br>21<br>20<br>28  | E.<br>ENE.<br>ENE.<br>SW.<br>E.                      | 24<br>31<br>17<br>22<br>32   | E.<br>ENE.<br>ENE.<br>SW.<br>E.                 | 24<br>32<br>17<br>17<br>32   | E.<br>ENE.<br>ENE.<br>SW.<br>E.           | 28<br>32<br>18<br>22<br>32                                   | E.<br>ENE.<br>E.<br>WSW.                   | 23<br>30<br>15<br>28<br>27                                   | E.<br>ENE.<br>E.<br>WSW.                  | 23<br>23<br>20<br>29<br>24                             | E.<br>ENE.<br>E.<br>WSW.                   | 26<br>25<br>20<br>31<br>26                            | E.<br>ENE.<br>E.<br>WSW.<br>ENE.            | 24<br>24<br>21<br>30<br>28                       | E.<br>ENE.<br>ESE.<br>WSW<br>ENE.                      | . 2                        | 25 E.<br>25 EN<br>27 E.<br>37 W.<br>29 NE          | IE.  | 24                                 | ENE.<br>ENE.<br>E.<br>WNV                           | 27<br>22<br>30<br>V. 12<br>31           | ENE<br>ENE<br>NW.<br>ENE  | 27<br>23<br>30  |
| Nov. 12<br>Nov. 13<br>Nov. 14<br>Nov. 15<br>Nov. 16                       | NE.<br>ENE.<br>ENE.<br>NE.          | 40<br>12<br>10<br>8   | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.                   | 38<br>14<br>10<br>8<br>10  | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.              | 42<br>10<br>10<br>9<br>12  | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.        | 34<br>12<br>10<br>9<br>10                                    | NE.<br>ENE.<br>ENE.<br>ENE.<br>NE.         | 35<br>11<br>6<br>9<br>11                                     | NE.<br>ENE.<br>ENE.<br>NE.                | 32<br>12<br>10<br>10<br>10                             | NNE.<br>E.<br>E.<br>ENE.<br>NE.            | 31<br>10<br>8<br>9<br>10                              | NE.<br>E.<br>E.<br>ENE.<br>NE.              | 26<br>10<br>9<br>10                              | NE.<br>E.<br>E.<br>ENE.<br>NE.                         | 1                          | 30 NF<br>9 EN<br>10 ES<br>10 EN<br>11 NF           | E.<br>E.   | 11                                 | NE.<br>NE.<br>ESE.<br>NE.<br>NE.                    | 24<br>12<br>7<br>10<br>11               | NE.<br>NE.<br>ESE.<br>ENE.<br>NE.   | 21<br>13<br>7<br>10   |
| Nov. 17<br>Nov. 18<br>Nov. 19<br>Nov. 20<br>Nov. 21                       | NE.<br>NE.<br>NE.<br>ESE.<br>ENE.   | $\begin{array}{c} 19 \\ 32 \\ 21 \\ 26 \\ 26 \end{array}$           | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.                   | 20<br>32<br>19<br>20<br>24   | NE.<br>NE<br>ENE.<br>ESE.<br>ENE.               | 20<br>32<br>22<br>23<br>28   | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.        | 19<br>32<br>20<br>25<br>24                                   | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.         | 20<br>33<br>19<br>25<br>24                                   | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.        | 23<br>27<br>21<br>25<br>24                             | NE.<br>ENE.<br>ESE.<br>ENE.                | 27<br>25<br>19<br>23<br>22                            | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.          | 27<br>23<br>19<br>23<br>23                       | NE.<br>NE.<br>ENE.<br>ESE.<br>ENE.                     | 1                          | 30 NI<br>25 NI<br>18 EN<br>24 ES<br>22 EN          | E.   | 20                                 | NE.<br>ENE.<br>ENE.<br>E.<br>ENE.                   | 32<br>20<br>22<br>24<br>24              | NE.<br>NE.<br>E.<br>ESE.<br>ENE   | 20<br>20<br>22<br>24<br>23  |
| Nov. 22<br>Nov. 23<br>Nov. 24<br>Nov. 25<br>Nov. 26                       | E.<br>WNW<br>SE<br>WNW<br>NW.       | . 17<br>. 22<br>. 22<br>. 6   | N.<br>WNW<br>E.<br>NW.<br>SSW.                       | . 16<br>5<br>29  | NE.<br>WNW<br>SE.<br>NW.<br>88W.                | 14<br>18<br>4<br>27<br>4   | N.<br>WNW<br>S.<br>NW.<br>S.              | 13<br>20<br>10<br>22<br>7                                    | NNW.<br>WNW.<br>SSW.<br>WNW.               | 12   | NNW.<br>W.<br>S.<br>NW.<br>SSE.           | 18<br>19<br>11<br>19<br>7                              | NW.<br>W.<br>SSE.<br>NW.<br>SE.            | 18<br>19<br>11<br>17<br>7                             | NNW.<br>WNW.<br>S.<br>WNW.<br>SE.           | 19<br>15<br>10<br>17<br>5                        | NW.<br>WNW<br>S.<br>WNW<br>SE.                         | r. i<br>r. i               | 9 . S.   | XW.  | 16                                 | NW.<br>W.<br>S.<br>N.<br>ESE.                       | 18<br>10<br>9<br>13<br>12               | NW.<br>WSV<br>S.<br>N.<br>ESE.  | V. 10<br>0<br>16<br>15  |
| Nov. 27<br>Nov. 28<br>Nov. 19<br>Nov. 40                                  | SSE.<br>ESE.<br>ESE.                | 11<br>21<br>33<br>21  | S.<br>ESE.<br>ESE.<br>E.                             | $\frac{7}{17}$ $\frac{27}{26}$   | SSE.<br>ESE.<br>ESE.<br>ESE.                    | 8<br>20<br>32<br>29  | SSE.<br>ESE.<br>ESE.<br>E.                | $\frac{6}{23}$ $\frac{22}{31}$                               | SSE.<br>ESE.<br>ESE.<br>ESE.               | $\frac{4}{24}$ $\frac{16}{28}$                               | S.<br>ESE.<br>ESE.<br>ESE.                | 7<br>20<br>15<br>23                                    | SSE.<br>ESE.<br>ESE.                       | 25<br>22<br>27  | SE.<br>ESE.<br>ESE.<br>ESE.                 | 7<br>24<br>18<br>29                              | SE.<br>ESE.<br>ESE.                                    |                            | 11 SE<br>26 ES<br>20 ES<br>28 ES                   | E.   | 23                                 | ESE.<br>ESE.<br>E.<br>ESE.                          | 16<br>25<br>21<br>25                    | ESE<br>ESE<br>ESE   | 21<br>21<br>25<br>28  |
| Meens.  | 18.7                                | '3  | 18. 6  | 0  | 19. 7   | 7  | 19. 5                                     | )  | 19. 0                                      | 7  | 18. 7                                     | )  | 19. 1                                      | 7   | 18.6  | 3  | 20   | .27                        |  | 19. 4  | 0                                  | 19  | . 00                                    | 1   | 8. 80   |
| -   | <b>1</b> p. 1                       | n.  | 2 p. n   | a  | 3 p. n  | 1.   | 4 p. n                                    | 1.   | 5 p. n                                     | n.   | 8 p. n                                    | l.   | 7 p. m                                     |   | 8 p. m.                                     | 1  | 9 p. m.  |                            | 10 p.  | m.   | 11 p.                              | m.  | 12 a.                                   | m.  |   |
| Date.   | Direct<br>and<br>veloci             | l   | Direct<br>^nd<br>veloci                              |  | Direct<br>and<br>veloci                         |  | Direct<br>and<br>veloci                   |  | Direct<br>and<br>veloci                    |  | Direct<br>and<br>veloci                   |  | Directi<br>and<br>velocit                  |   | Directic<br>and<br>velocity                 | 1  | Direction and velocity                                 | 1                          | Direct<br>and<br>veloci                            |  | Direc<br>an<br>veloc               | d   | Direct<br>and<br>veloci                 | lon   | Daily<br>nean ve-<br>locity.                                      |
| 18s2.<br>Nov. 1<br>Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5<br>Nov. 6         | NW.<br>NW.<br>NW.<br>ESE.<br>ENE.   | 6<br>28<br>18<br>16<br>26<br>24                                     | NW.<br>NW.<br>NW.<br>ESE.<br>ENE.<br>ENE.            | 31<br>14<br>17<br>24<br>22   | S.<br>NW.<br>NW.<br>ESE.<br>ENE.<br>ENE.        | 5<br>28<br>13<br>17<br>27<br>24                                    | SW.<br>NW.<br>NW.<br>ESE.<br>ENE.<br>ENE. | 10<br>22<br>6<br>19<br>28<br>24                              | SW.<br>NW.<br>WNW.<br>ESE.<br>ENE.<br>ENE. | 15<br>22<br>11<br>17<br>27<br>24                             | SSW.<br>NW.<br>WNW.<br>E.<br>ENE.<br>ENE. | 12<br>32<br>8<br>16<br>30<br>24                        | SSW.<br>WNW.<br>NNW.<br>E.<br>ENE.<br>ENE. | 12<br>34<br>8<br>17<br>28<br>23                       | SSW.<br>NW.<br>NNW.<br>E.<br>ENE.<br>E.     | 20<br>29   | NW.<br>NNW.<br>E.                                      | 16<br>31<br>12<br>19<br>29 | NW.<br>NW.<br>NW.<br>E.<br>E.                      | 15<br>12<br>20<br>29<br>24                                     | XW.<br>XW.<br>N.<br>E.<br>E.<br>E. | 6<br>40<br>10<br>20<br>27<br>23                     | NW.<br>NNW.<br>NNW<br>E.<br>ENE.<br>E.  | 1<br>37<br>9<br>20<br>30<br>22  | 8, 96<br>24, 04<br>17, 04<br>14, 17<br>26, 04<br>24, 28           |
| Xov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11                          | ENE.<br>ENE.<br>NNE.<br>ENE.        | 26<br>24<br>31<br>13<br>32  | ENE.<br>ENE.<br>ENE.<br>NE.                          | 24<br>24<br>29<br>11<br>31   | ENE.<br>ENE.<br>ENE.<br>ENE.<br>NE.             | 25<br>25<br>31<br>12<br>38   | ENE.<br>ENE.<br>ENE.<br>ENE.<br>NE.       | 24<br>26<br>28<br>16<br>39                                   | ENE.<br>ENE.<br>ESE.<br>E.<br>NE.          | 25<br>26<br>28<br>17<br>37                                   | ENE.<br>ENE.<br>ESE.<br>E.<br>NE.         | 23<br>23<br>26<br>23<br>38                             | ENE.<br>ENE.<br>ESE.<br>E.<br>NE.          | 24<br>24<br>20<br>20<br>44                            | ENE.<br>ENE.<br>E.<br>E.<br>NE.             | 25<br>15<br>20                                   | ENE.<br>E.<br>E.                                       | 24<br>13<br>24             | ENE.<br>ENE.<br>E.<br>E.<br>NE.                    | 32  <br>24<br>10<br>26<br>43                                   | ENE.<br>ENE.<br>ENE.<br>NE.        | 30<br>22<br>6<br>27<br>42                           | ENE.<br>ENE.<br>SW.<br>E.<br>NE.        | 30<br>17<br>7<br>29<br>38   | 25, 75<br>25, 21<br>21, 17<br>21, 96<br>3 <b>1,0</b> 6            |
| Nov. 12<br>Nov. 13<br>Nov. 14<br>Nov. 15                                  | NE.<br>NE.<br>ESE.<br>ENE.<br>NE.   | 24<br>14<br>8<br>11<br>11   | NE.<br>ENE.<br>ESE.<br>ENE.<br>ENE.                  | 23<br>13<br>7<br>11<br>10  | NNE.<br>ENE.<br>ESE.<br>ENE.<br>NE.             | 24<br>12<br>7<br>12<br>10  | NNE.<br>ENE.<br>ESE.<br>ENE.<br>NE.       | 27<br>13<br>8<br>11<br>11                                    | NE.<br>ENE.<br>ESE.<br>ENE.<br>NE.         | 20<br>11<br>10<br>11<br>10                                   | NE.<br>ENE.<br>E.<br>NE.<br>NE.           | 19<br>11<br>9<br>11<br>11                              | ENE.<br>ENE.<br>E.<br>NE.<br>NE.           | 19<br>11<br>0<br>11<br>12                             | NE.<br>ENE.<br>ENE.<br>NE.<br>NE.           | 9  | ENE.<br>ENE.<br>ENE.                                   | 9                          | NE.<br>ENE.<br>E.<br>NE.<br>NE.                    | 19<br>11<br>6<br>11<br>16                                      | NE.<br>ENE.<br>NE.<br>NE.          | 17<br>10<br>8<br>11<br>15                           | ENE.<br>ENE.<br>NE.<br>NE.              | 12<br>10<br>8<br>11:  | 25. 99<br>11. 49<br>8. 40<br>10. 04<br>11. 58                     |
| No. 5, 16   |                                     |   |  | 30   | NE.   | 28<br>21   | NE.<br>ENE.                               | 27<br>21   | NE.<br>ENE.                                | 30<br>24<br>18   | NE.<br>ENE.<br>E.                         | 36<br>23<br>22<br>24                                   | NE.<br>ENE.<br>E.                          | 36<br>24<br>23<br>24                                  | NE.<br>ENE.<br>E.<br>E.<br>NE.              | 32  <br>24<br>24<br>24                           | ENE.<br>E.<br>E.                                       | 25                         | NE.<br>ENE.<br>E.                                  | 34<br>20<br>28<br>21   | NE.<br>ENE.<br>ESE.                | 34<br>20<br>26                                      | NE.<br>ENE.<br>ESE.                     | 32<br>20<br>28  | 27, 83<br>24, 0<br>21, 17<br>23, 13                               |
|   | NE.<br>NE.<br>E.<br>NE.             | 27<br>20<br>23<br>26<br>19  | NE.<br>NE.<br>E.<br>NE.                              | 21<br>19<br>20<br>20   | NE.<br>E.<br>E.<br>NE.                          | 16<br>24<br>19   | E.<br>NE.                                 | 16<br>24<br>11   | E.<br>NE.                                  | 24<br>10   | E.<br>NE.                                 | 10   | NE.  | 9   | NE.   | 0  | NE.  | 9                          | E.<br>NE.  | 7  | E.<br>NE.                          | 20<br>6   | ENE.                                    | 20  | 23. 13<br>17. 5   |
| Nov. 16<br>Nov. 17<br>Nov. 18<br>Nov. 13<br>Nov. 20                       | NE.<br>E.                           | 20<br>23<br>26<br>19<br>19  | NE,<br>E.<br>E.                                      | 21<br>19<br>20   | NE.<br>E.<br>E.                                 | 16<br>24<br>19   | E.  | 24<br>11   | E.   | 24<br>10   |   |  |  |   | NE.<br>WNW.<br>NW.<br>SSE.<br>W.<br>SSE.    | 0<br>18<br>4<br>6<br>12<br>16                    | W.<br>ESE,<br>SSE,<br>W.<br>SE.                        | 23                         | NE.<br>WNW<br>ESE.<br>S.<br>WNW<br>SSE.            | 7 20 6 5   |                                    | 6   | ENE.<br>WNW<br>SE.<br>WNW<br>WNW<br>SSE | 1. 22   | 23, 1;<br>17, 5a<br>17, 9;<br>10, 8;<br>8, 4;<br>16, 0;<br>11, 6; |
| Nov. 16<br>Nov. 17<br>Nov. 18<br>Nov. 13<br>Nov. 20<br>Nov. 21<br>Nov. 22 | NE.<br>E.<br>NE.<br>NW.<br>W        | 20<br>23<br>26<br>19<br>19<br>11<br>6<br>16<br>16<br>20<br>28<br>24 | NE,<br>E.<br>E.<br>NE,<br>WNW,<br>WSW,<br>SSE,<br>W. | 21<br>10<br>20<br>20<br>20<br>•19<br>6<br>17<br>19<br>17<br>20<br>23<br>20 | NE.<br>E.<br>NE.<br>WNW.<br>WNW.<br>SSE.<br>WNW | 16<br>24<br>19<br>20<br>5<br>7<br>18<br>19<br>16<br>24<br>29<br>16 | E.<br>NE.<br>WNW<br>W.<br>SSE.<br>WNW     | 24<br>11<br>21<br>6<br>8<br>17<br>19<br>16<br>23<br>25<br>15 | E.<br>NE.<br>WNW.<br>W.<br>SSE.<br>WNW.    | 24<br>10<br>21<br>7<br>8<br>12<br>19<br>15<br>24<br>28<br>12 | NE.<br>WNW.<br>NW.<br>SSE.<br>WNW         | 10<br>20<br>5<br>9<br>14<br>18<br>19<br>20<br>28<br>15 | WNW.<br>NW.<br>SSE.<br>WNW.                | 9<br>20<br>8<br>7<br>10<br>17<br>20<br>21<br>28<br>15 | WNW.<br>NW.<br>SSE.<br>W.                   | 18<br>4<br>6<br>12<br>16<br>21<br>24<br>28<br>13 | W.<br>ESE.<br>SSE.<br>W.<br>SE.<br>SE.<br>ESE.<br>ESE. | 23<br>5<br>5               | WNW<br>ESE.<br>S.<br>WNW                           | 7<br>1.20<br>6<br>5<br>5<br>6<br>9<br>6<br>9<br>28<br>32<br>15 | NE.<br>WNV<br>ESE.<br>NW.<br>W.    | 6<br>V. 26<br>10<br>8<br>13<br>12<br>32<br>30<br>17 | ENE.<br>WNW<br>SE.<br>WNW               | 4<br>200<br>21<br>21<br>6<br>18<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22<br>22 | 17, 5a<br>17, 9;<br>10, 8;<br>8, 4;<br>16, 0;                     |

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883—Continued,

|   | t of ane                              |                           | eter abe                              |                           | rface of                               |                            | nd, 28 fee                            |                           | Washing<br>5 a. n                      |                          | nean tim                              |                                 | orrection<br>7 a. u                   |                           | educe to n<br>& a. m                |                           | local time                                    |                          | 17". \<br>10 a.                       |                                 | y gives<br>11 a                   |  |  | -                            |
|---|---------------------------------------|---------------------------|---------------------------------------|---------------------------|--|----------------------------|---------------------------------------|---------------------------|--|--------------------------|---------------------------------------|---------------------------------|---------------------------------------|---------------------------|-------------------------------------|---------------------------|---|--------------------------|---------------------------------------|---------------------------------|-----------------------------------|--|--|------------------------------|
| Date.   | Direct<br>and<br>veloci               | ion                       | Direct<br>and<br>veloc                | ion                       | Direct<br>and<br>veloci                | tion                       | Direct<br>and<br>veloci               | ion                       | Direct<br>and<br>veloci                | ion                      | Direct<br>and<br>veloci               | ion                             | Directi<br>and<br>velocit             | on                        | Direction and velocit               | on                        | Direction and velocit                         | on                       | Direc<br>an<br>veloc                  | tion                            | Dire                              | ction<br>ad<br>city.                   | Direction of the last of the l | ion                          |
| 1882.<br>Dec. 1<br>Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5 | ENE.<br>ENE.<br>SE.<br>E.             | 19<br>11<br>4<br>3<br>8   | ENE.<br>ENE.<br>SE.<br>E.             | 17<br>10<br>4<br>4<br>7   | ENE.<br>ENE.<br>SE.<br>E.              | 20<br>10<br>4<br>5         | ESE.<br>ESE.<br>ESE.<br>ESE.<br>ESE.  | 19<br>10<br>5<br>5        | ENE.<br>ESE.<br>E.<br>SE.<br>E.        | 20<br>10<br>4<br>5       | ENE.<br>ESE.<br>E.<br>SE.<br>E.       | 17<br>13<br>3<br>3              | ENE.<br>ESE.<br>ENE.<br>SE.           | 18<br>11<br>4<br>1<br>9   | ENE.<br>ENE.<br>Calm.<br>E.         | 18<br>9<br>4              | ENE.<br>ESE.<br>ENE.<br>SE.<br>ENE.           | 20<br>10<br>5<br>5<br>6  | ENE.<br>ENE.<br>SE.<br>ENE.           | 20<br>10<br>4<br>4              | ENE.<br>ENE.<br>SE.<br>ENE.       | 17<br>10<br>3<br>4                     | ENE,<br>E<br>E,<br>SE,<br>ENE  | 1: 3 5                       |
| Dec. 6<br>Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10         | SE.<br>NNE.<br>NNE.<br>N.             | 3<br>9<br>5<br>9<br>8     | SE.<br>NNE.<br>NNE.<br>NNW.           | 2<br>11<br>4<br>10<br>8   | SE.<br>NNE.<br>NNE.<br>NNW.            | 1<br>10<br>4<br>9<br>7     | SE.<br>NNE.<br>NNE.<br>NNW.           | 3<br>10<br>3<br>10<br>8   | SE.<br>NNE.<br>NNE.<br>NNW.            | 1<br>9<br>3<br>10<br>7   | SE.<br>NNE.<br>NNE.<br>NNW.           | 1<br>9<br>2<br>9<br>6           | Calm.<br>NNE.<br>NNE.<br>NNW.         | 8<br>2<br>8<br>6          | E.<br>NNE.<br>NNE.<br>NNW.          | 5<br>8<br>2<br>7<br>6     | ENE.<br>NNE.<br>NNE.<br>NNW.                  | 8 8 3 6 5                | ENE.<br>NNE.<br>NNE.<br>NNW.          | 2<br>4<br>7<br>7                | ENE,<br>NNE,<br>N,<br>NNW<br>NNW  | 3 8 4 7 7 5                            | ENE<br>NNE<br>NNW<br>NNW<br>NNW  | 2 4 6                        |
| Dec. 11<br>Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15     | WNW.<br>WSW.<br>SE.<br>SE.<br>NNE.    | 7<br>3<br>7<br>7<br>15    | NW.<br>WSW.<br>SE.<br>SE.<br>NE.      | 8<br>2<br>7<br>7<br>14    | W.<br>SSW.<br>SE.<br>SE.<br>NNE.       | 7<br>1<br>6<br>7<br>14     | WSW.<br>SSW.<br>ESE.<br>SE.<br>NNE.   | $^{8}_{7}^{1}_{6}$        | W.<br>SSW.<br>ESE.<br>SE.<br>NNE.      | 8<br>8<br>8<br>8<br>14   | W.<br>SE.<br>SE.<br>ESF<br>NE.        | 5<br>2<br>8<br>8<br>13          | NW.<br>ESE.<br>SE.<br>ESE.<br>NNE.    | 7<br>8<br>8<br>7<br>14    | NW.<br>ESE.<br>SE.<br>E.<br>NE.     | 6<br>4<br>8<br>8<br>14    | NW.<br>ESE.<br>SE.<br>E.<br>NE.               | 5<br>8<br>8<br>13        | NW.<br>ESE.<br>SE.<br>E.<br>NNE.      | 4<br>6<br>7<br>7<br>15          | WNV<br>ESE.<br>SE.<br>E.<br>NNE.  | V. 4<br>0<br>7<br>8<br>14              | WNW<br>ESE,<br>SE,<br>E,<br>NNE,   |                              |
| Dec. 16<br>Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20     | ENE.<br>NE.<br>ENE.<br>E.<br>SSW.     | 9<br>12<br>5<br>3<br>8    | ENE.<br>NE.<br>ENE.<br>E.<br>SSW.     | 8<br>13<br>5<br>3<br>10   | ENE.<br>ENE.<br>E.<br>E.               | 9<br>13<br>7<br>3<br>8     | ENE.<br>NE.<br>ENE.<br>E.<br>S.       | 8<br>11<br>9<br>6<br>7    | ENE.<br>NE.<br>ENE.<br>E.              | 9<br>12<br>8<br>3<br>5   | ENE.<br>NE.<br>ENE.<br>E.             | 9<br>8<br>3<br>10               | ENE,<br>NE,<br>ENE,<br>E,             | 9<br>12<br>8<br>3<br>6    | ENE.<br>ENE.<br>E.<br>S.            | $^{11}_{13}_{7}_{2}_{6}$  | ENE.<br>ENE.<br>E.<br>S.                      | 12<br>11<br>6<br>2<br>4  | NE.<br>NE.<br>ENE.<br>E.              | 12<br>12<br>6<br>2              | NE.<br>NE.<br>ENE.<br>E.<br>S.    | 12<br>10<br>3<br>3<br>4                | NE.<br>ENE.<br>ENE.<br>E.  | -                            |
| Dec. 21<br>Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25     | SSW.<br>SE.<br>NNW.<br>Calm.<br>Calm. | 2<br>1<br>8               | SSW.<br>SE.<br>NNW.<br>Calm.<br>Calm. | 5 2 7                     | SSW.,<br>SE,<br>NNW.<br>Calm.<br>Calm. | 5<br>2<br>6                | SSW.<br>SE.<br>NNW.<br>Calm.<br>Calm. | 8<br>1<br>7               | SSW.<br>SE.<br>NNW.<br>Calm.<br>Calm.  | 8 27                     | SSW.<br>SE.<br>NNW.<br>Calm.<br>Calm. | 8<br>1<br>7                     | S.<br>SE.<br>NNW.<br>Calm.<br>SE.     | 8<br>1<br>7               | S.<br>SE.<br>NNW.<br>WNW.<br>ESE.   | 9<br>3<br>6<br>1<br>2     | SSW.<br>Calm.<br>NNW.<br>Calm.<br>NE.         | 7<br>6<br>6              | SSW,<br>Calm,<br>NNW,<br>Calm,<br>NE, | 3<br>4<br>7                     | NW.<br>N.<br>NNW<br>Calm.<br>NNE. |  | NW,<br>N<br>Cabin<br>Calm<br>NNE,  | 1                            |
| Dec. 26<br>Dec. 27<br>Dec. 28<br>Dec. 29<br>Dec. 30     | NNE.<br>WSW.<br>WSW.<br>SW.<br>SSE.   | 13<br>13<br>19<br>30<br>8 | NNE.<br>WSW.<br>WSW.<br>SW.<br>SE.    | 15<br>14<br>15<br>32<br>7 | NE.<br>WSW.<br>WSW.<br>SW.<br>SSE.     | 13<br>13<br>15<br>31<br>10 | NE.<br>WSW.<br>WSW.<br>SSW.<br>SSE.   | 12<br>13<br>15<br>31<br>5 | WSW.<br>WSW.<br>WSW.<br>SE.            | 12<br>12<br>9<br>28<br>6 | NE.<br>WSW.<br>SW.<br>NNW.<br>SE.     | 11<br>9<br>36<br>8              | NE.<br>WSW.<br>SSW.<br>NNW.<br>ESE.   | 10<br>16<br>42<br>12      | NE.<br>WSW.<br>SSW.<br>NNW.<br>ESE. | 2<br>11<br>18<br>36<br>10 | NE.<br>WSW.<br>S.<br>NW.<br>ESE.              | 1<br>9<br>18<br>24<br>10 | Calm.<br>SW.<br>S.<br>NW.<br>SE.      | 13<br>20<br>22<br>11            | NE.<br>SW.<br>S.<br>NW.<br>SE.    | 1<br>11<br>19<br>21<br>12              | S.<br>SW.<br>S.<br>WNW.<br>SE.   |                              |
| Dec. 31   | SE.                                   | 21                        | SE.                                   | 16                        | SE.                                    | 17                         | SE.                                   | 19                        | ESE.                                   | 16                       | ESE.                                  | 18                              | SE.                                   | 21                        | SE.                                 | 15                        | SE.   | 19                       | ESE.                                  | 14                              | ESE.                              |  | SE.  | 1                            |
| Means.  | 8.71                                  |                           | 8, 61                                 |                           | 8, 58                                  |                            | 8.71                                  |                           | 8, 23                                  |                          | 7, 90                                 |                                 | 8.68                                  |                           | 8, 32                               |                           | , 7, 90                                       |                          | 7. 8                                  | 1                               | 7.                                | 97                                     | 7.1  | 1                            |
|   | 1 p. m                                | l e                       | 2 p. m                                | . !                       | 3 p. n                                 | i !                        | 4 p. m                                | ١.                        | 5 p. n                                 | ì. ;                     | 6 p. n                                | ь                               | 7 p. m                                | ٠,                        | 8 p. m.                             | 1                         | 9 p. m.                                       | - 11                     | ) p. m.                               | 11 1                            | . m.                              | 12 p. :                                |  |                              |
| Date.   | Directi<br>and<br>velocit             |                           | Directi<br>and<br>velocit             |                           | Directi<br>and<br>velocit              |                            | Directi<br>and<br>velocit             |                           | Directi<br>and<br>velocit              |                          | Directi<br>and<br>velocit             |                                 | Direction and velocit                 |                           | Direction and velocity.             |                           | Direction<br>and<br>velocity.                 |                          | rection<br>and<br>locity.             | Diregal<br>at<br>velo           | нl                                | Directi<br>and<br>velocit              | ion the  | kal,<br>nn v<br>eirs         |
| 1882.<br>Dec. 1<br>Dec. 2<br>Dec. 3<br>Dec. 4           | ENE.<br>ENE.<br>ESE.<br>ENE.          | 17<br>8<br>3<br>6<br>7    | ENE.<br>ENE.<br>ESE.<br>ESE.          | 16<br>9<br>3<br>5<br>4    | ENE.<br>ENE.<br>ESE.<br>ENE.           | 16 .<br>11 2<br>4 6        | ENE.<br>ENE.<br>ESE.<br>ESE.<br>ENE.  | 16<br>8<br>3<br>5         | E.<br>E.<br>ESE.<br>ESE.<br>E.         | 17<br>8<br>3<br>6<br>5   | E.<br>E.<br>SE.<br>ESE.<br>E.         | 12<br>8<br>3<br>7<br>5          | E.<br>E.<br>SE.<br>E.                 | 10                        | E.<br>SE.<br>E.                     | 8<br>7<br>6               | E. 10<br>E. 6<br>SE. 3<br>E. 8<br>SE. 3       | E.<br>E.<br>SE<br>E.     | H                                     | E.<br>ENE<br>SE.<br>E.<br>SE.   | . 5<br>2<br>8                     | E.<br>ENE.<br>SE.<br>E.<br>SE.         | 10<br>4<br>4<br>8<br>3   | 15.<br>3.0<br>5.<br>6.       |
| Dec. 6<br>Dec. 7<br>Dec. 8<br>Dec. 9                    | ENE.<br>NNE.<br>NNW.<br>NNW.<br>NNW.  | 2<br>8<br>5<br>7<br>8     | NE.<br>NNE.<br>NNW.<br>N.             | 5<br>5<br>6<br>7          | NE.<br>NNE.<br>NNW.<br>N.<br>NNW.      | 6<br>8<br>5<br>6           | NE.<br>NNE.<br>NNW.<br>N.             | 7<br>10<br>5<br>9<br>4    | NE.<br>NNE.<br>NW.<br>N.<br>SW.        | 5<br>10<br>5<br>8<br>5   | NE.<br>NNE.<br>NW.<br>N.<br>WNW.      | 6<br>6<br>6<br>8                | NE.<br>NNE.<br>WNW.<br>N.<br>WNW.     | 7<br>6<br>7<br>7          | NNE.<br>NW. 1                       | 5<br>0<br>7               | NNE. 8<br>NNE. 6<br>NW. 12<br>N. 9<br>WNW. 8  | N.                       | XE. 4<br>XE. 6<br>V. 11<br>XW. 6      | NNI<br>NNE<br>NNV<br>N.         | 7 10                              | NNE.<br>NNE.<br>N.<br>N.<br>WNW.       | 9<br>6<br>10<br>8<br>. 7   | 4.1<br>5.1<br>6.1            |
| Dec. 11<br>Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15     | WNW,<br>ESE,<br>SE,<br>ENE,<br>NE,    | 7<br>7<br>7<br>13         | WNW.<br>ESE,<br>SE,<br>ENE,<br>NE,    | 2<br>7<br>8<br>7<br>12    | WNW.<br>ESE.<br>SE.<br>ENE.<br>NE.     | 2<br>6<br>6<br>5           | WNW.<br>ESE.<br>SE.<br>ENE.<br>NE.    | 3<br>7<br>5<br>7<br>9     | WSW,<br>ESE,<br>SE,<br>NE,<br>NE,      | 4<br>7<br>9<br>8         | WSW.<br>ESE.<br>SE.<br>NE.<br>NE.     | 4  <br>11  <br>8  <br>10  <br>8 | WSW.<br>SE.<br>SE.<br>NE.<br>NE.      | 4<br>8<br>6<br>8<br>7     | SE.<br>SE.<br>NE.                   | 6                         | SW. 2<br>SE. 5<br>SE. 6<br>NE. 6<br>NE. 6     | SE                       |                                       | WSV<br>ESE.<br>SE.<br>NNF       | 4 5                               | WSW.<br>SE.<br>SE.<br>NNE.<br>ENE.     | 3<br>9<br>5<br>16<br>9   | 4<br>6.<br>N<br>11.          |
| Dec. 16<br>Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20     | NE.<br>ENE.<br>ENE.<br>E.             | 13<br>8<br>4<br>3<br>2    | NE.<br>ENE.<br>E.<br>E.<br>S.         | 12<br>7<br>3<br>8<br>1    | NE.<br>ENE.<br>E.<br>E.<br>SSW.        | 13<br>9<br>5<br>2<br>3     | NE.<br>ENE.<br>E.<br>SSW.             | 13<br>9<br>7<br>4<br>3    | NE.<br>ENE.<br>E.                      | 12<br>8<br>8<br>2<br>4   | NE.<br>ENE.<br>E.<br>W.               | 12<br>7<br>4<br>4<br>6          | NE.<br>ENE.<br>E.<br>SW.              | 15 · 9 · 5 · 2 · 3        | ENE.<br>E.<br>E.                    | 9<br>5<br>5               | NE. 13<br>ENE. 8<br>E. 5<br>E. 4<br>SSV. 3    | EN<br>E.                 | E. 7<br>5<br>6                        | NE.<br>ENE<br>E.<br>SE.         | " 5<br>6                          | NE.<br>ENE.<br>E.<br>S.<br>SSW.        | 10 '<br>6 6<br>9 3   | 11.<br>9.<br>5.<br>3.<br>4.  |
| Dec. 21<br>Dec. 22                                      | NW.<br>N.<br>Calm.                    | 6<br>7                    | NW.<br>N.<br>NNW.<br>Calm.<br>NNE.    | 6<br>8<br>2               | NW.<br>N.<br>NNW,<br>Calm.<br>NNE.     | 5<br>8<br>4                | NW.<br>N.<br>NNW.<br>Calm.<br>NNE.    | 3<br>9<br>3               | Calso<br>N.<br>N.W.<br>Calm.<br>N.N.E. | 10<br>3<br>16            | Colm<br>NW.<br>NE.                    | 1<br>1<br>15                    | NW.<br>N.<br>NW.<br>S.<br>NNE.        | 6 -<br>8<br>3<br>3<br>16  | N.<br>N.W.<br>Calm.                 |                           | Calm,<br>NNW, 8<br>NW, 1<br>Calm,<br>NNE, 13  | - Ca                     | W. 7<br>lm.<br>lm.                    | NW.<br>NNV<br>Calm<br>Calm      |                                   | SSE.<br>NNW.<br>Calm.<br>Calm.<br>NNE. | 2<br>8<br>10   | 3.                           |
| )ec. 23<br>)ec. 24                                      | Calm.<br>NNE.                         | 12                        | 24 24 201                             |                           |  |                            |                                       |                           |  |                          |                                       |                                 |                                       |                           |                                     |                           |   |                          |                                       |                                 |                                   |  |  | 7.                           |
| )ec. 23<br>)ec. 24                                      |                                       | 6<br>15<br>23             | NNW.<br>SSW.<br>S.<br>WNW.<br>SE.     | 8<br>12<br>23<br>14       | NNW.<br>SW.<br>S.<br>W.<br>SE.         | 5<br>18<br>26<br>13<br>16  | NNW.<br>SW.<br>S.<br>W.<br>SE.        | 13<br>26<br>15<br>15      | 38 V                                   | 15<br>15                 | SSV<br>S.<br>D. V.W.                  | 27<br>27                        | # X W.<br>SSW.<br>S.<br>W X W.<br>3E. | 12<br>23<br>34<br>5<br>18 | S. WNW.                             | 12 2                      | W. 14<br>SW. 25<br>SSW. 32<br>Calm.<br>SE. 20 | 88.6                     | W. 4                                  | W.<br>WSA<br>SSW<br>Calm<br>SE. | V. 26<br>. 29                     | WSW.<br>WSW.<br>SSW.<br>Calm.<br>SE.   | 10<br>17<br>32   | 13.5<br>22.5<br>18.1<br>13.5 |

State

Date.

1883. 1 1813. 2 1813. 2 1814. 3 1815. 4 1815. 4 1815. 8 1815. 8 1815. 12 1815

28 E 29 E 30 E 31 SI 31 SI

hate. D

6 N3 6 N3 7 W 8 W 9 W 10 W 11 W 12 W 12 W 13 3 4 14 W 15 W

17 SV 18 W 19 W 20 E2 21 E2 22 E2 23 SS 24 XV 25 XX 26 XX 27 E2 28 E2 27 E2 28 E2 27 E2 28 E2 27 E2 28 E2 29 E2 20 E2 21 E2 22 E2 23 E2 24 E2 25 E2 26 E2 27 E2 28 E2 27 E2 28

# Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

83—Continued, given in miles per Low. 11 a. m.

 $\begin{array}{ll} \textbf{Direction} & \textbf{Direction} \\ \textbf{and} & \textbf{u} \\ \textbf{velocity}, & \textbf{velocity}, \end{array}$ 

4 WNW 6 E8E 7 SE. 8 E 14 NNE

1 8 11 8W, 49 8, 21 WNW, 12 8E,

16 SE.

12 p. m. tion Direction means d and lear ity, velocity.

ESE.

 $12~\mathrm{fm}$ 

|   | 1 a. u                                   | 1.                           | 2 a. n                                      | h .   | 3 a. n                               | 1.                                | 4 a. n                               | ì.                           | 5 a. n.                             |  | 6 а. в                            |                                   | 7 a. m                             |  | % a. n                               |                            | 9 a. m  |                            | 10 a. n                              | n.<br>                    | 11 a.                               | m.                               | 12 n                                 |  |
|---|--|------------------------------|---|---|--------------------------------------|-----------------------------------|--------------------------------------|------------------------------|-------------------------------------|--|-----------------------------------|-----------------------------------|------------------------------------|--|--------------------------------------|----------------------------|---|----------------------------|--------------------------------------|---------------------------|-------------------------------------|----------------------------------|--------------------------------------|--|
| Date-   | Direct<br>and<br>veloci                  |                              | Directi<br>and<br>velocit                   |   | Directi<br>and<br>velocit            |                                   | Directi<br>and<br>velocit            |                              | Directi<br>and<br>velocit           |  | Directi<br>and<br>velocit         |                                   | Directi<br>and<br>velocit          |  | Directi<br>and<br>velocit            |                            | Directic<br>and<br>velocity                     |                            | Directi<br>and<br>velocit            |                           | Direc<br>and<br>veloc               | 1                                | Direct<br>and<br>veloci              | Į.   |
| 1363.<br>14 1<br>10 2<br>10 3<br>10 1                       | E.<br>SSW.                               | 17<br>26<br>4<br>12<br>12    | E.<br>ESE.<br>SSW.<br>E.<br>NE.             | 23<br>24<br>6<br>7                              | E.<br>ESE.<br>SSW.<br>E.<br>NE.      | 28<br>40<br>4<br>9                | E.<br>ESE.<br>SSW.<br>E.<br>NE.      | 25<br>40<br>2<br>7<br>12     | E.<br>ESE.<br>SF<br>E.<br>NE.       | 24<br>32<br>9<br>10<br>11                  | ESE.<br>ESE.<br>SE.<br>E.<br>N.E. | 18  <br>28  <br>4  <br>10  <br>12 | E.<br>ESE.<br>SE.<br>E.<br>NE.     | 20<br>32<br>5<br>10<br>11                      | E.<br>ESE.<br>SE.<br>E.<br>NNE.      | 25<br>32<br>10<br>9<br>12  | E.<br>ESE.<br>E.<br>E.<br>NNE.                  | 25<br>31<br>11<br>7        | E.<br>ESE.<br>E.<br>E.<br>NNE.       | 24<br>23<br>15<br>6<br>12 | ESE.<br>SE.<br>FSE.<br>ENE.<br>NNE. | 23<br>23<br>15<br>9<br>12        | ESE.<br>SE.<br>E.<br>ENE.<br>NNE.    | 23<br>19<br>12<br>3<br>12                    |
| in 6 in 7 in 9 in 10  | NNE.<br>N.<br>W.NW.<br>W.                | 8                            | NNE.<br>N.<br>WNW.<br>W.                    | 9<br>7<br>10<br>8<br>10                         | NNE.<br>NNW.<br>WNW.<br>W.<br>WSW.   | 7<br>6<br>9<br>13                 | NNE.<br>NNW.<br>WNW.<br>W.           | 7<br>6<br>7<br>15<br>15      | NNE.<br>NNW.<br>WNW.<br>WNW.<br>W.  | 7<br>8<br>15<br>15                         | NNE.<br>NNW.<br>WNW.<br>W.        | 8<br>2<br>8<br>14<br>10           | NNE.<br>NNW.<br>WNW.<br>W.         | 7<br>1<br>11<br>11<br>7                        | NNE.<br>WNW.<br>WNW.<br>W.           | 6<br>5<br>11<br>16<br>12   | NNE.<br>WNW.<br>WNW.<br>WSW.<br>WSW.            | 7<br>4<br>12<br>12<br>12   | NNE.<br>WNW.<br>WNW.<br>WSW.<br>WSW. | 5<br>12<br>16<br>12       | NNE.<br>WNW<br>WNW<br>W.<br>WSW.    | 6<br>4<br>14<br>15<br>15         | NNE.<br>WNW.<br>WNW.<br>W.           | 6<br>4<br>11<br>12<br>10                     |
| in 11<br>and 12<br>and 13<br>and 14<br>and 14               | WSW.<br>WSW.<br>WSW.<br>WSW.             | č<br>1<br>3<br>8<br>6        | WSW.<br>WNW.<br>WNW.<br>WNW.<br>WNW.        | 10 27 8 4                                       | WSW.<br>WNW.<br>WNW.<br>WNW.         | 9<br>3<br>9<br>6<br>5             | WSW.<br>WNW.<br>WNW.<br>WNW.         | 8<br>9<br>8<br>4             | W.<br>WNW.<br>WNW.<br>WNW.          | 11<br>3<br>10<br>10<br>3                   | W.<br>W.N.W.<br>W.N.W.<br>W.N.W.  | 9<br>3<br>9<br>11                 | W.<br>WNW.<br>WNW.<br>WNW.<br>WNW. | 9<br>2<br>10<br>11<br>3                        | W.<br>WNW,<br>WNW,<br>WNW,<br>WNW,   | 11<br>8<br>10<br>13<br>1   | W.<br>WNW.<br>WNW.<br>WNW.                      | 15<br>8<br>11<br>12<br>4   | W.<br>WNW.<br>WNW.<br>WNW.           | 13<br>4<br>12<br>12<br>12 | WNW<br>WNW<br>WNW<br>WNW            | . 10<br>. 6<br>. 10<br>. 11      | WNW,<br>WNW,<br>WNW,<br>WNW,         | 9<br>4<br>9<br>13                            |
| m. 16<br>m. 17<br>m. 18<br>m. 19<br>m. 20                   | ENE.<br>SE.<br>WSW.<br>W.                | 9<br>33<br>34<br>14<br>10    | ENE.<br>SE.<br>WSW.<br>WNW.                 | $\frac{11}{23}$ $\frac{28}{16}$ $\frac{11}{11}$ | ENE.<br>SE.<br>WSW.<br>WNW.          | 10<br>19<br>27                    | ENE.<br>SSE.<br>WSW.<br>WNW.<br>NNE. | 10<br>14<br>35<br>15<br>15   | ENE.<br>S.<br>WSW.<br>WNW.<br>NNE.  | 14<br>12<br>29<br>12<br>12                 | ENE.<br>WSW.<br>WSW.<br>WNW.      | 16<br>29<br>28<br>10<br>13        | E.<br>WSW.<br>WSW.<br>WNW.<br>NNE. | 17<br>34<br>33<br>8<br>13                      | E.<br>WSW.<br>WSW.<br>WNW.<br>NNE.   | 18<br>41<br>32<br>7<br>15  | E.<br>WSW.<br>WSW.<br>NW.<br>NNE.               | 19<br>36<br>36<br>9<br>13  | E.<br>WSW.<br>W.<br>WNW.<br>NNE.     | 23<br>37<br>40<br>7<br>10 | E.<br>SW.<br>W.<br>WNW<br>ENE.      | 24<br>11<br>34<br>7<br>16        | E.<br>SW.<br>W.<br>WNW.<br>ENE.      | 27<br>40<br>37<br>8<br>17                    |
| an. 21<br>an. 22<br>an. 23<br>an. 24<br>an. 25              | ENE.<br>E.<br>ESE.<br>W.<br>N.           | 30<br>33<br>39<br>19<br>15   | E.<br>E.<br>ESE.<br>WNW.                    | 28<br>26<br>37<br>21<br>14                      | E.<br>E.<br>ESE.<br>WNW.             | 28<br>33<br>39<br>22<br>10        | E<br>ESE.<br>WNW.                    | 28<br>40<br>36<br>19<br>9    | ENE.<br>E.<br>ESE.<br>WNW.<br>NNE.  | 28 3<br>35 33 22 14                        | ENE.<br>ESE.<br>WNW.<br>NNE.      | 28 :<br>30<br>32<br>21<br>14      | ENE.<br>ESE.<br>NW.<br>NNE.        | 28<br>36<br>32<br>24<br>18                     | ENE.<br>ESE.<br>NW.<br>NNE.          | 28<br>30<br>25<br>15<br>16 | ENE.<br>E.<br>ESE.<br>WNW.<br>NNE.              | 28<br>32<br>12<br>15<br>17 | E.<br>E.<br>ESE.<br>W.<br>NNE.       | 13<br>13<br>18            | E.<br>E.<br>SE.<br>WNW<br>NNE.      | 29<br>27<br>8<br>12<br>18        | ENE.<br>E.<br>SSW.<br>WNW<br>NNE.    | 31<br>26<br>5<br>14<br>18                    |
| an. 26<br>an. 27<br>an. 28<br>an. 29<br>an. 30              | NNE.<br>ENE.<br>ENE.<br>ESE.             | 13<br>5<br>8<br>1            | NNE.<br>ENE.<br>ENE.<br>ESE.                | 10 8 8 8 2                                      | NNE.<br>ENE.<br>ENE.<br>ENE.<br>ESE. | 9<br>9<br>7<br>3                  | NNE.<br>ENE.<br>ENE.<br>ESE.         | 86 80 8 × 11                 | NNE<br>ENE.<br>ENE.<br>ESE.         | 6<br>8<br>7<br>3                           | NNE.<br>ENE.<br>ENE.<br>ESE       | 9<br>8<br>8<br>1                  | NNE.<br>ENE.<br>ENE.<br>ESE.       | 10<br>9<br>8<br>8<br>2                         | NNE.<br>ENE.<br>ENE.<br>ENE.<br>ESE. | 12<br>8<br>8<br>6<br>3     | NNE.<br>ENE.<br>ENE.<br>ENE.<br>ESE.            | 14<br>8<br>8<br>6<br>3     | NNE.<br>ENE.<br>ENE.<br>ENE.         | 12<br>9<br>8<br>6<br>3    | NNE.<br>ENE.<br>ENE.<br>ESE.        | 10<br>7<br>5<br>2                | NNE.<br>ENE.<br>ENE.<br>ENE.<br>ESE. | 9<br>10<br>5<br>6<br>4                       |
| an. 31  | SE.                                      | 3                            | SE.   |   | SE.                                  | 5                                 | SE.                                  | 8                            | SE.                                 | 3  | SE.                               | 4                                 | SE.                                | 1  | SE.                                  | 7                          | SE.   | 7                          | SE.                                  | 8                         | SE.                                 | 6                                | ESE.<br>13.                          | 8  |
| Means .   |  | ~                            | 2 p. n                                      | =   | 3 p. n                               |                                   | 4 p. r                               | -                            | 5 p. r                              |  |                                   |                                   | 7 p. n                             |  | 8 p. m.                              | 77                         | 9 p. m.   |                            | 0 p. m.                              |                           | o. m.                               | 12 p.                            |                                      |  |
| Date.   | Direct<br>and<br>veloci                  | ion                          | Direct<br>and<br>veloci                     | ion   | Direct<br>and<br>veloci              | ion                               | Direct<br>and<br>veloci              | ion                          | Direct<br>and<br>veloci             | ion  | Direct<br>am<br>veloci            | ion                               | Directi<br>and<br>velocit          | on   | Direction and velocity               | on                         | Direction<br>and<br>velocity.                   | D                          | irection<br>and<br>alocity.          | Dire                      | ection<br>nd<br>ecity.              | Direc<br>and<br>veloci           | tion and                             | Daily<br>can ve<br>ocity.                    |
| 18-3.<br>Lan 1<br>Lan 2<br>Lan 3<br>Lan 3<br>Lan 4<br>Lan 4 | E.<br>SE.<br>ESL.<br>ENE.<br>N.M.        | 21<br>18<br>12<br>6<br>12    | E.<br>SE.<br>ESE.<br>ENE.<br>NNE.           | 17<br>20<br>11<br>6<br>11                       | E.<br>SE.<br>ESE.<br>ENE.<br>NNE.    | 30<br>17<br>9<br>7                | E.<br>SE.<br>ESE.<br>ENE.<br>NNE.    | 31<br>12<br>8<br>8           | E.<br>SE.<br>ESE.<br>ENE.<br>NNE.   | 30<br>16<br>3<br>7                         | E<br>SE.<br>SE.<br>ENE.<br>NNE.   | 24<br>12<br>7<br>6                | E.<br>SE.<br>SE.<br>ENE.<br>NNE.   | 25<br>10<br>7<br>7<br>12                       | E.<br>SE.<br>SE.<br>ENE.<br>NNE.     | 25<br>0<br>12<br>8<br>12   | E. 30<br>SE. 6<br>ESE. 13<br>ENE. 8<br>NNE. 11  | E                          | 27<br>SE. 5<br>E. 6                  | <br>\1                    | 26<br>8<br>7<br>11<br>11. 10        | E.<br>SSE.<br>E.<br>NE.<br>NYE.  | 50<br>6<br>11<br>11<br>9             | 24, 69<br>20, 50<br>8, 79<br>8, 20<br>11, 11 |
| Lat 6<br>Lat 7<br>Lata 5<br>Jan 9<br>Jan 10                 | NNE.<br>WNW<br>WNW<br>W.                 | 5<br>14<br>14<br>14<br>11    | NNE.<br>WNW<br>WNW.<br>W.                   | 3<br>5<br>9<br>43<br>13                         | NNE.<br>WNW<br>WNW<br>W.             | 3<br>4<br>13<br>15<br>15          | NNE.<br>WNW<br>W.<br>W.              | 14<br>15<br>11               | Calm.<br>WNW<br>W.<br>W.            | . 8<br>15<br>11<br>12                      | N.<br>W.N.W.<br>W.                | . 8<br>16<br>12<br>12             | W.XW.<br>W.<br>WSW.<br>W.          | 3<br>5<br>14<br>11<br>10                       | N.<br>WNW.<br>W.<br>WSW.             | 4<br>5<br>12<br>11<br>9    | N W N W . 13<br>W N W . 13<br>W . 12<br>W . 7   | - 11                       | NW ·                                 | 17                        | W. 9<br>12<br>10<br>6               | N.<br>W.S.W<br>W.                |                                      | 4, 9:<br>5, 60<br>11, 60<br>12, 70<br>10, 79 |
| Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15         | 11.7 II<br>11.7 II<br>11.7 II<br>11.7 II | . 6<br>. 9<br>. 13           | # 2 #,<br># 2 #,<br># 2 #,<br># 2 #,        | . 6<br>. 5<br>. 8<br>. 12<br>. 2                | WNW<br>WNW<br>WNW<br>Calm            | . 7<br>. 5<br>. 10<br>. 10        | W N W<br>W N W<br>W N W<br>W N W     | . 5                          | WNW<br>WNW<br>WNW<br>ENE.           | 6 6 10 10 10 10 10 10 10 10 10 10 10 10 10 | WNW<br>WNW<br>WNW<br>ENE.         | 57978                             | WNW.<br>WNW.<br>WNW.<br>ENE.       | 5<br>8<br>11<br>8<br>8                         | WNW.<br>WNW.<br>WNW.<br>WNW.         | 4<br>9<br>11<br>8<br>8     | WNW. 3<br>WNW. 4<br>WNW. 10<br>WNW. 9<br>ENE. 9 | 11                         |                                      | W.X<br>W.X<br>W.X         | W. 10<br>W. 10                      | WNW<br>WNW<br>WNW                | 7. 2<br>7. 10<br>7. 5<br>7           | 7, 60<br>5, 23<br>9, 7,<br>9, 43<br>1, 9     |
| J : 16  |  | 30<br>236<br>32<br>- 7<br>19 | E.<br>SW.<br>W.<br>W.N.W<br>E.N.E.          | 36<br>40<br>27<br>8<br>•20                      | E.<br>SW.<br>W.<br>WNW<br>ENU.       | 44<br>38<br>38<br>38<br>- 6<br>20 | 11.7.11.                             | 55<br>52<br>26<br>7. 5<br>21 | E.<br>WSW.<br>WNW                   | 26   | E.<br>WSW<br>W.<br>WNW<br>ENE.    | 2.5                               | E<br>SW,<br>WSW,<br>NW,<br>ENE.    | 56<br>30<br>26<br>4<br>27                      | E.<br>SW.<br>W.<br>Calm.<br>ENE.     | 52<br>32<br>25<br>25       | ESE. 48<br>WSW 37<br>WNW, 20<br>W, 2<br>ENE. 31 | 11                         | N1                                   | EST<br>WS<br>W.<br>EX     | 313                                 | ESE.<br>WSW<br>W.<br>NW.<br>ENE. | 33<br>16<br>7<br>30                  | 31 83<br>32, 33<br>28, 33<br>7 7<br>18, 8    |
| Jan. 18<br>Jan. 19<br>Jan. 19                               |  | 31<br>29                     | ENE.<br>ENE.<br>SW.                         | 34<br>27<br>6                                   | ENE.<br>ENE.<br>SW.<br>NW.           | 32,<br>2,0<br>4                   | 27.11.                               | 31<br>51<br>1<br>. 16<br>20  | FNE.<br>ENE.<br>SW.<br>NNW.         | 30<br>34<br>2<br>. 18<br>19                | ENE.<br>E.<br>SSE.<br>NNW<br>NNE. | 26<br>30<br>4<br>15               | SSE.                               | $\frac{28}{36}$ $\frac{5}{14}$ $\frac{14}{16}$ | ENE.<br>E.<br>S.<br>NNW.<br>NNE.     | 29<br>40<br>7<br>10<br>17  | ENE. 38<br>E. 38<br>S. 5<br>N. 18<br>NNE. 20    | E                          | NE 60<br>SW 8<br>NW, 13<br>NE, 16    | EN<br>SW<br>NN            | 13                                  | ENE.<br>WSW<br>N.<br>NNE.        | 30<br>35<br>1. 18<br>12<br>16        | 29, 5<br>32,77<br>16, 0<br>16, 3<br>16, 0    |
|   | ENE<br>ENE<br>S-W.<br>NW.                | 5<br>17<br>16                | NNE.  | 17  | NNE.                                 | 17                                |                                      |                              |                                     |  |                                   |                                   |                                    |  | ****                                 |                            | XE (  |                            |                                      |                           |                                     |                                  |                                      |  |
| Land 10<br>Jan 10<br>Jan 17<br>Lai 17<br>Jan 17             | NW.                                      | 5<br>17                      | NW.<br>NNE.<br>ENE.<br>ENE.<br>ENE.<br>ENE. | 5<br>9<br>7<br>4<br>8                           | NNE.<br>ENE.<br>ENE.<br>ENE.<br>ENE. | 5<br>8<br>8<br>9                  | NE.<br>ENE.<br>ENE.                  | 7<br>7<br>8<br>3<br>4        | NE.<br>ENF.<br>ENE.<br>ENE.<br>ESE. | 5<br>7<br>8<br>3<br>4                      | NE.<br>ENE.<br>ENE.<br>ESE.       | 6<br>8<br>8<br>3<br>4             | ENE.                               | 8<br>10<br>8<br>2<br>6                         | NE.<br>ENE.<br>ENE.<br>ESE.          | 9 8 2 5                    | ENE. 10<br>ENE                                  | 0 E<br>4 E<br>2 E          | E.<br>NE.<br>NE. 3<br>SE. 6          | EN<br>EN<br>E<br>E        | E. 8<br>E. 5<br>2                   | ENE<br>ENE<br>ESE<br>SE          | 6.1.76                               | 8, 2<br>8, 5<br>7, 4<br>1, 7<br>3, 6         |

State

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued,

[Height of anemometer above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, -5h 17m. Velocity given in miles per hosy:

| -  | i a. n   | n.   | 2 a. 1  | u.   | 3 a. n  | il.   | 4 n. n   | ì.   | 5 a. n   | 1.   | 6 a. n   | 1.   | 7 a. m.  |  | 8 a. m.  | 1  | 9 a. m.  | ******   | 10 a. ı  | na.  | 11 a  | - 111.   | 12 to   | -   |
|--|--|--|---|--|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|---|---|
| Date.  | Direct:<br>and<br>veloci   |  | Direct<br>and<br>veloci   | t  | Direct<br>and<br>veloci   |   | Directi<br>and<br>veloci   |  | Direct<br>and<br>veloci  |  | Directi<br>and<br>velocit  |  | Direction and velocity   |  | Direction<br>and<br>velocity.  |  | Direction and velocity   |  | Direct<br>and<br>veloci  |  | Dire<br>ni<br>velo  | ad   | Direct<br>and<br>veloci   |   |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4  | ESE.<br>SW.<br>SSW.  | 12<br>4<br>8<br>44   | ESE.<br>SW.<br>SW.  | 15<br>6<br>8<br>48                                       | ESE.<br>SW.<br>SW.  | 12<br>6<br>8<br>54                                    | ESE.<br>SW.<br>SSW.<br>W.  | 15<br>3<br>8<br>51   | ESE.<br>SW.<br>SSW.<br>W.  | 10<br>6<br>9<br>50   | ESE.<br>SW.<br>SSW.<br>W.  | 9<br>9<br>8<br>46                                      | E.<br>SW.<br>S.<br>W.  | 12<br>9<br>1<br>36   | E.<br>SSW.<br>S.<br>W.   | 9<br>8<br>8<br>31                        | SSW.   | 6<br>6<br>11<br>28   | E.<br>SSW.<br>S.<br>W.   | 6<br>11<br>25  | E.<br>SSW.<br>S.<br>WSW   | 4<br>8<br>11<br>- 18   | E.<br>SSW.<br>S.<br>WSW   | 6<br>11<br>10                             |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9   | NNE.<br>WSW.<br>SE.<br>W.<br>ESE.  | 7<br>48<br>23<br>60<br>25  | NE.<br>WSW.<br>ESE.<br>W.<br>ESE.   | 50<br>29<br>54<br>24                                     | ENE.<br>WSW.<br>ESE.<br>W.<br>ESE.  | 6<br>48<br>36<br>56<br>27                             | NE.<br>WSW.<br>ESE.<br>W.<br>SE.   | 11<br>56<br>35<br>53<br>21   | ENE.<br>WSW.<br>ESE.<br>W.   | 13<br>56<br>40<br>55<br>24                                 | E.<br>WSW.<br>ESE.<br>W.   | 16<br>48<br>35<br>48<br>21                             | E.<br>W.<br>SE.<br>WSW.  | 15<br>50<br>40<br>48<br>24                                       | SE.<br>WSW.  | 9<br>40<br>40<br>47<br>27                | 88W.<br>W.<br>SE.<br>WSW.  | 16<br>46<br>42<br>40<br>33   | 8.<br>W.<br>SE.<br>WSW.  | 13<br>45<br>40<br>36<br>35   | SSE.<br>W.<br>SE.<br>WSW<br>SSE.  | 17<br>44<br>32<br>. 38<br>32   | SSE.<br>WSW.<br>SSE.  | 0<br>35<br>23<br>30                       |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 13<br>Feb. 14  | W.<br>WNW.<br>SSW.<br>NW.<br>NW.   | 40<br>12<br>8<br>11  | WNW.<br>WNW.<br>SSW.<br>NNW.<br>NW.   | 36<br>15<br>8<br>11                                      | WNW.<br>WNW.<br>SSW.<br>NNW.<br>NW.   | 40<br>16<br>10<br>15                                  | WNW.<br>W.<br>SSW.<br>NNW.   | 32<br>11<br>9<br>13  | WNW.<br>WNW.<br>S.<br>NW.  | 32<br>8<br>8<br>11   | WNW.<br>W.<br>S.<br>NW.<br>NW.   | 29<br>12<br>5<br>6                                     | WNW.<br>WNW.<br>S.<br>WNW.<br>NW.  | 30<br>15<br>3<br>5   |  | 27<br>14<br>4                            | WNW.<br>W.<br>S.<br>WNW.   | 24<br>15<br>5<br>3   | WNW.<br>W.<br>S.<br>WNW.<br>WNW.   | 23<br>14<br>5<br>6   | WNV<br>W.<br>SSE.<br>WNV  | 16<br>5  | WXW<br>WXW<br>WXW   | 44 15 3                                   |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19  | W.<br>W.<br>ESE.<br>ESE.<br>SW.  | 7<br>14<br>5<br>9<br>14  | W.<br>W.<br>ESE.<br>ESE.<br>SW.   | 8<br>12<br>6<br>9<br>15                                  | W.<br>W.<br>E.<br>ESE.<br>SW.   | 8<br>11<br>7<br>6<br>13                               | WNW.<br>W.<br>E.<br>ESE.<br>SW.  | 9<br>12<br>8<br>9<br>8   | WNW.<br>W.<br>E.<br>ESE.<br>SW.  | 8<br>6<br>9<br>8   | WNW.<br>W.<br>E.<br>ESE.<br>SW.  | $\begin{array}{c} 7 \\ 7 \\ 4 \\ 10 \\ 10 \end{array}$ | WNW.<br>W.<br>E.<br>ESE.<br>SW.  | 9<br>10<br>4<br>10<br>9  | WNW.<br>WSW.<br>E.<br>ESE.<br>SW.  | 8 3 7 7                                  | WNW.<br>WSW.<br>ENE.<br>ESE.<br>SW.  | 8<br>6<br>7<br>9<br>7  | W.<br>WSW.<br>NE.<br>ESE.<br>SW.   | 7 . 8 . 8 . 15 . 6   | W.<br>WSW<br>NE.<br>ESE.<br>WSW   | 8<br>16  | W<br>SW<br>NE.<br>SE.<br>SW   | i<br>i                                    |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24  | NW.<br>NNW.<br>NNW.<br>NE.<br>WNW.   | 10<br>8<br>10<br>4<br>7  | NW.<br>NNW.<br>NNW.<br>NE.<br>WNW.  | 11<br>7<br>12<br>1<br>5                                  | NNW.<br>NNW.<br>NNW.<br>NE.<br>WNW.   | 13<br>8<br>11<br>1<br>6                               | NNW.<br>NNW.<br>NNW.<br>NE.<br>WNW.  | 11<br>8<br>11<br>1<br>7  | NNW.<br>NNW.<br>NNW.<br>NE.<br>WNW.  | 11<br>7<br>9<br>1<br>6                                     | NNW.<br>NNW.<br>N.<br>Calm.<br>WNW.  | 12<br>8<br>10<br>4                                     | NNW.<br>NNW.<br>N.<br>Calm.<br>WNW.  | 12<br>7<br>10<br>4   | NNW.<br>NNW.<br>N.<br>NE.<br>WNW.  | 8<br>6<br>5<br>1                         | NNW.<br>NNW.<br>N.<br>NE.<br>WNW.  | 10<br>8<br>5<br>1<br>4   | NNW.<br>NNW.<br>N.<br>NE.<br>W.  | 7<br>10<br>6<br>2<br>7   | NNW<br>NNW<br>NNE.<br>NE.<br>W.   | . 6  | M.<br>27T<br>22T<br>22T<br>22M<br>22M   | 11 6 5 4 5                                |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28   | WSW.<br>WSW.<br>SE.<br>SSE.  | 8<br>8<br>8  | WSW.<br>WSW.<br>SE.<br>S.   | 8<br>3<br>12<br>6  | WSW.<br>WSW.<br>SE.<br>S.   | 8<br>3<br>13<br>5                                     | WSW.<br>Calm.<br>SE.<br>S.   | 9<br>18<br>7   | WSW.<br>Calm.<br>SE.<br>S.   | 11<br>12<br>6  | WSW.<br>Calm.<br>SE.<br>S.   | 11<br>11<br>7  | WSW.<br>WSW.<br>SE.<br>S.  | 8<br>1<br>4<br>9   | Calm.<br>SE.<br>SSW.   | 10<br>6<br>8                             | WSW.<br>Calm.<br>SE.<br>SSW.   | 12<br>6<br>9   | WSW.<br>SW.<br>SE.<br>SSW.   | 11<br>1<br>5<br>8  | WSW.<br>SW.<br>SE.<br>SSW.  | . 14<br>3<br>6<br>10   |   | II<br>3                                   |
| Means.   | 15, 11   |  | 15.46   | 3 !  | 16.15   |   | 16. 03   | 3 .  | 15. 38   | 3  | 14, 31   |  | 13.84  |  | 12.38  |  | 12.84  |  | 12.6   | 1  | 12.   | . 50   | 11.1  | 9   |
| -  |  |  |   | ,  |   |   |  |  |  |  | -  |  |  |  |  | ~ 1                                      |  |  |  |  |   |  |   |   |
| -  | 1 p. m   | l. j   | 2 p. n  | ı.   | 8 p. m  | ı.  | 4 p. m   |  | 5 p. u   | ar<br>N  | - 6 p. m   | . —  | 7 p. m.  | i  | 8 p. m.  | i  | 9 p. m.  | 10   | p. m.  | 11 p   | . m.  | 12 p.  |   |   |
| Date.  | i p. m<br>Directional<br>and<br>velocit  | on   | 2 p. n<br>Directi<br>and<br>velocit   | ion  | 8 p. m<br>Directi<br>and<br>velocit   | on  | 4 p. m<br>Directi<br>and<br>velocit  | on   | 5 p. u Directi   | on   | 6 p. m<br>Directi<br>and<br>velocit  | on   | 7 p. m.  Direction and velocity  | n  | 8 p. m.  Direction and velocity.   |  | 9 p. m. Direction and velocity.  | Di   | p. m.<br>rection<br>and<br>locity.   | Dire   | etion<br>ad   | Direct Stee veloci   | rion le   | aily<br>an ve-<br>city                    |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4  | Direction and  | on   | Directi<br>and  | ion  | Directi<br>and  | on  | Directi<br>and   | on   | Directi  | on   | Directi<br>and   | on   | Direction and velocity  WSW. SW. SSW.  | n  | Direction and  | 1 28                                     | Direction<br>and   | District Ve  | rection and locity.  | Dire   | etion<br>ad<br>city.  | Direc  | prion me<br>lity.   | 3B 7e-                                    |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3  | Direction and velocit  E. SSW. SSE.  | on<br>y.<br>2<br>10<br>11  | Directi<br>and<br>velocit   | ion   2   10   16   21   24                              | Directi<br>and<br>velocit<br>E.<br>SW.<br>SSW.  | on<br>y.  | Directi<br>and<br>velocit<br>E.<br>SW.<br>SSW.   | on<br>y.<br>3<br>8<br>20   | Directi<br>and<br>velocit<br>E.<br>SW.<br>SSW.   | ion<br>ty.   | Directi<br>and<br>velocit<br>E.<br>SSW.  | on 2 8 22  | Direction and velocity  WSW. SW. SSW. SW. SW. SSW. SSW. SSW. S   | n 4 7 26 14 30 7 36 8  | Direction and velocity.  WSW. 1 SSW. 6 SW. 26 SSW. 9 SSW. 44 NNW. 5  | V SSS S                                  | Direction<br>and<br>velocity.  | Ve<br>Ve<br>Ve<br>SSV<br>Ve<br>SSV<br>We<br>E.<br>We<br>ES   | rection and locity.  8W. 3 W. 9 8W. 48 W. 11 8W. 45  | Dire<br>at<br>velo   | etion ad city.  V. 5 8 8 V. 49 13 52 17                                     | Direct<br>veloci<br>WSW<br>SSW,<br>W,  | Drion me<br>1 los los los los los los los los los los   | an vecity                                 |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4<br>Feb. 5<br>Feb. 6<br>Feb. 7  | E. SSW. SSE. WSW. S. WNW. SSE. W. WNW. SSE. W. WNW. SSE. W.    | on<br>y.<br>10<br>11<br>15<br>26<br>31<br>26<br>25                 | Directi<br>and<br>velocit<br>S.W.S.<br>W.S.W.S.W.N.W.S.S.W.W.                                       | 2<br>10<br>16<br>21<br>24<br>28<br>19<br>20<br>40        | Direction and velocity sw. ssw. ssw. ssw. ssw. ssw. ssw. sw. s                              | 29<br>28<br>12<br>26<br>20<br>29<br>14                | Directi<br>and<br>velocit<br>E.<br>SW.<br>SSW.<br>SW.<br>S.<br>NW.<br>WSW.<br>S.<br>W.   | on<br>y<br>3<br>8<br>20<br>16<br>28<br>16<br>44<br>10  | Direction and velocity sw. S.W. S.W. S.W. S.W. N.W. W.S.W. S.W. S  | 28<br>28<br>14<br>28<br>16<br>44<br>12<br>52               | Directi<br>and<br>velocit<br>E.<br>SSW.<br>SSW.<br>SW.<br>SW.<br>W.<br>W. N.W.<br>W. W.  | on<br>2<br>8<br>22<br>14<br>28<br>8<br>48<br>14        | Direction and velocity WSW. SW. SW. SW. SW. SW. SW. WSW. WSW.  | 4<br>7<br>226<br>14<br>30<br>7<br>36<br>8<br>71<br>48<br>8<br>14 | Direction and velocity.  WSW. 1 88W. 6 8W. 26 8SW. 9 8SW. 9 8SW. 44 NNW. 5 8W. 46 8. 7   | SS SS SS SS SS SS SS SS SS SS SS SS SS   | Direction and velocity.  WSW. 4 SSW. 8 SW. 31 SSW. 9  SW. 32 SNE. 8 SW. 52 SEE. 8  | District   Ve   Ve   Ve   Ve   Ve   Ve   Ve   V  | rection and locity.  SW. 3 W. 9 SW. 48 W. 11 SW. 45 E. 12 SW. 48 SW. 45  | Dire<br>an<br>velo<br>WSV<br>SSW<br>WSV<br>SW.<br>WSV<br>E.<br>W.  | etion ad city.  V. 5 8 8 8 V. 49 8 V. 47 13 52 17 V. W. 41                  | Direct<br>918<br>veloci<br>WSW,<br>W,<br>SW,<br>WSW,<br>ESE,<br>W,<br>ESE,   | Drion me le   | # 41                                      |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4<br>Feb. 7<br>Feb. 7<br>Feb. 8<br>Feb. 8<br>Feb. 10<br>Feb. 11<br>Feb. 12   | E. SSW. SSE. WSW. S. WNW.                          | 2<br>10<br>11<br>15<br>26<br>23<br>37                              | Directi<br>and<br>velocit<br>S.W.S.<br>W.S.W.S.W.<br>S.W.W.<br>S.W.W.<br>S.W.W.<br>W.W.W.<br>W.W.W. | 2<br>10<br>16<br>21<br>24<br>28<br>19<br>20<br>40        | Directi<br>and<br>velocit<br>SW.<br>SSW.<br>SSW.<br>SW.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W. | 2<br>9<br>9<br>12<br>12<br>26<br>20<br>29<br>14<br>46 | Directi<br>and<br>velocit<br>S.W.<br>SSW.<br>S.W.<br>W.WSW.<br>S.W.<br>W.WSW.<br>S.W.<br>W.  | on<br>y.<br>3<br>8<br>20<br>16<br>28<br>16<br>44<br>10<br>42<br>47<br>14<br>17                   | Directi<br>and<br>velocit<br>E.<br>SSW.<br>SSW.<br>SSW.<br>W. W. W.<br>SW.<br>W. W. W.<br>W. SW.<br>SSW.   | 28<br>28<br>14<br>28<br>16<br>44<br>11<br>11<br>18<br>6    | Directi<br>and<br>velocit<br>SSW.<br>SSW.<br>SSW.<br>SW.<br>WSW.<br>SW.<br>WSW.<br>SSW.<br>W.  | 28<br>8 22<br>14 28<br>8 48<br>14 60<br>48 11<br>17 4  | Direction and velocity  WSW. SW. SSW. SSW. SSW. WSW. WSW. WSW  | 7. 4 7 226 14 30 7 36 8 8 14 4 4 4 222 10 6                      | Direction and velocity.  WSW. 18 SSW. 26 SSW. 26 SSW. 44 NXW. 5 SW. 47 SSW. 18 SSW. 18 W. 44 NW. 18 ESE. 7   | SE SE SE SE SE SE SE SE SE SE SE SE SE S | Direction and velocity.  WSW. 4 8SW. 8 8W. 8 8W. 9 8W. 9 8W. 52 8K. 6 6 VSW. 70 VNW. 44 SW. 12 8W. 8 V. 4 V. 6 17 SEE. 5 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5   | Ve Ve Ve Ve Ve Ve Ve Ve Ve Ve Ve Ve Ve V   | rection and locity.  SW. 3 W. 9 SW. 45 SW. 45 E. 12 SW. 45 W. 11 SW. 45 W. 13 W. 13 W. 14 W. 13 W. 14 W. 14 W. 14 W. 15 W. 16 W. 17 W. 17 W. 11  | Dire<br>an<br>velo<br>WSV<br>SSW<br>WSV<br>SW.<br>WSV<br>E.<br>WSV<br>WNV<br>SSW<br>WNV<br>SSW<br>WNV<br>SSW<br>WNV<br>SSW | etion ad city.  V. 5 8 8 8 V. 49 8 V. 47 13 52 17 V. W. 41                  | Direct Process of the Saw. W.S.W. W.S.W. W.S.W. W.S.W. E.S.E. W.S.W. W. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W. W.S.W.  | Dition me los los los los los los los los los los   | ## TE TE TE TE TE TE TE TE TE TE TE TE TE |
| 1883. Feb. 1 Feb. 2 Feb. 3 Feb. 3 Feb. 6 Feb. 7 Feb. 8 Feb. 7 Feb. 11 Feb. 12 Feb. 12 Feb. 14 Feb. 15 Feb. 17 Feb. 18  | E. SSW. SSE. W.S.W. SSE. W.S.W. SSE. W.S.W. SSE. W.S.W. S. W.W. W.W                                | 2<br>10<br>11<br>15<br>26<br>31<br>25<br>27<br>18<br>18<br>37<br>7 | E. SW. S. W.S. W.S. W.S. W.S. W.S. W.S.   | 20 10 16 21 24 28 19 20 40 15 8 8 11                     | E. SW. SSW. SSW. SW. SW. SW. SW. SW. SW.  | 2 9 28 12 26 20 29 14 46 15 3 4 4 15 5 5 12 16 16     | Directi<br>and<br>velocit<br>SW.<br>SSW.<br>SSW.<br>SW.<br>WSW.<br>SW.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W  | 3 8 20 16 28 16 44 17 4 7 16 8 8 9   | E. SW. SSW. SSW. SW. W.  | 2 8 28 14 28 16 44 11 12 52 44 8 5 7 7                     | E. SSW. SSW. SW. XSW. SW. XSW. SW. SW. SW. SW. SW. WSW. SW. W. WSW. SSW. W. WSW. SSW. W. SSW. SS | 28 8 8 14 60 48 11 177 4 8 6 6 11                      | Direction and velocity SW. SW. SW. SSW. SSW. SSW. WSW. WSW. W  | 7. 4 7 226 14 30 7 36 8 8 14 4 4 4 4 22 2 10 6 13                | Direction and velocity.  WSW. 18 SSW. 26 SSW. 26 SSW. 44 NXW. 5 SW. 48 SSW. 77 SSW. 18 SSW. 18 SSW. 16 ESE. 77 E. 78 SSW. 16 SSW. 16 SSW. 17 ESE. 77 SSW. 10 SSW. 18 SSW. 88 SSW. 88 SSW. 88 SSW. 88 SSW. 88 SSW. 88 SSW. 18 SSW. 10 S | V SS SESS V SS V V PES V SS V V          | Direction and velocity.  AVSW. 4 SSW. 8 SW. 31 SSW. 9 SW. 50 SSW. 9 SW. 50 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 12 SSW. 14 SSW. 15 SSW. 15 SSW. 15 SSW. 15 SSW. 15 SSW. 15 SSW. 15 SSW. 16 SSW. 16 SSW. 16 SSW. 16 SSW. 17 SSW. 17 SSW. 17 SSW. 17 SSW. 18 SSW | Dis   ve   WS   SS'   WS   SS'   WS   E.   WS   W.   W.   W.   W.   W.   E.   E.   SS'   rection and locity.  3 W. 9 W. 98 W. 11 SW. 45 E. 12 SW. 48 W. 13 SW. 48 W. 11 SW. 45 E. 14 T. 14 W. 11 T. 11 T. 11  | Dire my velo wsv ssw. wsv sw. wsv es. wsv wsv wsv wsv wsv wsv wsv wsv wsv wsv  | etion ad city.  V. 58 V. 49 8 V. 47 13 52 17 V. W. 41 13 W. 7 6 8 13 7 9 12 | Direct 918 veloci WSW SSW. W. SSW. WSW ESE. WSW WNW SSW. WNW. W. W. W. W. W. ESE. WS. W. W. W. W. ESE. WS. W. W. ESE. WS. W.   | Diion medity.  7 44 6 - 43 18 58 22 - 6 - 6 11 - 6 10   | 21 0 21 0 21 0 21 0 21 0 21 0 21 0 21 0   |
| 1883. Feb. 1 Feb. 2 Feb. 3 Feb. 4 Feb. 5 Feb. 6 Feb. 7 Feb. 10 Feb. 11 Feb. 12 Feb. 13 Feb. 14 Feb. 15 Feb. 16 Feb. 16 Feb. 17 Feb. 17 Feb. 18 | E. SSW. SSE. WSW. SSE. WSW. SSE. WNW. WSW. SSE. WNW. W. SSE. WNW. W. W. WNW. WNW. WNW. WNW. WNW. W | 2 10 26 31 15 26 37 17 2 9 10 5 5 9 10                             | Lirectiand velocit E. S.W. S. W.S.W.S. W.S.W.S.W.W.S.S.W.W.W.S.S.W.W.W.W                            | 24 10 16 21 24 28 19 20 40 18 15 5 8 8 11 5 5 10 6 2 7 7 | Direction and velocit E. S.W. S.W. S.W. S.W. W.W. W.          | 29 28 12  | Direction and velocity and velocity and velocity and velocity are solved as well as we | on<br>y-<br>28<br>16<br>44<br>44<br>17<br>14<br>7<br>16<br>8<br>8<br>9<br>5<br>9<br>12<br>4<br>3 | E. SSW. SSW. NW. W.S.W. SW. SW. W.S.W. S.S.W. W.S.W. S.S.W.  288 144 12 52 444 11 186 5 5 24 8 5 7 10 6 5 8 8 6 7 7 5 5 | Directi and velocit  E. SSW. SSW. SSW. SW. XXW. WSW. SSW. W. W. WSW. SSW. W.   | 28 8 48 11 17 4 8 6 6 11 6 10 10 4 4 5 7 7 7 4 4 4     | Direction and velocity WSW. SSW. SSW. SSW. SSW. SSW. SSW. WSW. WSW. SSW. WSW. WSW. SSW. WSW. SSW. WSW. WSW. SSW. WSW. WSW. SSE. SEE. SE | 7. 4 7. 26 14 8 8 14 4 4 8 11 5 8 7 11 5 8 7 11                  | Usection and velocity.  WSW. 1 88W. 26 8SW. 26 8SW. 26 8SW. 75 8W. 44 8SW. 75 8W. 88 8W. 8 8W. 8 10 8SW. 8 10 8SW. 8 10 8SW. 8 10 8SW. | SEST VEST VEST VEST VEST VEST VEST VEST  | Direction and velocity.  VSW. 4   SSW. 8   SSW. 8   SSW. 9   SSW. 9   SSW. 9   SSW. 9   SSW. 12   SSW. 14   SSW. 16   SSW. 17   SSW. 18   SSW. 10    Dis   Ve   W.   SE   S.   S.   W.   W.   W.   W.   W.   W.   | sw. 3<br>sw. 9<br>sw. 48<br>w. 11<br>sw. 45<br>sw. 45<br>sw. 45<br>sw. 45<br>sw. 45<br>sw. 45<br>sw. 47<br>sw. 12<br>sw. 12<br>sw. 13<br>sw. 13<br>sw. 13<br>sw. 13<br>sw. 14<br>sw. 13<br>sw. 14<br>sw. 13<br>sw. 14<br>sw. 14<br>s | Dire an velo WSV SSW. WSV E. ESE WSV WNY SSW. WNY SSW. WNY SSW. WNY NW. NW. NNW. NNW. NNW. NNW. NNW.                       | etion addr. V. 5 8 8 8 8 13 7 7 6 8 8 13 1 1 8 9 9 12 12 12                 | Direct and velocity v | Dominion to the little of the | 7 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5   |

<sup>\*</sup> Record incomplete for February 9 and 10.

ent showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883—Continued,

3—Continued. iven in miles per hour II a.  $\mathbf{m}_{\mathrm{c}}$ 

Direction and velocity.

sw. sw. vsw.

12, 50 12 p. m . m.

etion Direction mounts of and sud stay, velocity.

7. 5 WSW 7 8 SSW 7 8 SSW 6 7 47 WSW 44 13 ESE 1-152 W 5 17 ESE 2-2 WSW V 41 WSW 3-V 7 WSW 4 8 W 6

10 4

12 :.

Director told velocity

|  | 1 a. m                               |                            | 2 a. m                               |                                | 3 a. n                               | 11.                      | 4 a. m                               | .   | 5 a. m                              |                                   | 6 a. m                              |                            | 7 a. m                               |                            | 4 a. r                                   | n.                         | 9 a. n  | 1.                       | 10 a.                                      | m.                                      | 11 a.  | m                                   | 12 :                                | ti.                                     |
|--|--------------------------------------|----------------------------|--------------------------------------|--------------------------------|--------------------------------------|--------------------------|--------------------------------------|---|-------------------------------------|-----------------------------------|-------------------------------------|----------------------------|--------------------------------------|----------------------------|--|----------------------------|---|--------------------------|--|---|--|-------------------------------------|-------------------------------------|---|
| Date:  | Directi<br>and<br>velocit            |                            | Directi<br>and<br>velocit            |                                | Direct<br>and<br>velocit             |                          | Directi<br>and<br>velocit            |   | Directi<br>and<br>velocit           |                                   | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit            | on<br>y.                   | Direct<br>and<br>veloci                  |                            | Directi<br>and<br>velocit                       |                          | Direct<br>and<br>veloci                    | ion<br>ty.                              | Direc<br>an<br>veloc                               | tion<br>d<br>ity.                   | Direct<br>and<br>veloc              | tion<br>il<br>ity.                      |
| 1883.<br>ar. 1                                     | N.                                   | 6                          | N.                                   | в                              | N.                                   | 7                        | N.                                   | و   | N.                                  | 10                                | N.                                  | 6                          | N.                                   | 6                          | N.                                       | G                          | N.  | 6                        | N.   | 8                                       | N.   | 6                                   | N.                                  | 5                                       |
| ar. 2<br>ar. 3<br>ar. 4<br>ar. 4                   | NE.<br>ESE.<br>E.<br>SW.<br>WNW.     | 10<br>7<br>13<br>14<br>7   | NE.<br>ESE.<br>E.<br>SW.<br>WNW.     | 12<br>5<br>11<br>11<br>6       | ENE.<br>ESE.<br>E.<br>SW.<br>W.      | 16<br>6<br>13<br>12<br>9 | E.<br>ESE.<br>ENE.<br>W.<br>W.       | 13<br>12<br>11<br>13<br>8                     | E.<br>ESE.<br>ENE.<br>WSW.          | 13<br>8<br>13<br>9<br>8           | E.<br>ESE.<br>ENE.<br>WSW.<br>W.    | 12<br>7<br>10<br>12<br>6   | E.<br>ESE.<br>ENE.<br>WSW.<br>W.     | 11<br>6<br>16<br>10<br>6   | E.<br>ESE.<br>ENE.<br>W.                 | 14<br>4<br>8<br>13<br>8    | E.<br>ESE.<br>ENE.<br>WNW.<br>W.                | 12<br>5<br>8<br>14<br>11 | E<br>ESE.<br>ENE.<br>WNW.<br>W.            | 14<br>4<br>6<br>0                       | E.<br>ESE.<br>HNE.<br>WNW<br>W.                    | 16<br>5<br>4<br>8<br>9              | E.<br>ESE.<br>ENE.<br>WNW.<br>WSW.  | 17<br>6<br>14<br>7                      |
| at. 7<br>n. 5<br>or. 9<br>or. 10<br>or. 11         | WSW.<br>W.<br>W.<br>W.<br>SW.        | 1<br>14<br>13<br>6<br>7    | WSW.<br>W.<br>W.<br>W.<br>SW.        | 4<br>14<br>10<br>6<br>4        | WSW.<br>WSW.<br>WSW.<br>SW.          | 3<br>13<br>10<br>8<br>4  | WSW.<br>WSW.<br>WSW.<br>SW.          | 3<br>12<br>13<br>6<br>3                       | WSW.<br>WSW.<br>WSW.<br>SW.         | 4<br>11<br>11<br>6<br>4           | WSW.<br>WSW.<br>W.<br>WSW.<br>SW.   | 4<br>12<br>12<br>6<br>8    | WSW.<br>WSW.<br>W.<br>WSW.<br>SW.    | 11<br>10<br>6<br>3         | WSW.<br>SW.<br>WSW.<br>SW.               | 7<br>10<br>10<br>4<br>2    | WSW.<br>WSW.<br>WSW.<br>SW.                     | 8<br>10<br>0<br>3<br>1   | WSW.<br>WSW.<br>WSW.<br>Calm.              | 8<br>11<br>8<br>3                       | WSW.<br>W.<br>SW.<br>WSW.<br>SSE.                  | 8<br>16<br>8<br>4<br>2              | WSW.<br>W.<br>SW.<br>WSW.<br>NE.    | 10<br>16<br>10<br>4<br>2                |
| ar. 12<br>8. 13<br>a. 14<br>a. 15<br>a. 15         | NE.<br>SW.<br>SE.<br>ENE.<br>ENE.    | 12<br>6<br>4<br>14<br>20   | NE.<br>SW.<br>SE.<br>ENE.<br>ENE.    | 12<br>1<br>3<br>10<br>20       | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.   | 11<br>1<br>3<br>14<br>18 | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.   | 10<br>3<br>2<br>14<br>18                      | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.  | 11<br>4<br>1<br>14<br>16          | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.  | 10<br>4<br>1<br>13<br>18   | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.   | 10<br>4<br>2<br>13<br>22   | NE.<br>WSW.<br>SE.<br>ENE.<br>ENE.       | 10<br>1<br>2<br>13<br>22   | NE<br>WSW.<br>SE.<br>ENE<br>ENE.                | 9<br>1<br>2<br>12<br>22  | NE.<br>WSW<br>Calm.<br>ENE.<br>ENE.        | 11<br>5<br>14<br>24                     | NE.<br>WSW.<br>E.<br>ENE.<br>ENE.                  | 9<br>8<br>1<br>12<br>22             | ENE.<br>NNE.<br>NE.<br>ENE.<br>ENE. | 4<br>6<br>4<br>10<br>2:                 |
| on 17<br>15 15<br>25 19<br>27 19<br>27 20<br>26 21 | ENE.<br>NE.<br>NE.<br>SSW.<br>ESE.   | 21<br>20<br>11<br>4<br>12  | ENE.<br>ENE.<br>NE.<br>SSW.<br>ESE.  | 22<br>20<br>9<br>3             | ENE.<br>NE.<br>SSW.<br>E.            | 21<br>19<br>9<br>5<br>12 | ENE.<br>ENE.<br>NE.<br>SSW.<br>E.    | 28<br>12<br>10<br>2<br>11                     | ENE.<br>ENE.<br>NE.<br>SSW.<br>E.   | 24<br>13<br>8<br>2<br>10          | ENE.<br>NE.<br>SSW.<br>E.           | $^{24}_{14}$ $^{5}_{10}$   | ENE.<br>NE.<br>SSW.<br>E.            | 25<br>14<br>6<br>4<br>14   | ENE<br>E.<br>NE.<br>SSW.<br>E.           | 24<br>12<br>4<br>1<br>14   | ENE.<br>E.<br>NE.<br>SSW.<br>E.                 | 24<br>15<br>3<br>4<br>4  | ENE.<br>E.<br>ESE.<br>SSW.<br>E.           | 23<br>13<br>4<br>3<br>16                | ENE.<br>ENE.<br>SSE.<br>Calm.<br>E.                | 24<br>18<br>3                       | ENE.<br>SSE.<br>SW.<br>E.           | 10                                      |
| ar 12<br>at 23<br>it 24<br>at 25<br>at 26          | E.<br>SE.<br>SE.<br>SE.<br>WSW.      | 28<br>4<br>12<br>14<br>6   | ESE.<br>SE.<br>SE.<br>SW.            | 30<br>7<br>17<br>17<br>17<br>3 | E.<br>SE.<br>SE.<br>SSE.<br>SW.      | 30<br>6<br>17<br>20<br>4 | E.<br>SSE.<br>SE.<br>SW.             | 32<br>18<br>18<br>2                           | E.<br>SW.<br>SE<br>SSE.<br>NNW.     | 26<br>14<br>19<br>16<br>2         | E.<br>SW.<br>SE.<br>SSE.<br>NE.     | 23<br>14<br>18<br>16<br>4  | E.<br>SW.<br>SE.<br>SSE.<br>NE.      | 24<br>16<br>19<br>21<br>4  | E.<br>SW.<br>SE.<br>SSE.<br>NE.          | 28<br>15<br>18<br>20<br>8  | ESE.<br>SW.<br>SE.<br>SSE.<br>NE.               | 28<br>14<br>18<br>17     | ESE.<br>SW.<br>SE.<br>SSE.<br>ENE.         | 32<br>11<br>16<br>14<br>11              | ESE,<br>SW:<br>SE<br>SSE,<br>ENE.                  | 26<br>12<br>16<br>16<br>16          | ESE.<br>SW.<br>SE.<br>SSE<br>ENE.   | 16<br>16<br>1-                          |
| at. 17<br>7 28<br>1 19<br>3r 0<br>at. 3            | SSW.<br>WSW.<br>SE.<br>WSW.<br>SSE.  | 34<br>23<br>17<br>7<br>8   | S.<br>SW.<br>SE.<br>S.<br>SSE.       | 29<br>13<br>19<br>4<br>2       | S.<br>SW.<br>SE.<br>SE.<br>S.        | 27<br>15<br>16<br>4<br>3 | S.<br>SSW.<br>SE.<br>SSE.<br>SSE.    | 28<br>8<br>13<br>5<br>5                       | SSW.<br>SW.<br>SE.<br>SSE.<br>SSE.  | 25<br>12<br>16<br>6<br>5          | SSW.<br>SSE.<br>SSE.<br>SSE.        | 28<br>8<br>12<br>4<br>4    | SSW.<br>S.<br>SSE.<br>S.<br>SSE.     | 25<br>8<br>8<br>3<br>9     | S. SSE.<br>SSE<br>SS.                    | 22<br>3<br>8<br>3<br>8     | S.<br>SSE.<br>SSE.<br>SW.                       | 6                        | SSE.<br>SE.<br>SSE.<br>SW.                 | 29<br>8<br>7<br>6<br>2                  | S.<br>SE.<br>SSE.<br>S.<br>SW.                     | 32<br>12<br>8<br>5<br>7             | S.<br>SE.<br>SSW.<br>WSW.           |   |
| fean-  | 12.19                                | }                          | 11.0                                 |                                | 11.4                                 |                          | 11.25                                |   | 11, 00                              |                                   | 10 35                               |                            | 10, 90                               |                            | 10.4                                     | č                          | 10 8  |                          | 10. €                                      |   | 11.  |                                     | 11.                                 | 0G<br>                                  |
|  | 1 p. m                               |                            | 2 p. n<br>—                          |                                | 3 p. r                               |                          | 1 p. n                               |   | 5 p. n                              |                                   | e p. n                              |                            | 7 <sub>.</sub> p. m                  |                            | 5 p. m                                   |                            | 9 p. m.   | -                        | 0 p. m.                                    |   | ). III.  | 12 p. i                             | 1                                   | Daily                                   |
| Date   | Directi<br>and<br>velocit            |                            | Directi<br>and<br>velocit            |                                | Direct<br>and<br>veloci              |                          | Directi<br>and<br>velocit            |   | Directi<br>and<br>velocit           |                                   | Directi<br>and<br>velocit           |                            | Directi<br>and<br>velocit            |                            | Direction and velocity                   |                            | Direction<br>and<br>velocity.                   |                          | irection<br>and<br>elecity.                | a.                                      | etion ,<br>nd<br>eity,                             | Direct<br>and<br>veloci             | lon lo                              | an ve                                   |
| 1883.<br>lat. 1                                    | N.                                   | 7                          | N.                                   | 7                              | N.                                   | 7                        | N.                                   | ٨   | N.                                  | 4                                 | N.                                  | 6                          | N.                                   | 8                          | NNE.                                     | 10                         | NNE. 7  | N                        | NE. 12                                     | NNI                                     | E. 12  | NE.                                 | 10                                  | 7. 6                                    |
| La. 2<br>La. 3<br>Inc. 4<br>Inc. 5                 | ESE.<br>ESE.<br>ENE.<br>WNW.<br>WSW. | 18<br>7<br>8<br>10         | ESE.<br>ESE.<br>ENE.<br>WNW.<br>WSW. | 19<br>11<br>6<br>10            | ESE.<br>ESE.<br>ENE.<br>WNW.<br>WSW. | 17<br>4<br>6<br>14<br>11 | ESE.<br>ESE.<br>ESF.<br>NW.<br>WSW.  | 16<br>7<br>5<br>12<br>8                       | ESE.<br>ESE.<br>SE.<br>NW.<br>SW.   | 17<br>11<br>5<br>12<br>8          | ESE<br>ESE.<br>SSE.<br>WNW.<br>WSW. | 16<br>8<br>6<br>11<br>8    | ESE.<br>ESE.<br>SSW.<br>WNW.<br>WSW. | 18<br>8<br>12<br>8         | ESE.<br>ESE.<br>SSW.<br>WNW.<br>WSW.     | 18<br>8<br>10<br>11<br>10  | ESE. 21<br>ESE. 7<br>SSW. 14<br>NW. 10<br>SW. 8 | E                        | SE. 16<br>SE. 9<br>W. 14<br>W. 8           | ESE<br>SW<br>WX<br>WS                   | 12   | ESE.<br>E.<br>SW.<br>WNW<br>WSW     | 10<br>12<br>14<br>. 7<br>. 8        | 14, 9<br>7, 3<br>9, 9<br>10, 7<br>8, 4  |
| 1 a. 7<br>la: 1<br>la: 1<br>la: 1                  | WSW.<br>WXW.<br>SW.<br>WSW.<br>SSE.  | 11<br>16<br>10<br>3        | WSW.<br>WNW.<br>SW.<br>WSW.<br>SE.   | 11<br>15<br>12<br>4            | WSW,<br>WSW,<br>WSW,<br>WSW,<br>ESE, | 17<br>18<br>11<br>4<br>5 | WSW,<br>WSW,<br>WSW,<br>WSW,<br>ESE. | 14<br>19<br>0<br>6<br>4                       | WSW.<br>WNW.<br>WSW.<br>SW.<br>ESE. | 15<br>18<br>11<br>5<br>4          | W.<br>WNW.<br>W.<br>SW.<br>ESE.     | 17<br>17<br>11<br>5<br>4   | W.<br>WNW.<br>SW.<br>ESE.            | 20<br>18<br>12<br>5<br>6   | WSW,<br>W.<br>SW.<br>LNL                 | 14<br>16<br>12<br>6<br>6   | W. 17<br>W. 18<br>W. 8<br>WSW. 5<br>ENE. 9      | 11 3                     | NW. 12<br>15<br>8<br>SW. 4<br>NE. 16       | W.<br>W.<br>SW.<br>ENI                  | 14<br>10<br>7<br>6<br>14                           | W.<br>W.<br>W.<br>SW.<br>ENE.       | 14<br>10<br>7<br>8<br>9             | 10. 0<br>14. 1<br>10. 0<br>5. 1<br>5. 0 |
| I a. 12<br>I a. 15<br>I.r. 14<br>I.r. 15           | FNE.<br>NE.<br>NNE.<br>FNE.<br>ENE.  | 6<br>5<br>4<br>1<br>22     | ENE.<br>SE.<br>NNE.<br>ENE.<br>ENE.  | 3<br>4<br>12<br>21             | ENE.<br>SE<br>ENE.<br>ENE.           | 8<br>1<br>3<br>12<br>26  | ENE.<br>SSE.<br>SE<br>ENE.<br>ENE.   | 10<br>2<br>3<br>15<br>24                      | NE.<br>SE<br>E.<br>ENE.<br>ENE.     | 5<br>7<br>16<br>24                | NE.<br>SE.<br>E.<br>ENE.<br>FNE.    | 1<br>6<br>19<br>24         | NE.<br>SE.<br>SE<br>ENE.<br>ENE      | 1<br>4<br>19<br>19         | NE<br>SE.<br>ENE.<br>ENE.<br>ENE.        | 7                          | SW. 3<br>SE. 1<br>E. 19<br>ENE. 10<br>ENE. 2    | 81<br>E                  | SW. 5<br>E. 2<br>NE. 6<br>NE. 16<br>NE. 26 | SW<br>SE.<br>ENI<br>ENI                 | 4 3 7 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19 | SW.<br>SE<br>ENE.<br>ENE.<br>ENE.   | 4<br>4<br>6<br>16<br>19             | 7, 2<br>3, 9<br>3, 9<br>14, 1<br>22, 1  |
|  | ENE.<br>ENE.<br>SSW<br>v lan.<br>L   | 21<br>15<br>6              | ENE<br>ENE.<br>88W.<br>Calm.<br>E    | 24<br>14<br>3<br>20            | ENE.<br>ENE.<br>SSW.<br>ESE<br>E.    | 24<br>13<br>6<br>4<br>23 | ENE.<br>ENE.<br>SSW.<br>ESE.<br>E.   | $\frac{23}{14}$ $\frac{14}{7}$ $\frac{3}{26}$ | ENE.<br>ENE.<br>SSW.<br>ESE.<br>E.  | $^{25}_{16} \\ ^{5}_{4} \\ ^{28}$ | ENE<br>NE.<br>SSW.<br>ESE.<br>E.    | 20<br>17<br>6<br>5<br>28   | ENE<br>NE.<br>SSW.<br>ESE.<br>E.     | 22<br>20<br>6<br>5<br>30   | FNE.<br>NE<br>SSW<br>USF.<br>ESE         | 23<br>18<br>8<br>6<br>26   | ENE. 23<br>NE. 13<br>SSW. 10<br>ESE. 6<br>E. 3  | 1 2 1                    | NE 95<br>41. 0<br>8W. 6<br>8E. 4<br>8U. 25 | ENT<br>SSW<br>ESE<br>ESE                | 15 23<br>15 8<br>25 25                             | ENE.<br>NE<br>SSW.<br>1 SU.<br>USF. | 21<br>12<br>6<br>9<br>25            | 23, 5<br>15, 0<br>6, 5<br>3, 7<br>19, 7 |
|  | ESE<br>SW<br>SE,<br>SE,<br>LNE       | 27<br>15<br>16<br>16<br>11 | USE.<br>SF<br>UNID                   | 21<br>17<br>11<br>15<br>17     | ESII<br>Str<br>Str<br>E.             | 20<br>14<br>16<br>11     | ESE.<br>SE<br>SSW<br>E.              | 23<br>12<br>16<br>10<br>24                    | SE.<br>SE.<br>SSW.<br>ESE.          | 23<br>12<br>28<br>11<br>24        | SE.<br>SE.<br>SW.<br>ESE            | 18<br>11<br>20<br>10<br>23 | 8E<br>8E<br>8W<br>E8E                | 11<br>11<br>19<br>12<br>17 | SE SE SE SE SE SE SE SE SE SE SE SE SE S | 16<br>10<br>19<br>14<br>21 | SL 2<br>SE 2<br>W. 11<br>SE 21                  | -                        | E zo                                       | 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 1.   | SE SEL                              | 5<br>14<br>16<br>-8                 | 21 3                                    |
|  |                                      |                            |                                      |                                | SSW.                                 | 25                       | WSW.                                 | 21  | WSW.                                | 43.00                             | SW                                  |                            | 571                                  | 117                        | U.SII.                                   |                            | WSW.  |                          | SW 21                                      | WS                                      | W 27   | V 515                               |                                     | 17.1                                    |

Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continuel,

[Height of an emometer above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, -50 17m. Velocity given in miles per home 5 a. m A a m Direction Direction Direction Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. velocity. velocity. NNW. NNW. NNW. N.W. Calm. X. SSE. SSW. SE. ENE. E. 3 10 12 12 12 22 S. SSW. SE. ENE. ENE. S. SSW SE. ENE ENE. WSW. WSW. W. ENE. SW. NW. W. W. 14 12 13 6 1 6 ENE 12 3 6 N.W. W. N. W. W. SII' 9 4 6 14 8 NE. W. ESE. WNW W. 17 3 13 13 ESE. W. ESE. 17 6 14 16 N. W. ESE. 11 7 11 14 6 10 10 14 12 12 12 20 3 NW. W. WSW. WNW. WSW. W. W. WSW. NNE. N. W. W. Celm. NE. NXW. W. W. SSW. NE. N. NNE 8.16 8, 10 7, 60 7. 30 7, 90 8, 16 7 p. m. 1 p. m. 2 p. m. 3 p. m. 4 p. m. 5 p. m. 6 p. m. 8 p. m. 10 n. m. Date. Direction Direction Direction Direction Direction Direction Direction Direction Direction Direction and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. and velocity. S. SSE. E. ENE. ENE. SSW SSE. 12 11 15 27 20  $11 \\ 10 \\ 16 \\ 27 \\ 20$ 10 1 10 1 20.12 11 6 13 11 13 N. SW. ENE. NE. E. 10 6 13 8 13 W. 20 11 28 11 6 W. WSW. Calm. NE. NE. W. W. NNE. W. W. NNE. NE. 13 2 8 5 12 6 12 10.46

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Statement showing the direction and velocity of the wind at Uylaamie from October, 1881, to August, 1883—Continued.

18elght of an emomenter above surface of ground, 28 feet. Washington mear time. Correction to reduce to mean local time -59 179. Velocity given in miles per hour.

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| Date.  | Direct<br>and<br>veloci  |   | Direct<br>and<br>veloci  | ł  | Direct<br>and<br>relocit   |   | Direct<br>and<br>velocit   |   | Direct<br>and<br>velocit   |   | Directi<br>and<br>velocit  |  | Direct<br>and<br>veloci  |   | Direct<br>and<br>veloci   | 1  | 8  | ection<br>nd<br>neity   |  | irect<br>and<br>eloci  |  | Dire<br>ni<br>velo   | ction<br>ad<br>city.  |   | rection<br>and<br>locity.  |
| May 1<br>May 2<br>May 3<br>May 4<br>May 5  | NE<br>ENE.<br>ESE.<br>E.   | 17<br>16<br>23<br>13<br>17  | ENE.<br>ENE.<br>ESE.<br>ESE.   | 11<br>15<br>19<br>14<br>20   | NE.<br>ENE.<br>ENE.<br>E.  | 11<br>16<br>20<br>14<br>21  | NE.<br>ENE.<br>ESE.<br>ESE.  | 13<br>16<br>19<br>13<br>22                                | NE.<br>ENE.<br>E.<br>E.  | 11<br>16<br>14<br>14<br>22  | NE.<br>ENE.<br>NE.<br>E.<br>ESE.   | 9<br>15<br>11<br>14<br>16  | NE.<br>ENE.<br>NE.<br>E.<br>ESE.   | 9<br>16<br>14<br>12<br>17                                       | NE.<br>ENE.<br>NE.<br>E.<br>ESE.  | 9<br>16<br>13<br>15<br>15  | ENE.<br>E.   |   | 12 NI<br>16 E2<br>18 NI<br>16 E.<br>16 E.  | ŠE.  | 16<br>12<br>15   | NE.<br>ENE.<br>NE.<br>E.<br>ESE.   | 11<br>17<br>10<br>18<br>15  | NE<br>EN<br>E.<br>SE.   | E. 17<br>E. 10<br>20<br>17   |
| May 6<br>May 7<br>May 8<br>May 9<br>May 10   | SSW.<br>NNE.<br>SSE.<br>NE.<br>SW.   | 6<br>27<br>4<br>11<br>5   | SSW.<br>NNE.<br>SSE.<br>NE.<br>SW.   | 10<br>25<br>8<br>13<br>7   | SSW.<br>NNE.<br>S.<br>NE.<br>SW.   | 9<br>25<br>10<br>14<br>4  | SSW.<br>NNE.<br>SW.<br>NE.<br>SSE.   | 12<br>25<br>11<br>16<br>2                                 | SSW.<br>NNE.<br>SW.<br>NE.<br>SE.  | 5<br>24<br>14<br>16<br>1  | SW.<br>NNE.<br>SW.<br>NNE.<br>ENE.   | 7<br>23<br>14<br>16<br>5   | WSW.<br>NNE.<br>SW.<br>NNE.<br>NE.   | 8<br>25<br>14<br>19<br>5  | WNW.<br>NNE.<br>SW.<br>NNE.<br>NE.  | 11<br>22<br>14<br>20<br>7  | WNV<br>NNE<br>SW.<br>NNE<br>NE.  |   | 9 NV<br>20 NI<br>12 SS<br>19 NI<br>7 E.  | V.<br>N.E.<br>W.   | 16<br>20   | N.<br>NNE.<br>SW.<br>NE.<br>ENE.   | 13<br>22<br>11<br>21<br>4   | NN<br>NN<br>SSV<br>NN<br>NN   | V. 10<br>F. 16   |
| May 11<br>May 12<br>May 13<br>May 14<br>May 15   | SSW.<br>NE.<br>NE.<br>ENE.<br>ENE.   | 17<br>16<br>21<br>3   | W.<br>NE.<br>NE.<br>ENE.<br>NNW.   | 11<br>14<br>16<br>19<br>6  | WSW.<br>NE.<br>NE.<br>NE.<br>NY.   | 11<br>16<br>16<br>20<br>7   | NE.<br>NE.<br>NE.<br>NE.   | 12<br>15<br>21  | W.<br>NNE.<br>NE.<br>NE.<br>NNE.   | 8<br>10<br>18<br>21<br>7  | WNW.<br>N.<br>NE.<br>NE.<br>N.   | 10<br>18<br>19<br>7  | W.<br>NNE.<br>NE.<br>NNE.<br>NNE.  | 6<br>12<br>18<br>16<br>10                                       | NNW.<br>NE.<br>NNE.<br>NNE.   | 14<br>18<br>10   | NNE.<br>NE.<br>NNE   |   | 2 N:<br>10 N!<br>21 N!<br>18 N:<br>12 N.   | NW.<br>E.<br>E.<br>NE.   | 21<br>14   | ENE.<br>NE.<br>NE.<br>NNE<br>NNE   | 8<br>5<br>24<br>11<br>15  | NX<br>NE<br>NE<br>NE<br>NX  | . 9<br>19  |
| May 16<br>May 17<br>May 18<br>May 19<br>May 20   | N.<br>88W.<br>8W.<br>88W.<br>88W.  | 20<br>11<br>17<br>12<br>16  | SSW.<br>SW.<br>SSW.<br>SSW.  | 15<br>12<br>16<br>8<br>15  | NYW.<br>SSW.<br>SW.<br>SSW.  | 15<br>13<br>16<br>9<br>12   | NNW.<br>SSW.<br>SW.<br>SSW.  | 13<br>13<br>13<br>10<br>11                                | SSW.<br>SSW.<br>SSW.   | 9<br>12<br>17<br>12<br>10   | SW.<br>SW.<br>SSW.<br>SSW.   | 9<br>15<br>16<br>11<br>6   | NW.<br>SW.<br>SW.<br>SW.   | 7<br>15<br>16<br>8<br>4   | SW.<br>SW.<br>SW.<br>SW.  | 8<br>13<br>16<br>8<br>5  | SW.  |   | 9 NV<br>13 SV<br>14 SV<br>9 SV<br>4 SS   | V.   | 16<br>13   | NW.<br>SW.<br>SW.<br>SSW.<br>SSW.  | 8<br>16<br>12<br>6<br>2   | 817<br>817<br>881<br>881  | . 19<br>. 14<br>V. 7   |
| May 21<br>May 22<br>May 23<br>May 24<br>May 25   | SW.<br>E.<br>SE.<br>SSE.<br>SW.  | 1<br>11<br>14<br>10<br>10   | SW.<br>E.<br>SE.<br>SSE.<br>SW.  | 10<br>16<br>9<br>8   | SW.<br>ESE.<br>SE.<br>SSE.<br>SW.  | 10<br>19<br>8<br>6  | SW.<br>ESE.<br>SE.<br>SSE.<br>SW.  | 3<br>11<br>16<br>12<br>7                                  | NW.<br>ESE,<br>SE,<br>SSE,<br>SW.  | 1<br>11<br>16<br>10<br>7  | Calm.<br>ESE.<br>SE.<br>SSE.<br>WSW.   | 10<br>16<br>6  | ESE.<br>SE.<br>SSE.<br>WSW.  | 10<br>14<br>9<br>5  | E.<br>ESE.<br>SE.<br>SSE.<br>WSW.   | 11<br>19<br>8  | ESE.   |   | 4 E.<br>12 ES<br>14 SS<br>8 SS<br>  Ca   | E.<br>W.<br>Im.  | 12<br>16<br>7  | E.<br>ESE.<br>SSE.<br>SW.<br>Calm  | 11<br>17<br>7   | E.<br>ESI<br>SSI<br>SW<br>SSI   | . 16   |
| May 26<br>May 27<br>May 28<br>May 29<br>May 30   | NE.<br>ENE.<br>ESE.<br>NNE.<br>E.  | 6<br>8<br>13<br>18  | ENE.<br>ESE.<br>NNE.<br>E.   | 5<br>11<br>9<br>12<br>16   | ENE.<br>ESE.<br>NNE.<br>ENE.   | 6<br>12<br>6<br>12<br>16  | ENE.<br>ESE.<br>NNE.<br>ENE.   | 4<br>10<br>8<br>13<br>20                                  | NNE.<br>ENE.<br>NNE.<br>ENE.   | 10<br>6<br>13<br>19   | NE.<br>ENE.<br>ESE.<br>NNE.<br>ENE.  | 8<br>6<br>14<br>21   | ENE.<br>ESE.<br>NNE.<br>E.   | 8<br>16<br>21   | NE.<br>ENE.<br>ESE.<br>NNE.<br>E.   | 3<br>6<br>4<br>16<br>22  | ENE<br>ESE.  |   | 6   E.   | NE.<br>lm.<br>E.   | 7  | NE.<br>SE.<br>Calm<br>NE.<br>E.  | 6<br>10<br>20<br>19   | ESI<br>Cal<br>NE<br>E.  | 111.   |
| May 31   | E.   | 18  | ENE.   | 10   | ENE.   | 20  | ENE.   | 16  | ENE.   | 16  | E.   | 19   | E.   | 18  | Е.  | 14   |  |   | 16 E.  |  |  | ENE  | 13  | EN  |  |
| Means.   | 12. 7  | 4   | 12.6   | 1  | 12.8   | 7   | 12.6   | 7   | 12.0   | 8   | 11. 32   | 9  | 11.7   | 4   | 11.6  | 34   | 11   | 1, 38   |  | 11.6   | 4  | 11   | . 48  |   | 11. 67   |
|  |  |   |  |  |  |   |  |   |  |   | 1110   |  |  |   |   |  |  |   | _ :  |  |  |  |   |   |  |
|  | 1 p. n   | n.  | 2 p. n   | u.   | 8 p. u   | ۵.  | 4 p. n   |   | 5 p. n   |   | 6 p. m   |  | 7 p. m   | -   | 8 p. m.   | -  | 9 p. n   | n.  | :<br>10 p. :   | m.   | 11 p.  | m.   | 12 p.   | m.  |  |
| Date.  | 1 p. n  Direct  and  velocit   | ion   | 2 p. n Direct  | ion  | 3 p. u<br>Direct<br>and<br>velocit   | ion   |  | ien   |  | ion   | 1  | ion  |  | on  | S p. m. Directi   | on   | 9 p. n<br>Directi  | on  | Direct and veloci  | ion  | 11 p.  | tion   | 12 p. 1   | ion   | Daily mean velocity.   |
| Date.  less. May 1 May 2 May 3 May 4 May 5   | Direct   | ion   | Direct   | ion  | Direct<br>and  | ion   | 4 p. m<br>Direct   | ien   | 5 p. n   | ion   | 6 p. m   | ion  | 7 p. m<br>Directi  | on  | Directi   | on   | Directi  | on  | Direct   | ion  | Direct   | tion   | Direct  | ion   | mean ve-   |
| May 1<br>May 2<br>May 3  | Direct<br>and<br>velocit<br>NE,<br>ENE,<br>ENE,<br>ENE,  | ion<br>ty.  | Direct<br>and<br>veloci<br>NE.<br>ENE.<br>ENE.   | 12<br>20<br>14<br>19   | Direct<br>and<br>velocit<br>NE.<br>ENE,<br>E.  | ion<br>ty.<br>16<br>21<br>16<br>17  | 4 p. m  Direct and velocit  ENE, ENE, ENE, ESE,  | ien<br>ty.<br>16<br>24<br>16<br>20                        | Direct and velocit   | ion<br>y.<br>17<br>24<br>14<br>20   | Directi<br>and<br>velocit<br>ENE.<br>ENE.<br>ESE.<br>WSW.<br>N.<br>E SE.<br>SE.<br>WW.   | ion<br>y.<br>16<br>27<br>15<br>20  | 7 p. m  Directi and velocit  ENE. ENE. E. E. E.E.  | on   17   26   16   18  | Directi<br>and<br>velocity<br>ENE.<br>ENE.<br>E.<br>E.  | on<br>y.<br>19<br>25<br>16<br>20   | Directi<br>and<br>velocit<br>ENE.<br>ENE.<br>ESE.  | 17<br>28<br>17<br>17  | Direct<br>and<br>veloci<br>ENE.<br>ENE.<br>ESE.  | 18 24 16 11 13 24 6 7  | Direction velocity ENE.  | tion<br>d<br>ity.<br>16<br>24<br>16<br>15  | Direct<br>and<br>veloci<br>ENE.<br>ENE.<br>ESE.   | ion<br>l<br>ty.<br>16<br>24<br>17<br>16   | 13, 76<br>19, 87<br>15, 08<br>16, 50   |
| 1886.<br>May 1<br>May 2<br>May 2<br>May 4<br>May 5<br>May 6<br>May 6<br>May 8  | Direct<br>and<br>velocit<br>NE,<br>ENE,<br>ENE,<br>ESE,<br>SE,<br>NNE,<br>SW,<br>NNE,  | 12<br>18<br>11<br>19<br>11<br>16<br>24<br>7                                 | Direct and velocit  NE. ENE. ENE. ESE. N. NNE. SW. NNE.  | 12<br>20<br>14<br>19<br>9<br>17<br>20<br>7<br>24   | Direct and velocities.  NE. ENE. E. S. N. NNE. SW. NNE.  | 16 21 16 17 6 18 17 5   | Direction and velocity and velocity and velocity ENE. ENE. ESE. SW. NNE. NNE. NNE.   | 16 24 16 20 11 18 14 5 12                                 | Direct and velocity ENE. E. E. S.W. N. E. SE. NNE.   | 17<br>24<br>14<br>20<br>15<br>20<br>14<br>1<br>12   | Direction and velocity ENE. E. E. WSW. N. E. SE. SE. SE.   | 16 27 15 29 13 12 6 3  | 7 p. m<br>Directi<br>and<br>velocit<br>ENE.<br>ENE.<br>E.<br>ESE.<br>SW.<br>NNE.<br>ESE.<br>ESE.<br>Calm.  | on   17   26   16   18   11   24   10                           | Directi<br>and<br>velocity<br>ENE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E   | on 19 25 16 20 10 24 7 7 5   | Directi<br>and<br>velocit<br>ENE.<br>ENE.<br>ESE.<br>SSW.<br>NNE.<br>SE.<br>ESE.<br>W.   | 17 28 17 17 12 23 7 9   | Direct<br>and<br>veloci<br>ENE.<br>ENE.<br>ESE.<br>E.<br>SSW.<br>NNE.<br>SSE.<br>ENE.  | 18 24 16 11 13 24 6 7  | Direct<br>and<br>veloc<br>ENE.<br>ENE.<br>ESE.<br>E.<br>SW.<br>NNL.<br>SSE.<br>ENE.<br>SW.   | 16<br>24<br>16<br>15<br>13<br>21<br>5  | Direct<br>and<br>veloci<br>ENE.<br>ENE.<br>ESE.<br>E.<br>SW.<br>NNIC.<br>SSE.<br>NNIC.<br>SSE.                                | 16<br>24<br>17<br>16<br>12<br>24<br>4<br>9  | mean ve-<br>locity.<br>13, 76<br>19, 87<br>15, 08<br>16, 59<br>14, 75<br>15, 58<br>17, 18<br>8, 83<br>13, 33         |
| May 1 May 2 May 3 May 4 May 5 May 6 May 9 May 1  | Direct<br>and<br>velocit<br>NE.<br>ENE.<br>ESE.<br>SE.<br>N.NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.   | 12 18 11 19 11 16 24 7 19 4 8 8 25 3  | Direct and velocity NE. ENE. ENE. ESE. SW. NNE. NNE. NNE. N. E. NE. SE.  | 12 20 14 19 9 17 20 7 7 4 4 12 8 23 3 18   | Direct and velocit  NE. E.NE. E. S. N. NNE. SW. NNE. W. NNE. NNE. NNE. NE. SW.   | 16 21 16 17 6 18 17 5 19 7 7 24 3   | Directiand velocities ENE. ENE. ENE. ESE. SW. NNE. NNE. WNW. NNE. NNE. NNE. NNE. ENE. E  | 16 24 16 20 11 18 14 12 10 16 10 25 4                     | Direct and velocity  ENE. ENE. E. E. SW.  N. E. SE. NNE. WNW.  NNE. NNE. NNE. NNE. NNE. NNE. NNE. NN   | 17 24 14 12 20 15 12 8 16 11 12 5 3   | Direction of the control of the cont | 16 27 15 12 12 16 3 3 9 15 15 24 5   | 7 p. m  Directi and velocit  ENE. ENE. E. E. ESE. SW. NNE. ESE. Calm. WSW. NNE. ENE. ENE. ENE. ENE. ENE.   | 177 266 18 11 24 10 16 23 4                                     | Directi<br>and<br>velocity<br>ENE.<br>ENE.<br>ESE.<br>SSW.<br>NNE.<br>ESE.<br>W.<br>W.<br>NNE.<br>ENE.<br>ENE.  | 19 25 16 20 10 24 7 7 7 8 8 14 16 12 4 3                                 | Direction and velocities to the control of the cont | 17 28 17 17 12 23 7 9 6 6 14 24 1   | Direct and veloci ENE. ENE. ESE. E. SSW. NNE. SSE. ENE. WNW S'. NNE. ENE. ENE. ENE. ENE. ENE.  | 18 24 16 17 13 24 6 7 7 8 17 16 24 1   | ENE.<br>ENE.<br>ENE.<br>ESE.<br>E.<br>SW.<br>NNIL.<br>SSE.<br>ENE.<br>SW.<br>NNE.<br>ENE.<br>YW.   | 16 24 16 15 13 24 5 6 7 6 15 15 15   | Direct<br>and<br>veloci<br>ENE,<br>ENE,<br>ESE,<br>E,<br>NNE,<br>SSE,<br>NNE,<br>SSW,<br>NNE,<br>NNE,<br>NNE,<br>NNE,<br>NNE, | 16<br>24<br>17<br>16<br>12<br>24<br>4<br>9<br>5<br>7                                    | 13, 76<br>19, 87<br>15, 58<br>16, 50<br>14, 75<br>15, 68<br>17, 68<br>18, 80<br>10, 50<br>11, 90<br>12, 90<br>12, 90 |
| May 1 May 2 May 8 May 4 May 7 May 8 May 9 May 10 May 11 May 12 May 13 May 14 May 15 May 16 May 16 May 17 May 18 May 16 May 17 May 18 Ma | Direct and velocit  NE. ENE. ENE. ENE. SE. N. NNE. NE. NE. NE. NE. NE. NE. NE. N   | 12 18 11 19 11 16 24 7 19 4 8 8 25 3 16 5 20 14 3                           | Direct and velocity of the control o | 12 20 14 19 9 9 7 7 24 4 4 12 8 3 3 18 18  | Direct and velocity NE. ENE. E. E. S. N. N. E. S. W. N. Y. S. W. S | 16 21 16 17 6 18 17 7 16 7 7 24 3 18 17 12 8                                    | Direction of the control of the cont | 16 24 16 20 11 18 14 14 10 16 10 25 17 12 10 6 4 4        | Direct and velocit ENE. E. E. SW. M. E. SE. NNE. WNW. NNE. ENE. S. W. WSW. SW. SW. SW. SW. SW. SW. SW.   | 177 244 144 120 155 16 11 12 8 16 11 12 5 3 23 11 18  | 6 p. m<br>Directi<br>and<br>volocit<br>ENE.<br>E.SE.<br>WSW.<br>N.<br>SE.<br>SE.<br>W.<br>NE.<br>ENE.<br>E.SE.<br>W.<br>W.<br>NE.<br>E.SE.<br>W.<br>W.<br>W.<br>W.<br>W.<br>W. W.<br>W. S.<br>W. W. W. S.<br>W. W. W. W. S.<br>W. W. W. W. W. S.<br>W. W.  | 16 27 15 29 13 22 14 5 23 8 24 8   | 7 p. m<br>Directi<br>and<br>velocit<br>ENE.<br>E.SE.<br>ESE.<br>Calm.<br>WSW.<br>NNE.<br>ENE.<br>WSW.<br>WSW.<br>SSW.  | 17 26 16 18 11 24 10 7 7 8 10 16 23 4 24 24 11 11 29 20 11 11   | Directi<br>and<br>velocity<br>ENE.<br>ENE.<br>E.<br>ESE.<br>SSW.<br>W.<br>W.<br>W.<br>W.<br>W.<br>SW.<br>SW.<br>SW.<br>SW.<br>SW                              | 19 25 16 20 10 24 7 7 5 8 14 16 24 3 19 9 9                              | Directi<br>and<br>velociti<br>ENE.<br>ENE.<br>ESE.<br>ESE.<br>SSW.<br>NNE.<br>SE.<br>NNE.<br>SE.<br>NNE.<br>SE.<br>NNE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>S  | 17 28 17 17 12 23 7 9 6 6 7 14 19 16 17 8   | Direct and veloci energy services and veloci energy services energy energy services energy services energy en | 18 24 16 17 13 24 6 7 7 7 8 17 16 19 9   | Direct and veloc ENE. ESE. ESE. ENE. SSW. NNE. SSW. NNE. NNE. NNW. NNW. SSW. SSW. SSW. SSW. SSW. SSW   | 16 24 16 15 13 24 15 5 6 7 8 15 16 17 17 17 17 12  | Direct<br>and<br>veloci<br>ENE.<br>ESE.<br>E.<br>NNE.<br>SSE.<br>NNE.<br>SSW.<br>NNE.<br>SSW.<br>SSW.<br>SSW.<br>SSW.<br>SSW. | 16<br>24<br>17<br>16<br>12<br>24<br>4<br>9<br>5<br>7<br>16<br>15<br>20<br>1<br>15       | 13, 76<br>19, 87<br>15, 58<br>16, 50<br>14, 75<br>15, 68<br>17, 68<br>18, 80<br>10, 50<br>11, 90<br>12, 90<br>12, 90 |
| 1883. May 12 May 2 May 3 May 3 May 3 May 5 May 5 May 6 May 7 May 10 May 10 May 11 May 12 May 13 May 14 May 15 May 16 May 16 May 16 May 16 May 16 May 16 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May 17 May 18 May  | Direct and volocity of the control o | 12 18 11 11 16 24 7 19 4 8 8 25 3 16 5 20 14 3 3 12 19 13                   | Direct and velocity of the control o | 1220<br>144<br>199<br>17<br>207<br>77<br>244<br>4<br>128<br>8<br>8<br>18<br>18<br>15<br>20<br>127<br>77<br>4<br>4<br>121<br>121<br>121<br>121<br>121<br>121<br>121<br>121<br>121 | Direct and velocit  NE. ENE. E. S. N.  | 16 21 16 17 6 18 17 5 19 7 7 16 7 7 24 3 18 10 4 12 220 14                      | J. P. M. Directed and velocit and velocit energy en | 16 24 16 20 11 18 14 21 10 16 12 5 17 12 9 6 6 4 15 20 12 | 5 p. n<br>Directed and velocity<br>ENE, E. E. E. S. SW.<br>N. E. S. N. S. S. N. S.   | 17 24 14 12 20 15 15 11 8 6 6 5 15 18 11  | Directi<br>and<br>velocit<br>ENE.<br>ENE.<br>WSW.<br>N.<br>SE.<br>SE.<br>WSW.<br>N.<br>SE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>N   | 160n<br>27, 155<br>29 113<br>222 12 6<br>3 3 9<br>15 155<br>23 8 24 8 8 11 4 6 6 15 17 | T p. m  Directi and velocit  ENE, ENE, ENE, ESE, Catha, WSW, NNE, ENE, ENE, ENE, ENE, ENE, ENE, EN   | 17 26 16 18 11 24 10 7 7 8 10 16 23 4 24 9 20 11 12 7 6 6 15 15 | Directi<br>and<br>velocity<br>ENE.<br>ENE.<br>ESE.<br>SSW.<br>NNE.<br>ESE.<br>W.<br>W.<br>NNE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>E                   | 9 19 25 16 20 10 24 7 7 7 7 5 8 8 14 16 4 2 3 19 9 19 9 11 4 4 6 15 14 8 | Directif and velocit and velocit and velocit and velocit ENE. ENE. ESE. ESE. W.  | 17 28 17 17 12 23 7 9 6 6 7 16 14 24 1 19 17 8 15 15 15 15 10                                   | Direct and veloci cand veloci  | 18 24 16 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | Direct<br>ann<br>veloc<br>ENE,<br>ENE,<br>ENE,<br>ENE,<br>ENE,<br>VW,<br>NNE,<br>NNE,<br>NNW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW | 16 24 16 15 13 16 6 7 7 8 15 16 17 12 12 12 12 15 15 15 16 17 12 12 12 15 15 16 16 17 17 12 12 12 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16                                 | ENE. ESE. SW. NXE. ESE. XV. SSW. SSW. SSW. Caha.  | 16 24 17 16 12 24 4 9 5 7 7 16 15 11 15 11 12 12 16 16 16 16 16 16 16 16 16 16 16 16 16 | 13, 76<br>19, 87<br>15, 58<br>16, 50<br>14, 75<br>15, 68<br>17, 68<br>18, 80<br>10, 50<br>11, 90<br>12, 90<br>12, 90 |
| 1883,   1   May   1   May   2   May   3   May   4   May   6   May   6   May   10   May   10   May   11   May   12   May   13   May   14   May   15   May   16   May   17   May   18   May   17   May   18   May   18   May   18   May   19   May   17   May   18   May   18   May   18   May   19   May   | Direct and over the control of the c | 12 18 11 19 11 16 24 77 19 4 8 8 5 3 16 5 20 14 4 8 3 3 12 19 13 4 6 6 7 24 | Direct and velocity and velocit | 12 20 14 19 9 17 24 4 4 4 12 11 19 11 11 11 11 11 11 11 11 11 11 11  | Direct and velocit and velocit and velocit and velocit NE ENE E E E E E S. N. N. N. E. S. N. N. N. E. S. N. N. S. W. N. N. S. W. N. N. S. W. S. W. S.   | 166 21 16 17 6 18 17 7 5 19 7 7 16 7 7 24 3 18 10 14 12 20 14 4 4 4 4 4 4 8 3 3 | Direct and velocit end of the control of the contro | 16 16 24 16 29 11 18 14 12 10 10 25 17 12 20 6 4 15 12 2  | Direct and velocit tensor services with the services of the se | 177 244 144 200 15 12 20 144 1 1 1 2 5 3 23 23 11 8 6 6 6 10 1 1 2 6 6 10 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 | Direct and velocit was and velocit with the series of the  | 16 27 15 29 19 15 15 15 24 8 24 8 11 4 4 6 15 17 12 2 10 6 6 26 26                     | 7 p. m  Directic data and velocit energy ene | 24 10 7 8 10 11 12 24 10 7 8 10 11 12 2 7 6 15 12 15 12 15 12 7 | Directi<br>and<br>velocity<br>ENE.<br>ENE.<br>ESE.<br>ESE.<br>ESE.<br>ESE.<br>ENE.<br>W.<br>W.<br>N.N.E.<br>ENE.<br>ENE.<br>ENE.<br>ESE.<br>ENE.<br>ENE.<br>E | 19 25 16 20 10 24 77 75 5 8 14 16 16 24 13 19 9 11 4 6 15 14 8 8 6       | Direction of the control of the cont | 17 28 17 17 17 17 17 17 17 17 17 18 11 15 15 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | Direct and veloci and  | 18 24 16 17 13 24 6 6 7 7 7 16 24 1 17 10 110 12 2 8 16 16 10 5 5 7 9 21                           | Direct<br>ann<br>veloc<br>ENE,<br>ENE,<br>ENE,<br>ENE,<br>ENE,<br>VW,<br>NNE,<br>NNE,<br>NNW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW,<br>SSW | tion d 16 24 16 15 13 15 16 17 17 12 12 12 12 15 15 16 16 17 17 12 12 12 12 15 15 16 16 17 17 18 16 17 17 18 16 17 17 18 16 17 18 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | ENE ENE ENE ENE ENE ENE ENE ENE ENE ENE   | 16 24 16 12 24 4 4 4 4 4 4 15 15 11 15 11 12 10 4 6 5                                   | 13, 76<br>19, 87<br>15, 58<br>16, 50<br>14, 75<br>15, 68<br>17, 68<br>18, 80<br>10, 50<br>11, 90<br>12, 90<br>12, 90 |

Statement showing the direction and relocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

[Height of anemometer above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time, —5\(\frac{1}{2}\) 17". Velocity given in miles per hour

|  | 1 8. 1  | n.  | 2 a. n   | n.   | 3 a. n   | 11.  | 4 0. 11  | 3.   | 5 a. n  | ١.  | 6 s. n   | a.  | 7 n. n   | a.   | Na. n  | a.   | 9 a. m   |  | 10 a.  | m.   | 11.0   | . ni.  | N n  |  |
|--|---|---|--|--|--|--|--|--|---|---|--|---|--|--|--|--|--|--|--|--|--|--|--|--|
| Date.  | Direct<br>and<br>veloci   | l   | Direct<br>and<br>veloci  | l  | Direct<br>and<br>veloci  | 1  | Direct<br>and<br>veloci  |  | Direct  |   | Direct<br>and<br>veloci  |   | Direct:<br>and<br>velocit  |  | Direct<br>and<br>veloci  |  | Directi<br>and<br>velocit  |  | Direc<br>an<br>veloc   | d  | Dire<br>al<br>velo   | 10   | Direct   | 1  |
| 1883.<br>June 1<br>June 2<br>June 3<br>June 4  | NNE.<br>WNW.<br>NNW.  | . 12<br>. 13<br>. 7   | NNE.<br>NW.<br>NNE.<br>WNW.  | 11<br>14<br>5<br>6   | NNE,<br>NW.<br>NNE,<br>WNW.  | 8<br>9<br>4<br>7   | NNE.<br>NW.<br>NNE.<br>WNW.  | 8<br>12<br>4<br>7  | N.<br>NW.<br>NNW.   | 6<br>14<br>7<br>7   | N.<br>NNW.<br>NNW.   | 9<br>16<br>6<br>8   | N.<br>NW.<br>N.<br>WNW.  | 7<br>9<br>8<br>6   | N.<br>NNW<br>NNW.  | 7<br>10<br>9<br>7                                    | N.<br>NW.<br>NNW.<br>W.  | 10<br>7<br>7   | N.<br>NW.<br>N.<br>WSW.  | 8<br>8<br>6  | NNW<br>NW.<br>NW.  | 9 3  | NAW<br>NAW<br>NAW<br>NAW   | •  |
| June 5<br>June 7<br>June 8<br>June 9   | 88W.<br>WSW.<br>SW.<br>ENE.<br>E.   | 9<br>8<br>10<br>17  | WSW.<br>WSW.<br>ENE.<br>ENE.   | 8<br>5<br>13<br>17   | SSW.<br>WSW.<br>WSW.<br>ENE.<br>E.   | 6<br>4<br>12<br>19   | SW.<br>WSW.<br>ENE.  | 5<br>4<br>14<br>17   | S.<br>SSW.<br>WSW.<br>NE.<br>ENE.   | 6<br>2<br>14<br>17  | SSE.<br>S.<br>WSW.<br>ENE.<br>E.   | 5<br>4<br>1<br>13<br>15   | SSE.<br>S.<br>Calm.<br>ENE.<br>E.  | 10<br>12<br>18   | SE.<br>SSW.<br>NNE.<br>ENE.<br>E.  | 8<br>9<br>6<br>12<br>16                              | SE.<br>S.<br>N.E.<br>E.<br>D.  | 11<br>14<br>6<br>12<br>15  | SSE.<br>S<br>NE.<br>ENE.<br>E.   | 8<br>13<br>8<br>15<br>17   | SE.<br>S.<br>ENE.<br>ENE.<br>E.  | 12   | SI<br>L<br>ENE   | l.,  |
| June 10<br>June 11<br>June 12<br>June 13<br>June 14  | ESE.<br>ESE.<br>NE.<br>ENE.<br>NE.  | 13<br>6<br>15<br>14<br>21   | ESE.<br>E.<br>NNE.<br>ENE.<br>ENE.   | 11<br>8<br>14<br>14<br>20  | ESE.<br>ENE.<br>NNE.<br>ENE.<br>ENE.   | 10<br>8<br>13<br>13  | ESE.<br>E.<br>NNE.<br>ENE.<br>ENE.   | 11<br>8<br>12<br>11<br>20  | ESE.<br>ESE.<br>NNE.<br>ENE.<br>ENE.  | 11<br>6<br>12<br>12<br>20   | ESE.<br>NNE.<br>E.<br>LNE.   | 11<br>ti<br>14<br>11<br>16  | SE.<br>ENE.<br>NNE.<br>ESE.<br>ENE.  | 13<br>3<br>16<br>9<br>13   | SE.<br>E.<br>NNE.<br>USE.<br>UNE.  | 12<br>4<br>14<br>6<br>13                             | SE.<br>ENE.<br>N.<br>USE.<br>E.  | 10<br>6<br>12<br>7<br>12   | SE.<br>NNE.<br>N.<br>ESE.<br>E.  | 10<br>6<br>12<br>7<br>13   | SE,<br>NE,<br>NNE,<br>SE,<br>E,  | 8<br>6<br>10<br>9<br>14  | SE<br>NNE<br>NNE<br>SEL<br>ENE   |  |
| June 15<br>June 16<br>June 17<br>June 18<br>June 19  | ESE.<br>NNE.<br>NNE.<br>N.<br>E.  | 13<br>9<br>8<br>5<br>15   | ENE.<br>NE.<br>NNE.<br>N.<br>N.  | 13<br>9<br>6<br>4<br>16  | ENF<br>NNE.<br>NNE.<br>E.  | 11<br>10<br>5<br>9   | NNE.   | 14<br>8<br>4<br>9<br>14  | ENE.<br>NE.<br>NNE.<br>NNE.<br>ENE.   | 11<br>8<br>4<br>8<br>15   | ENE.<br>NE.<br>NNE.<br>NNE.<br>ENE.  | 10<br>6<br>5<br>8<br>14   | ENE.<br>NNE.<br>NNE.<br>NNE.<br>ENE.   | 6<br>6<br>8<br>16  | NE.<br>NNE.<br>NNE.<br>NE.<br>ENE.   | 7<br>6<br>3<br>10<br>13                              | NE.<br>NNE.<br>NNE.<br>NE.   | 7<br>8<br>5<br>10<br>13  | NE.<br>NNE.<br>NNE.<br>NNE.<br>ENE.                                      | 8<br>6<br>4<br>10<br>12  | ENE.<br>NE.<br>NNE.<br>NNE.<br>ENE.  | 11<br>6<br>5<br>10   | ENE<br>NE.<br>NE.<br>NE.   | 11 11 12   |
| June 20<br>June 21<br>June 22<br>June 23<br>June 24  | ENE.<br>NE.<br>NNE.<br>ENE.<br>ENE.   | 12<br>17<br>12<br>15<br>24  | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 12<br>17<br>14<br>12<br>28   | ENE.<br>NE.<br>NNE.<br>NE.<br>ENE.   | 12<br>17<br>12<br>15<br>28   | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 13<br>16<br>14<br>11<br>31   | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.   | 14<br>17<br>13<br>14<br>29  | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 11<br>16<br>12<br>14<br>29  | NE.<br>ENE.<br>NE.<br>NE.<br>ENE.  | 12<br>16<br>11<br>16<br>32   | ENE.<br>ENE.<br>NE.<br>ENE.<br>ENE.  | 11<br>14<br>13<br>17<br>30                           | ENE.<br>NE.<br>NE.<br>ENE.<br>UNE.   | 13<br>14<br>13<br>18<br>33   | ENE.<br>ENE.<br>ENE.<br>ENE.   | 13<br>12<br>14<br>16<br>31   | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 11<br>14<br>11<br>14<br>25   | NE.<br>NE.<br>ENE.<br>ENE.   | la<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La<br>La   |
| June 25<br>June 26<br>June 27<br>June 28<br>June 29  | ENE.<br>ENE.<br>ESE.<br>ENE.  | 32<br>23<br>10<br>17  | ENE.<br>ENE.<br>ESE.<br>E.   | 30<br>23<br>10<br>19<br>7  | ENE,<br>ENE,<br>ESE,<br>E,   | 28<br>23<br>10<br>16<br>7  | ENE.<br>ENE.<br>ESE.<br>NE.  | 18<br>22<br>9<br>14<br>9   | ENE.<br>ENE.<br>ESE.<br>ESE.  | 29<br>20<br>8<br>15<br>10   | ENE.<br>ENE.<br>ESE.<br>ESE.<br>E.   | 30<br>17<br>6<br>11<br>10   | ENE.<br>ENE.<br>SE.<br>ESE.<br>ESE.  | 27<br>19<br>3<br>12<br>10  | ENE.<br>ENE.<br>SE.<br>ESE.  | 26<br>18<br>3<br>7<br>8                              | ENE.<br>ENE.<br>SSE.<br>ESE.<br>SE.  | 23<br>19<br>5<br>8<br>8  | ENE.<br>ESE.<br>ESE.<br>SW.  | 23<br>20<br>4<br>11<br>12  | ENE.<br>ESE.<br>ESE.<br>SW.  | 27<br>19<br>8<br>9<br>5  | ENE<br>E.<br>E.<br>SE.<br>WSW.   | 5  |
| June 30  | ESE.  | 16  | SE.  | 1  | SSE.   | 12   | wsw.   | 14   | W.  | 1   | W8W.   | 6   | sw.  | 1  | SSW.   | 6  | ssw.   | в  | SW.  | 15   | SW.  | 16   | SW.  | 11   |
| Means .  | 12. 73  | 3 1   | 12. 33   | 3  | 12. 43   | 3  | 12. 20   | )  | 11.86   | 3   | 11.33  | 3   | 11. 16   | 8  | 10. 8  | 3  | 11. 36   |  | 11.  | 80   | 11.  | .33  | 11.3   | 0  |
|  |   |   |  |  |  |  |  |  |   |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1 p. n  | 1.  | 2 p. n   | 1.   | 3 p. n   | 1.   | 4 p. n   | 1.   | 5 p. n  | ,   | 6 p. n   | 1.  | 7 p. m   | la   | 8 p. m.  |  | 9 p. m.  | 10   | p. m.  | 11 p   | . m.   | 12 p.  | m.   |  |
| Date.  | I p. n<br>Directi<br>and<br>velocit   | on  | 2 p. n.<br>Directi<br>and<br>velocit   | on   | 3 p. n Directi and velocit   | ion  | 4 p. n  Directi  and  velocit  | on   | Directi<br>and<br>velocit   | on  | 6 p. n<br>Directi<br>and<br>velocit  | on  | 7 p. m<br>Directic<br>and<br>velocity  | on   | S p. m.  Direction and velocity  |  | 9 p. m.  Direction and velocity.   | Di   | p. m.<br>rection<br>and<br>locity.                                       | Dire   | ction<br>ud  | 12 p. Direct   | ion loc  | a :<br>in re-<br>city  |
| Date.  1883. June 1 June 2 June 3 June 4   | Directi   | on  | Directi  | on   | Directi<br>and   | ion  | Directi<br>and   | on   | Directi   | on  | Directi  | on  | Directic and   | on   | Direction and velocity  WSW.   | 15   5   10  | Direction<br>and   | Di ve  | rection<br>and<br>locity.  | Dire   | etion<br>ud<br>eity.   | Direct   | ion loc<br>ty.   | an re-   |
| 1883.<br>June 1<br>June 2<br>June 3  | Directi<br>and<br>velocit<br>NNW,<br>NNW,<br>NW,  | on<br>y.<br>6<br>8<br>4   | Directi<br>and<br>velocit<br>WNW.<br>NNW.  | 0n<br>y.<br>6<br>2<br>5  | Directi<br>and<br>velocit<br>W.<br>NW.   | ty.  | Directi<br>and<br>velocit<br>W.<br>WNW.<br>NNW.  | on y.  | Directi<br>and<br>velocit   | on<br>y.  | Directi<br>and<br>velocit<br>WSW.<br>NW.   | on<br>y.  | Directic and velocity  WSW. Calm.  | on<br>y.<br>12   | Direction and velocity  WSW. NNE. NNW. WSW. SSW. SSW. ENE.   | 15   15   16   17   17   17   17   17   17   17      | Direction<br>and<br>velocity.<br>WSW. 14<br>N. 4   | W. N. N. W.  | rection and locity.  13 3 1W. 8 8W. 2 W. 6 SW. 7 IE. 13                  | Dire<br>velo   | 15 4 8 3 7 11 14 14 14 14  | Direct<br>and<br>veloci<br>WNW<br>N.   | D: ion mea loo ty.   | 9.70<br>7.16<br>7.12   |
| 1883. June 1 June 2 June 3 June 4  June 5 June 6 June 7 June 8   | Directi<br>and<br>velocit<br>NNW.<br>NNW.<br>WSW.<br>SE.<br>S.<br>ENE.<br>E.  | 6 8 4 1 10 13 6 14  | Directi<br>and<br>velocit<br>WNW.<br>NNW.<br>NW.<br>SE.<br>S.<br>E.<br>E.  | on<br>y.<br>6<br>2<br>5<br>5<br>5<br>9<br>16<br>7<br>15                                | Directi<br>and<br>velocit<br>W.<br>NW.<br>NNW.<br>WSW.<br>SE.<br>S.<br>ENE.<br>E.  | 7 3 9 5 10 16 7 16   | Directi<br>and<br>velocit<br>W.<br>W.N.W.<br>N.N.W.<br>SE.<br>SS.W.<br>N.E.<br>E.  | on<br>y.<br>5<br>6<br>5<br>11<br>14<br>8<br>16                                 | Directi<br>and<br>velocit<br>W.<br>NW.<br>WNW.<br>WNW.<br>SSE.<br>SW.<br>ENE.<br>ENE.   | on<br>y.<br>11<br>3<br>7<br>4<br>10<br>8<br>9   | Directi<br>and<br>velocit<br>WSW.<br>NW.<br>NW.<br>WSW.<br>SSW.<br>SSW.<br>E.<br>E.  | on<br>y.<br>12<br>2<br>8<br>6<br>8<br>9   | Directic and velocity  WSW. Calm. NW. WNW. SSW. SSW. ENE. ENE.   | on<br>y.<br>12<br>11<br>4<br>8<br>7<br>12<br>15  | Direction and velocity WSW. NNE. NNW. WSW. SSW. SW. ENE. ENE. E. ESE. NNE. ENE. ENE. E.  | 7 5 10 11 11 11 11 11 11 11 11 11 11 11 11           | Direction and velocity.  WSW. 14 N. 4 WNW. 9 WNW. 2 SSW. 6 WSW. 8 ENE. 12 E. 16  | W. N. N. N. N. W. SS W. E.   | 13 3 3 3 3 3 3 3 4 W. 8 8 W. 2 W. 6 8 W. 7 (E. 13 17 E. 15 (E. 4         | Dire<br>R<br>velo<br>W.<br>N.<br>N.W.<br>W.<br>SSW.<br>SSW.<br>ENH   | ction ad city.   | Direct and veloci WNW N. WNW W. S. S.W. E.N.E.   | Definition less less less less less less less les  | 9.70<br>7.16<br>7.12<br>5.04<br>7.45<br>7.45<br>7.45<br>7.45<br>7.45   |
| June 1 June 2 June 3 June 4 June 5 June 6 June 7 June 9 June 10 June 11 June 12 June 13 June 12 June 13 June 14 June 1   | Directi<br>and<br>velocit<br>NNW.<br>NNW.<br>NSW.<br>SE.<br>S.<br>ENE.<br>E.<br>ENE.<br>SE.<br>NNE.<br>NNE.<br>NNE.   | 000 y. 6 8 4 1 1 10 10 10 10 10 10 10 10 10 10 10 10                        | Directi<br>and<br>velocit<br>WNW.<br>NNW.<br>W.<br>SE.<br>S.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>NNE.<br>NNE.   | 6 2 5 5 5 9 16 7 15 14 6 7 11 9  | Directi<br>and<br>velocit<br>W.<br>NW.<br>NNW.<br>WSW.<br>SE.<br>S.<br>ENE.<br>E.<br>ENE.<br>ENE.<br>NNE.<br>SE.   | 7 10 16 7 7 16 16 7 7 9 12   | Directi<br>and<br>velocit<br>W. WNW.<br>NNW.<br>SE.<br>SSW.<br>NE.<br>E.<br>E.NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.  | 9 5 6 5 5 11 14 8 16 17 6 6 8 8 10   | Directi<br>and<br>velocit<br>W.<br>WNW.<br>WNW.<br>SSE.<br>SW.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>NNE.<br>NNE.  | 111 3 77 4 10 8 9 14 18 6 10 7 15   | Directi<br>and<br>velocit<br>WSW.<br>NW.<br>NW.<br>WSW.<br>SSW.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>NNE.<br>NNE.  | on  | Directic and velocity WSW. Calm. NW. WNW. SSW. ENE. ENE. E. NNE. NNE. E. NNE. E. NNE. E. NNE. E. NNE. E. NNE. E. NNE. E. E. E. NNE. E. E. NNE. E. E. E. E. NNE. E.  12<br>11<br>4<br>8<br>7<br>12<br>13<br>15<br>18<br>8<br>12<br>11<br>17   | Direction and velocity  WSW. NNE. NNW. WSW. SSW. ENE. E.   | .   15   15   10   4   4   4   4   4   4   4   4   4 | Direction and velocity.  WSW. 14 N. 4 WNW. 9 WNW. 2 SSW. 6 BSE. 17 E. 5 NNE. 12 NNE. 12 E. 2 C.  | W. N. N. W. SSS. E. S. E. N. I. E. E. S. N. I. S | 13 3 3 3 3 4 W. 8 8 W. 2 2 W. 6 8 SW. 7 (TE. 13 15 KE. 4 VE. 14 12 19 13 | Dire  W. N. N. N. SSW. ENFE. ESE ENFE. ENFE. ENFE.   | ction and city.  | Direct and veloci  WNW N. WNW W. S. ENE. E. E. E. NE. NE. ENE.   | Decion lead to the lead of the | 9.75<br>7.16<br>7.16<br>7.16<br>7.16<br>7.16<br>7.16<br>7.16<br>7.16   |
| 1883. June 1 June 2 June 3 June 3 June 6 June 6 June 6 June 7 June 10 June 11 June 12 June 12 June 14 June 15 June 17 June 18  | Directi<br>and<br>velocit<br>NNW.<br>NNW.<br>WSW.<br>SE.<br>S.<br>E.NE.<br>E.NE.<br>SSE.<br>NNE.<br>NNE.<br>NNE.  | on y  | Directi<br>and<br>velocit<br>WNW.<br>NNW.<br>W.<br>SE.<br>S.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>SSE.<br>SS   | on<br>y.<br>6 2 5 5 5 9 16 7 7 15 14 6 6 7 11 9 15 10 7 6 6 11                         | Directi<br>and<br>velocit<br>W.<br>NW.<br>NNW.<br>WSW.<br>SE.<br>S.<br>ENE.<br>ENE.<br>ENE.<br>NNE.<br>SE.<br>ENE.<br>NNE.<br>N  | 7 10 16 16 17 7 18 16 16 17 7 12 16 11 8 7 12  | Directi<br>and<br>velocit<br>W. W.W.<br>W.W.<br>SE.<br>SSW.<br>N.E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>N.N.E.<br>E.<br>E.<br>N.N.E.<br>E.<br>E.<br>N.N.E.<br>E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>N.E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>E.<br>N.E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.  | 00 5 6 5 5 11 14 8 8 10 17 14 11 7 7 16  | Directi<br>and<br>velocit<br>W.<br>NW.<br>WNW.<br>WNW.<br>SSE.<br>ENE.<br>ENE.<br>ENE.<br>ENE.<br>ESE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E | 111 3 7 4 100 8 9 14 18 6 10 7 15 12 10 7 5 14  | Directi<br>and<br>velocit<br>WSW.<br>NW.<br>WSW.<br>SSW.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>NNE.<br>NNE.<br>NNE  | on y. 12   2   8   6   8   9   11   15   16   12   9   8   6   16   16   16   16   16   16          | Directic and velocity WSW. Calm. NW. WNW. SW. ENE. E. E. E. NNE. E. E. NNE. NNE. E. E. NNE. NNW. E. E. NNE. NN   | 12 11 4 8 7 12 15 18 8 12 11 17 13 10 11 6 17  | Direction and velocity WSW. NNE. NNW. WSW. SSW. SENE. ENE. NNE. ENE. ENE. NNE. ENE. NNE. ENE. NNE. NN | 7 7 8 100 1 10 10 10 10 10 10 10 10 10 10 10         | Direction and velocity.  WSW. 14 4 4 WNW. 2 8 WNW. 2 8 WNE. 12 8 8 10 EEE. 17 EE. 5 NNE. 12 EE. 11 NNE. 12 EN. 12  | W. W. N.   | 18 13 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16                       | Direction of the control of the cont | ction and city.  15 4 8 3 7 11 17 10 12 14 18 14 18 14 18 14 18 14 18 14 18 14 18 14 18 14 18 16 16 16 16 16 16 16 16 16 16 16 16 16 | Direct and veloci WNW N. WNW W. S. E.  | D: measing local line local lo | 9.75 8.00 C. 66 7.15 1.15 1.15 1.15 1.15 1.15 1.15 1.15  |
| 1883. June 1 June 2 June 2 June 3 June 5 June 5 June 6 June 7 June 10 June 10 June 11 June 10 June 13 June 13 June 14 June 15 June 14 June 15 June 17 June 18 June 18 June 20 June 20 June 21 June 20 June 21 June 20 June 22 June 22 June 23 June 24 June 26 June 27 June 27 June 28 June 29  | Directi<br>and<br>velocit<br>NNW.<br>NNW.<br>WSW.<br>8E.<br>8.<br>E.NE.<br>8.<br>E.NE.<br>8.<br>SE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.   | 000 y   | Directi<br>and<br>velocit<br>WNW.<br>NW.<br>W.<br>SE.<br>S.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>NNE.<br>NN  | 62<br>25<br>55<br>55<br>916<br>77<br>154<br>67<br>111<br>915<br>10<br>76<br>111<br>111 | Directifiand velocity N.W. N.W. N.W. W.S.E. E. E. E. E. E. E. N.E. E. N.E. E. N.E. E. N.E. E. N.E. E. N.E. E.   | 7 10 16 16 16 17 7 16 16 17 11 12 11 13 12 13 16   | Direction and velocity with wind wind with wind with wind with wind with wind with wind with wind with wind with wind with wind with wind with wind with wind wind with wind wind with wind wind wind with wind wind wind wind wind wind wind wind | 0 5 5 6 5 5 11 14 8 16 17 7 7 7 16 12 13 13 13 13 19                           | Directi and velocit W. W.W. W.W. SSE. ENE. ENE. ENE. ENE. ENE. ENE. NNE. ENE. NE.                             | 9 14 18 6 10 7 15 14 15 13 15 13 22 24 17   | Direction of the control of the cont | on y. 12 2 8 6 6 8 9 11 15 16 12 9 8 6 6 16 14 14 15 14 15 14 15 14 23                              | Directic and velocity WSW. Calm. NW. SSW. SSW. ENE. ENE. E. NNE. E. NNE. E. NNE. NNE   | 12<br>11<br>4<br>8<br>7<br>12<br>15<br>18<br>8<br>12<br>11<br>17<br>13<br>10<br>11<br>16<br>12<br>13<br>12<br>11<br>14   | Direction and velocity WSW. NNE. NNW. WSW. ENE. ENE. ENE. ENE. ENE. ENE. ENE. EN   | 7 7 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1             | Direction and velocity.  WSW. 14 N. 4   | W. N.  | rection and locity.  133   | Direct Research N. N. N. N. N. N. N. N. N. S. S. W. S. N. E. S. E.   | 15 4 8 8 8 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18  | Direct and veloci wnw N. W. W. W. W. S. S. W. E. E. E. E. N. E.  | D: measilos (15) 15 15 15 15 15 15 15 15 15 15 15 15 15  | andy state and the state of the   |
| June 2<br>June 3<br>June 4<br>June 3<br>June 5<br>June 6<br>June 7<br>June 6<br>June 10<br>June 10<br>June 11<br>June 13<br>June 13<br>June 14<br>June 14<br>June 14<br>June 14<br>June 15<br>June 19<br>June 20<br>June 21<br>June 22<br>June 23<br>June 23<br>June 23<br>June 25<br>June 2 | Direction and velocit | 0 8 4 1 1 10 13 6 6 6 6 11 13 14 11 11 18 8 5 11 11 11 11 13 36 20 20 21 15 | Directi<br>and<br>velocit<br>WNW.<br>NW.<br>W.<br>SE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>Nne.<br>Nne.<br>Nne.<br>Nne.<br>Nne.<br>Nne.<br>Nne.<br>Nne | 6 2 5 5 9 16 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                                       | Direction of the control of the cont | 7 7 8 9 5 10 16 16 16 16 16 16 17 7 12 11 13 12 11 12 11 15 15 15 15 14 15 15 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 | Direction www. 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EN  | 7 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1              | Direction and velocity, WSW. 14 W.N.W. 6 WNW. 2 SSW. 6 ESE. 17 ESE. 12 ESE. 17 ESE. 16 ESE. 17 ESE. 16 ENE. 12 ESE. 16 ENE. 11 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 WNE. 14 ESE. 26 ENE. 21 ESE. 21 ESE. 21 ESE. 22 ESE. 24 ESE. 24 ESE. 24 ESE. 24 ESE. 26 ESE. 26 ESE. 27 ESE. 27 ESE. 27 ESE. 28 ESE. 29 | W. W. W. SS W. E. S. E. S.   | rection and locity.  133   | Direction of the control of the cont | 15 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | Direct and veloci wnw. N. W. N. W. S. S. S. W. E. E. E. E. N. E. E. N. E. N. E. S. 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city given in miles per hour.

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rection Direction and and locity.

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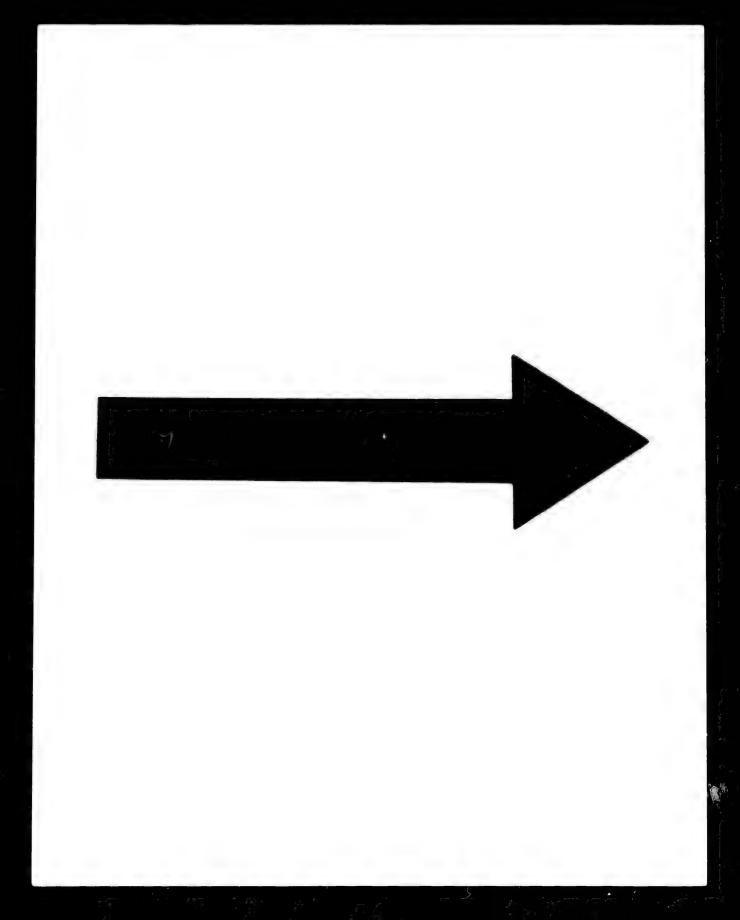
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24 EN 14 ES 20 E. 2. 8 NE 1. ES 10.40 7.7 3.5 11.62 13.61

# Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued.

Height of an emometer above surface of ground, 28 feet. Washington mean time. Correction to reduce to mean local time. —8h 17m. Velocity given in miles per hour.]

|  | 1 n. m   | la .   | 9 a. s   | n.   | 3 a. ı   | u.   | 4 a. n   | ì.  | 5 a. m   | 3.  | 6 a. n  | n.  | 7 a. m   | .   | 8 a. r   | 33.   | 9 a. m   |  | 10 n.  | 301.  | <b>11</b> n  | m. I   | 13   | m.   |
|--|--|--|--|--|--|--|--|---|--|---|---|---|--|---|--|---|--|--|--|---|--|--|--|--|
| Date.  | Directi<br>and<br>velocit  |  | Direct<br>and<br>veloci  |  | Direct<br>and<br>veloci  | Į.   | Direct:<br>and<br>velocit  |   | Directi<br>and<br>velocit  |   | Direct:<br>and<br>velocit   |   | Directi<br>and<br>velocit  |   | Direct<br>and<br>veloci  | }   | Directi<br>and<br>velocit  |  | Direc<br>and<br>veloc  | ů.  | Dire<br>at<br>velo   |  |  | etion<br>nd<br>neity.  |
| 1863.<br>Jul. 1<br>Hay 2<br>July 3<br>July 1   | SW.<br>ENE.<br>ESE   | 7<br>9<br>12<br>9  | WSW.<br>ENE.<br>ESE.<br>E.   | 6<br>9<br>12<br>8  | WSW.<br>ENE.<br>ESE.   | 3<br>8<br>10<br>7  | Calm.<br>ENE.<br>ESE.<br>E.  | 7<br>11<br>1  | Calm.<br>ENE.<br>ESE.<br>SW.   | 7 9   | Calm.<br>ENE.<br>ESE.<br>SW.  | 7<br>9  | WNW.<br>NE.<br>ESE.<br>SW.   | 6<br>11<br>5  | WNW.<br>NE.<br>E.<br>S'V.  | 3<br>7<br>10<br>5   | NNW.<br>ENE.<br>ESE.<br>SW.  | 2<br>7<br>12<br>5  | Calm.<br>E.<br>ESE.<br>SW.   | 9<br>7<br>4   | NNW<br>ESE.<br>ESE.<br>SW:   | . 2<br>12<br>8<br>6  | NNW<br>E<br>ESE.<br>SW.  | 7. 1<br>7.<br>5.<br>5.   |
| falls 5<br>3 dv 6<br>4 dv 7<br>4 dv 7  | WSW.<br>ENE.<br>ENE.<br>SE<br>W.   | 13<br>13<br>8<br>9   | WSW.<br>ENE.<br>E.<br>ESE.<br>W.   | 7<br>13<br>10<br>12<br>3   | WSW.<br>ESE.<br>S.<br>Calm.  | 13<br>10<br>12   | WSW.<br>ENE.<br>ENE.<br>S.<br>SSE.   | 9<br>13<br>9<br>17<br>1   | WSW.<br>E.<br>E.<br>S.<br>SE.  | 8<br>15<br>7<br>14<br>1   | WSW.<br>ENE<br>E.<br>S.<br>SE.  | 7<br>15<br>8<br>20<br>3                                       | WSW.<br>ENE.<br>ENE.<br>SW.<br>SE.   | 7<br>11<br>6<br>23<br>5   | WSW.<br>ENT.<br>ES'.<br>WSW.<br>NE   | 7<br>16<br>10<br>19<br>2  | WSW,<br>ENE,<br>ESE,<br>SW,<br>ENE,  | 6<br>18<br>10<br>21<br>6   | WSW.<br>ENE.<br>ESE.<br>WSW.<br>LNE.   | 5<br>18<br>11<br>22<br>5  | WSW<br>E.<br>ESE.<br>WSW<br>E.   | 19   | WSW<br>E.<br>SE.<br>WSW<br>E.  | 13   |
| July 10<br>July 11<br>July 12<br>Liv 13  | NNE.<br>NNE.<br>NNE.<br>ENE.<br>WSW.   | 0.4004.6   | NNE.<br>NNE.<br>NNE.<br>ENE.<br>WSW.   | 20<br>20<br>15<br>7  | NNE.<br>NNE.<br>NNE.<br>NE.<br>WSW.  | 20<br>19<br>14<br>5<br>5   | NNE.<br>NNE.<br>NNE.<br>ENE.<br>WSW.   | 20<br>20<br>14<br>5<br>3  | NNE.<br>NNI.<br>NE.<br>NE.<br>WNW.   | 19<br>18<br>12<br>1<br>3  | NNE.<br>NE.<br>NE.<br>ENE.<br>WSW.  | 20<br>16<br>12<br>5<br>3                                      | NNE.<br>NNE.<br>NNE.<br>ENE.<br>WSW.   | 22<br>19<br>11<br>5   | NNE.<br>NNE.<br>NNE.<br>E<br>SW.   | 23<br>19<br>11<br>4<br>4  | NNE.<br>NE.<br>NE.<br>E.<br>W.   | 23<br>23<br>11<br>3<br>4   | NNE.<br>NE.<br>II.<br>WNW  | 24<br>21<br>10<br>5   | NNE.<br>NE.<br>NE.<br>W.   | 29<br>20<br>9<br>5<br>4  | NNE<br>NE<br>NE<br>NE<br>WSW   |  |
| July 15<br>Luly 16<br>Luly 16<br>Luly 17<br>Luly 18<br>Luly 19   | NW.<br>N.<br>NNE.<br>ESE.<br>NE.   | 2<br>4<br>14<br>4  | ESE.<br>NNE.<br>ESE.<br>NNE.   | 2<br>5<br>12<br>6  | NNE.<br>NNE.<br>NNE.<br>E.<br>NE.  | 9<br>6<br>11<br>5  | NNE.<br>NNE.<br>NE.<br>ESE.<br>ENE.  | 5<br>9<br>6<br>13<br>4  | NNE.<br>NNE.<br>ENE.<br>ESE.<br>NNE.   | 3<br>9<br>3<br>11<br>8  | NNE.<br>NNE.<br>ENE<br>ESE.<br>NE.  | + 8 21 8 6  | NNE.<br>NNE.<br>ENE.<br>ESE.<br>ENE.   | 3 8 8 6   | NNE.<br>NE.<br>ENE<br>SE.<br>ESE.  | 12<br>3<br>8<br>9   | NNE.<br>NE.<br>ENE.<br>SE.<br>ESE.   | 6<br>12<br>4<br>7<br>5   | N.<br>NE.<br>ENE.<br>SE.<br>NE.  | 61<br>9<br>5<br>9   | NNE.<br>NNE.<br>ESE.<br>SE.<br>NE.   | 8<br>5<br>6<br>10  | N.<br>ENE.<br>SE.<br>ENE   | 5<br>C   |
| 1 dl. 29<br>1 dl. 21<br>1 dl. 22<br>July 23<br>July 24   | NE.<br>ENE.<br>ENE.<br>NNE.<br>NE.   | 20<br>13<br>12<br>15<br>13   | ENE.<br>NE.<br>NE.<br>NNE.<br>ENE.   | 19<br>12<br>13<br>16<br>13   | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 11<br>11<br>12<br>12<br>12   | E.<br>NE.<br>NE.<br>ENE.<br>ENE.   | 16<br>13<br>13<br>14<br>14  | ENE.<br>NE.<br>NE.<br>NE.<br>ENE.  | 17<br>11<br>8<br>15   | ENE.<br>ENE.<br>NE.<br>NE.<br>ENE.  | 16<br>11<br>13<br>14<br>12                                    | E.<br>NE.<br>NNE.<br>NE.<br>ENE.   | 16<br>10<br>13<br>11<br>12  | E.<br>ENE.<br>NE.<br>NNE.<br>ENE.  | 16<br>10<br>13<br>9   | E.<br>NE.<br>NNE.<br>NE.<br>ENE.   | 16<br>8<br>10<br>9   | E.<br>NNE.<br>NNE.<br>NE.<br>NE.   | 14<br>10<br>13<br>10<br>10  | E.<br>NNE.<br>NNE.<br>NNE.<br>ENE.   | 12<br>11<br>12<br>9  | E.<br>NE.<br>NNE<br>NNE<br>ENE   | . 8  |
| bilv 25<br>3, 26<br>1 6) 25<br>1 6) 28<br>1 6) 28  | ENE.<br>ENE.<br>E.<br>E.   | 10<br>12<br>16<br>21<br>26   | E.<br>E.<br>E.<br>ENE.   | 10<br>14<br>15<br>20<br>23   | ENE.<br>E.<br>E.<br>E.<br>ENE.   | 9<br>12<br>12<br>20<br>22  | NE.<br>E.<br>E.<br>NE.   | 8<br>12<br>10<br>22<br>21   | NE.<br>E.<br>E.<br>ENE.  | 0<br>9<br>10<br>18<br>20  | NE.<br>E.<br>ENE.<br>E.<br>ENE.   | 8<br>10<br>10<br>15<br>22                                     | NE.<br>E.<br>ENE.<br>E.<br>ENE.  | 7<br>10<br>12<br>17<br>22   | NE.<br>E.<br>E.<br>E.<br>ENE.  | 11<br>12<br>16<br>22  | NE.<br>E.<br>ENE.<br>E.<br>ENE.  | 8<br>11<br>12<br>16<br>22  | ENE.<br>ENE.<br>E.<br>ENE.   | 7<br>11<br>15<br>17<br>22   | NE.<br>ESE.<br>ENE.<br>E.<br>ENE.  | 7<br>10<br>16<br>19<br>24  | NNE<br>SE.<br>E.<br>ENE<br>NE.   | 17   |
| tily So<br>Jely St   | NE.<br>ENE.  | 20<br>20   | ENE.   | $\frac{20}{20}$  | ENE.   | $\frac{22}{21}$  | ENE.   | 19<br>19  | NE.<br>ENE.  | $^{19}_{18}$  | ENE.  | 17<br>19  | NE.<br>ENE.  | 10<br>21  | NE.<br>ENE.  | 16<br>20  | NE.<br>ENE.  | 19<br>20   | NE.<br>ENE.  | 18<br>19  | ENE.   | 18<br>20   | NE.<br>UNE   | 17<br>20   |
| Мерия.   | 12. 20   |  | 12.0   | 0  | 11. 0  | 6  | 11.10  | 3   | 10.2   | 5   | 10.5  | 1   | 10.93  | -   | 10. 9  | 16  | 10, 51   |  | 11.  | 20  | 11   | . 45 .   | 11   | 1. 19  |
|  |  |  |  |  |  |  |  |   |  |   |   |   |  |   | 1  |   |  |  |  |   |  | W-W  |  |  |
|  | 1 p. m   | la C   | 2 p. n   | n.   | 3 p. n   | n,   | 4 p. n   | i.  | 5 p. n   | - ·   | 6 р. п  | n.  | 7 p. m.  |   | i<br>  |   | 9 p. m.  | 10   | ) p. m.  | 11  | p. m.  | 12 p.  | m.   |  |
| Date.  | I p. m Directi and velocit   | on   | 2 p. n<br>Direct<br>and<br>veloci  | ion  | 3 p. n<br>Direct<br>and<br>veloci  | ion  | 4 p. n Directi   | lon   |  | ion   |   | ion   | 7 p. m. Directic and velocity  | )11<br>)11  | Directic   | on -  | 9 p. m.<br>Direction<br>and<br>velocity.   | Di   | p. m.<br>rection<br>and<br>locity.   | Dire  | ction  | 12 p.  Direct and veloci   | ion n  | Daily<br>lean ve<br>locity.  |
| Date.  July 1 July 2 July 3 July 4   | Directi<br>and   | on   | Direct   | ion  | Direct<br>and  | ion  | Direct<br>and  | lon   | 5 p. n<br>Directi  | ion   | 6 p. n Direct   | ion   | Direction and  | )11<br>)11  | Direction  | on<br>y.  | Direction<br>and   | Di<br>ve   | rection<br>and   | Dire  | ection<br>and<br>peity.  | Direct<br>and<br>veloci<br>ENE.<br>ESE<br>ENE.   | ion n  | ican ve  |
| July 1<br>July 2<br>July 3   | Directi<br>and<br>velocit<br>NNW.<br>ESE.<br>ESE.  | on<br>y.   | Direct<br>and<br>veloci:<br>NNW.<br>ESE.<br>SSW.   | ion ty.  | Direct<br>and<br>velocis<br>NNW.<br>ESE.<br>SW.  | ion<br>ty.   | Directi<br>and<br>velocit<br>N.<br>ESE.<br>WSW,  | 6<br>16<br>4  | 5 p. n  Directi and velocit  NNE. ESE. WSW.  | ion<br>ty.  | 6 p. n  Direct and velocit  NNE. ESE. WSW.  | ion<br>ty.  | Directic<br>and<br>velocity<br>NNE.<br>NW.   | on<br>v.  | Directic<br>and<br>velocity<br>ENE.<br>ESE.  | on<br>y.<br>11<br>2<br>3<br>9<br>9  | Direction<br>and<br>velocity.  | EN WEST WEST WEST WEST WEST WEST WEST WEST   | rection and locity.  | Dire<br>velo  | ection and specific s | Direct<br>and<br>veloci<br>ENE.<br>ESE<br>ENE.   | ion III<br>l<br>ty.  | 4.80<br>8.47<br>7.62   |
| July 1<br>July 2<br>July 3<br>July 4<br>July 5<br>July 6<br>July 8   | Directi<br>and<br>velocit<br>NNW.<br>ESE.<br>ESE.<br>SW.<br>WSW.<br>E.<br>ESE.<br>WSW.   | on<br>y.<br>1<br>13<br>5<br>4<br>3<br>20<br>16<br>24               | Direct<br>and<br>velocis<br>NNW.<br>ESE.<br>88W.<br>WSW.<br>WSW.<br>E.<br>WSW.<br>E.<br>WSSE.  | ion<br>ty.   | Direct<br>and<br>velocis<br>NNW.<br>ESE.<br>SW.<br>WSW.<br>WSW.<br>ESE.<br>SSE.  | ion<br>ty.<br>3<br>12<br>5<br>5<br>5<br>18<br>11<br>24   | Directi<br>and<br>velocit<br>N.<br>ESE.<br>WSW.<br>WSW.<br>W.<br>W.  | 6<br>16<br>4<br>5<br>15<br>12<br>22<br>13                               | Direction and velocity NNE. ESE. WSW. WSW. N. E. SSW. W.   | 8 9 6 7 5 11 16 18  | B p. n  Direct and velocit  NNE. ESE. WSW. N. E. S. WSW. NNE.   | 5 11 16 17 15   | Directic<br>and<br>velocity<br>NNE.<br>NW.<br>NNE.<br>E.<br>S.<br>WSW.   | on<br>r.<br>11<br>6<br>3<br>9<br>6<br>8<br>17<br>15                 | Direction and velocity  ENE. ESE. N. WSW. NNE. E. S. W. NE. NE. NE. NE.  | 9 8 13 15 16 8 6  | Direction and velocity.  ENE. 9 ESE. 7 N. 7 WSW. 9 NE. 11 NE. 8 SSE. 15  | EN ES NO W NI NI NI NI NI NI NI NI NI NI NI NI NI  | rection and docity.  VE. 9 NE. 8 SW. 9 NE. 14 E. 7 E. 13 SW. 13 NE. 18 NE. 21 NE. 21 NE. 26 NE. 21 NE. 26 NE. 21 NE. 26 NE. 21 NE. 26 NE. 21 NE. 26 NE. 27 NE. 27 NE. 28 NE. 21 NE. 26 NE. 27 NE. 28 NE. 21 NE. 26 NE. 27 NE. 28 N | E. ESH EN WS SEE W. NE.   | ection and socity.   | Direct<br>and<br>veloci<br>ENE.<br>ESE<br>ENE.<br>WSW<br>E.<br>E.<br>ESE.<br>W.  | ion II<br>ty.  | 4. 80<br>8. 47<br>7. 62<br>6. 59<br>7. 33<br>13. 37<br>11. 66<br>17. 41  |
| 18:3. July 1 July 2 July 3 July 5 July 5 July 5 July 8 July 9 July 10 July 11 July 12 July 12 July 12  | Directi<br>and<br>velocit<br>NNW.<br>ESE.<br>ESE.<br>WSW.<br>E.<br>ESE.<br>WSW.<br>E.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.  | on<br>y.<br>13554<br>32016<br>2413<br>24168<br>3                   | Direct<br>and<br>velocit<br>NNW.<br>ESE.<br>SSW.<br>WSW.<br>E.<br>SSE.<br>W.<br>E.<br>NNE.<br>NNE.<br>NNE.<br>NNE.   | tty.   | Direct<br>and<br>velocis<br>NNW.<br>ESE.<br>SW.<br>WSW.<br>ESE.<br>SSE.<br>W.<br>ENE.<br>NNE.<br>NNE.<br>NNE.  | 3 12 5 5 5 3 18 11 24 11 12 7 16 8 5 4 7 7   | Directi<br>and<br>velocit<br>N.<br>ESE.<br>WSW.<br>WSW.<br>W.<br>E.<br>S.<br>W.<br>ENE.<br>NNE.<br>NNE.  | 5 15 12 222 13 27 166 7 4 4 4   | 5 p. n  Directi and velocit  NNE. ESE. WSW. W. E. W. W. ENE. NNE. NNE. NNE. NNE.   | 5 11 16 18 14 24 17 8 8   | 6 p. n  Direct and velocity  NNE, ESE, WSW.  N, E. S.  WSW.   | 5 11 16 17 15   | Directic<br>and<br>velocity<br>NNE.<br>NW.<br>WSW.<br>NNE.<br>E.<br>WSW.<br>ENE.<br>NE.<br>NNE.<br>NE.<br>NNE.<br>WSW.   | 11<br>6<br>3<br>9<br>6<br>8<br>17<br>17<br>17<br>17<br>18<br>8<br>8 | Direction and velocity ENE. ENE. ENE. WSW. NNE. E. S. W. W. NNE. NNE. NNE. NNE. NNE. NNE. NN   | 11<br>2<br>3<br>9<br>9<br>8<br>13<br>15<br>16<br>16<br>8<br>6<br>6<br>2<br>7<br>7 | Direction and velocity.  ENE. 9 ESE. 7 N. 7 WSW. 9 NE. 11 NE. 8 SSE. 15 NNE. 18 NNE. 18 NNE. 18 NNE. 18 NNE. 7 WSW. 7 WSW. 6 WSW | EN WY NI MIN WY  | VE. 9 WE. 9 WE. 8 SW. 9 NE. 14 E. 7 E. 13 NE. 18 NE. 18 NE. 21 NE. 16 & 8  | E. ESH ENI WS E. N.           | ction and socity.  | Direct and veloci veloc | 10 10 8 10 10 14 9 16 8 18 20 16 8 4                                       | 4, 80<br>8, 45<br>8, 47<br>6, 50<br>7, 33<br>13, 65<br>17, 41<br>18, 75<br>10, 08<br>5, 08   |
| 1883. July 1 July 2 July 3 July 4 July 5 July 6 July 7 July 8 July 10 July 11 July 12 July 13 July 13 July 15 July 16 July 17 July 18 July 17 July 17 July 17 July 17 July 17 July 17 July 17 July 17 July 17 July 17 July 18  | Directi<br>and<br>velocit<br>NNW.<br>ESE.<br>ESE.<br>WSW.<br>E.<br>ESE.<br>WSW.<br>E.<br>NNE.<br>NNE.<br>NNE.<br>WSW.<br>NNE.<br>NNE.<br>WSW.<br>SE.<br>SE.  | on<br>y.<br>113554<br>2016424<br>13 2468336<br>58444               | Direct and velocit when the second well and velocit with the second with the s | ion 1 1 1 1 1 6 4 18 13 26 12 24 17 7 8 5 5 5 8 9 9 8 5 5                | Direct<br>and<br>velocity<br>NNW,<br>ESE,<br>SW,<br>WSW,<br>WSW,<br>WSW,<br>NE,<br>NNE,<br>NNE,<br>NNE,<br>WSW,<br>N. E.<br>ESE,<br>NNE,<br>NNE,<br>NNE,<br>NNE,   | 3 12 5 5 5 18 11 24 11 27 16 8 5 5 4 7 9 7 6   | Directi<br>and<br>velocit<br>N.<br>ESE.<br>WSW.<br>WSW.<br>W.<br>E.S.<br>W.<br>ENE.<br>NNE.<br>NNE.<br>NNE.<br>WNW.<br>W.  | 6 16 4 5 5 15 12 22 21 3 27 16 7 4 4 4 8 10 9 9 9                       | Direction and velocit with the velocit with the velocit with the velocit with the velocity with the ve | 8 9 11 8 9 11 8   | 6 p. n  Direct and velocit  NNE. ESE. WSW. WSW. N. E. S. WSW. N. N. E. N. N. E. N. N. E. N. N. E. N. W. W. N. W.          | 8 5 6 8 5 11 16 17 15 28 16 7 6 5 5 8 8 8 12 0                | Directic and velocity  NNE. NW. WSW. NNE. E. S. WSW. ENE. W'. WNW. N. E. E. N. WNW. N. E. E. N. WNW. N. E. E. N. E. E. N. WNW. N. E.   | 000 000 000 000 000 000 000 000 000 00                              | Directic and velocity | 9 8 13 15 16 24 16 8 6 6 2 7 7 7 12 6 16 16 16                                    | Direction and velocity.  ENE. 9 ESE. 7 N. 15 N.E. 11 N.E. 15 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 16 N.E. 18 E. 15 N.E. 18 E. 15 N.E. 18 E. 15 N.E. 18 E. 15 N.E. 18 E. 15 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 E. 18 N.E. 18 N.E. 18 E. 18 N.E. 18 N.E. 18 N.E. 18 E. 18 N.E.  | ESS NOW NOT SEE THE SE | Trection and docity.  NE. 9 SNE. 9 SNE. 9 SNE. 8 SW. 9 SNE. 18 SW. 18 NE. 18 NE. 18 NE. 16 KNE. 18 KNE. 16 KNE. 18 KNE | E. ESSEEN WS E. N.            | ection mid petity. 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  | Direct and veloci veloci veloci ENE. ESE ENE. WSW E. ESE. W. W. MNE. NNE. NNE. WSW NNE. N.**   | 10 10 10 10 10 10 10 10 10 10 10 10 10 1                                   | 4. 80<br>8. 47<br>7. 62<br>6. 50<br>11. 66<br>17. 75<br>11. 66<br>17. 75<br>10. 08<br>5. 08<br>4. 12<br>5. 79<br>8. 50<br>7. 62  |
| Jes5, July 1 July 2 July 3 July 4 July 5 July 6 July 6 July 8 July 9 July 10 July 11 July 12 July 15 July 16 July 17 July 18 July 19 July 19 July 19 July 20 July 20 July 20 July 20 July 20 July 20 July 20 July 22 July 24 J | Directi<br>and<br>velocit<br>NNW.<br>ESE.<br>SW.<br>ESE.<br>WSW.<br>E.<br>NNE.<br>NNE.<br>NNE.<br>WSW.<br>NE.<br>SE.<br>NE.<br>SE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>NE.<br>N   | on<br>y.<br>13554<br>32016<br>2416<br>2416<br>2416<br>24111<br>158 | Direct and velocic NNW. ESE. SSW. WSW. E. SSE. W. E. NNE. NNE. NNE. WSW. ENE. ENE. ENE. ENE. ENE. NNE.   | 1 11 1 6 4 18 13 26 5 12 24 10 19 8                                      | Direct and velocity and velocity with the control of the control o | don<br>12<br>5<br>5<br>5<br>3<br>18<br>11<br>24<br>11<br>27<br>7<br>6<br>6<br>14<br>16<br>12<br>17<br>17<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18 | Direction of the control of the cont | 5 15 12 222 13 27 166 7 7 4 4 4 8 10 9 9 16 18 10 18 7                  | Directi<br>and<br>velocit<br>NNE.<br>ESE.<br>WSW.<br>W.<br>ENE.<br>NNE.<br>NNE.<br>NNE.<br>NNE.<br>NE.<br>ESE.<br>NNW.<br>ENE.<br>ESE.<br>NNE.<br>NE.<br>NNE.<br>NE.<br>NNE.<br>NE.<br>NNE.<br>N   | 5 11 16 18 14 17 8 8 9 11 1 8 16 18 12 18 8 8   | 6 p. n<br>Direct<br>and<br>veloch<br>NXE.<br>ESE.<br>WSW.<br>V.<br>W. S.<br>WSW.<br>NYE.<br>S.<br>NYE.<br>NYE.<br>NYE.<br>NYE.<br>NYE.<br>NYE.<br>NYE.<br>NYE | 8 5 6 8 8 8 12 6 6 13 10 6                                    | Directic and velocity NNE. NW. NW. NNE. E. WSW. NNE. NE. NNE. NE. NNE. NNE. E. NNE. NNE. E. NNE. E. NNE. E. NNE. NN. | 99 6 87 7 15 16 14 18 8 6 17 15 16 14 18 8 7                        | Directic and velocity.  ENE. ESE. WSW. NNE. S. WSW. NNE. NNE. NNE. NNE. NNE. NNE. NNE. NN  | 9 9 8 13 15 16 24 16 16 16 13 18 10 12 12 16                                      | Direction and velocity.  ENE. 9 ESE. 7 N. 7 WSW. 9 NE. 11 N. 15 N. 15 N. 16 N. 16 N. 17 WSW. 3 N. 16 N. 18 N | EXENT MANAGENER EXECUTION OF EX | rection and locity.  1.  | E. E. S. E. E. S. S. E. W. N. | ection and beity. 11 10 11 11 11 11 11 11 11 11 11 11 11   | Direction of the control of the cont | ion II tyy.  10 8 10 10 114 9 10 10 8 18 18 7 6 6 15 5 5 17 13 111 111 111 | 4, 85<br>8, 45<br>7, 62<br>6, 7, 62<br>11, 66<br>17, 41<br>17, 87<br>10, 68<br>5, 68<br>4, 12<br>5, 70<br>11, 66<br>11, 75<br>11, 66<br>11, 75<br>11, 66<br>11, 67<br>11, 67<br>11, 67   |
| 18:53,   July   1   July   2   July   3   July   4   July   5   July   6   July   7   July   9   July   10   July   11   July   12   July   12   July   13   July   14   July   15   July   16   July   17   July   18   July   19   July   10   Jul   | Direction of velocity and veloc | on y   | Direct and velocity and velocit | tty.  1 1 1 1 6 4 18 13 26 12 24 17 8 5 5 5 12 14 10 19 8 6 6 9 11 17 21 | Direct and velocity and velocit | 3 3 12 5 5 5 3 8 11 24 4 11 1 27 7 6 6 14 12 117 9 7 7 6 12 18 8 23 23   | Directi and velocit and velocit and velocit and velocit N. ESE. WSW. WSW. WSW. E. S. WS. E. ESE. N. S. ESE. N. S. E.   | 6 10 4 5 5 15 12 22 22 13 27 4 4 4 8 10 9 9 16 18 10 18 7 9 12 15 20 23 | Direction of the control of the cont | 5 11 16 18 14 24 17 8 8 9 11 1 8 16 18 12 11 18 12 11 18 18 18 18 18 18 18 18 18 18 18 18 | 6 p. n.  Direct and velocit  NYE. ESE. WWW. WSW. Y. E. NYE. NYE. NYE. NYE. NYE. NYE. NY   | 8 5 6 8 8 8 11 16 17 15 5 8 8 8 12 2 8 13 19 6 10 10 15 22 22 | Directic and velocity and velocity NNE. NW. NNE. S. WSW. ENE. N. N. E. N. N. E. N. N. E. E. N. N. E. E. N. N. E. E. N. N. E. N. N. E. E. N. N. E. E. N. N. E. E. N. N. N. E. E. E. N. N. N. E. E. E. E. N. N. N. E.  | 000 000 000 000 000 000 000 000 000 00                              | Direction of the control of the cont | 9 8 13 15 16 24 6 6 2 12 6 16 16 13 18 10 12 12 16 6 23 22                        | Direction and velocity.  ENE. 9 ESE. 7 V. V. V. V. V. V. V. V. V. V. V. V. V.  | EXERCISE EXECUTE EXECU | rection and clocity.  VE. 9 SER. 9 SE | E. SEENS SEENS N. S.          | -ction and below the second se | Direction of the control of the cont | ion H 10 8 10 10 10 10 10 10 10 10 10 10 10 10 10                          | 4. 8. 4. 7. 62 6. 7. 301 13. 66 11. 55 66 11. 35 11. 35 6. 11. 35 11. 35 6. 11. 35 11. |



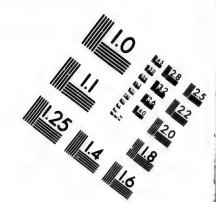
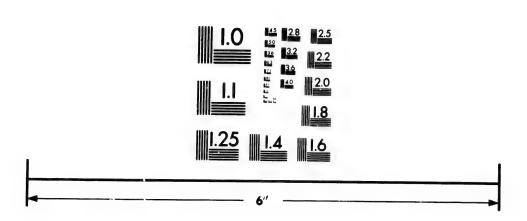


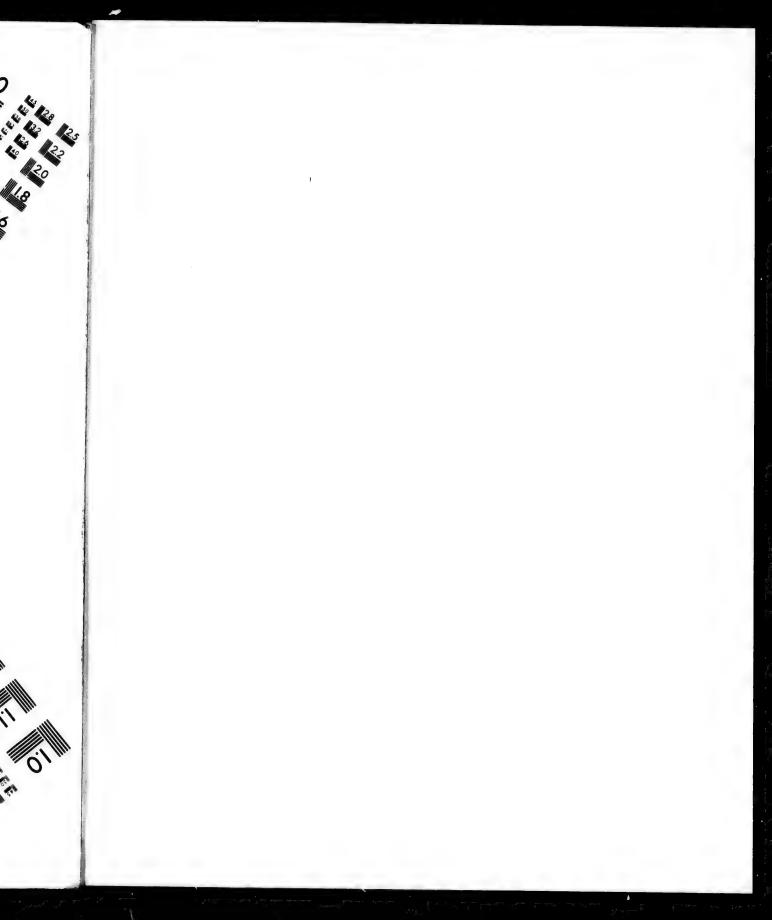
IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

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Statement showing the direction and velocity of the wind at Uglaamie from October, 1881, to August, 1883-Continued,

| [Height of anemometer above surface of ground, 28 feet. | Washington mean time. | Correction to reduce to mean local time, -5h 17m. | Velocity given in miles per hour. |
|---|-----------------------|---|-----------------------------------|
|   |                       |   |                                   |

|  | 1 a.   | m.   | 2 a.   | m.   | 3 a.   | m.   | ' I a. 1  | n.   | 5 a.   | m.   | 6 a. 1  | na.  | 7 a. 1   | m.   | 8 a. n   | n.  | 9 a. n   | n.  | 10 a.  | m.   | 11   | a. m.   | 12   | tal.  |
|--|--|--|--|--|--|--|---|--|--|--|---|--|--|--|--|---|--|---|--|--|--|---|--|---|
| Date.  | Direction and velocity   | 1  | Direc<br>and<br>veloc  | ıl.  | Direc<br>and<br>veloc  | 1  | Direct<br>and<br>veloci   | l  | Direct<br>and<br>veloci  | 1  | Direct<br>and<br>veloci   | l  | Direct<br>and<br>veloc   | ì  | Directi<br>and<br>veloci   |   | Directi<br>and<br>velocit  |   | Direc<br>800<br>veloc  | d .  | a  | ection<br>nd<br>ocity,  | Dire<br>an<br>velo   | td.   |
| 1883.<br>Aug. 1<br>Aug. 2<br>Aug. 3  | ENE.   | 19<br>15<br>14   | ENE.<br>E.<br>E.   | 18<br>14<br>14   | ENE.<br>E.<br>ESE.   | 20<br>13<br>13   | ENE.<br>E.<br>ESE.  | 19<br>12<br>13   | ENE.<br>E.   | 19<br>12<br>10   | ENE.<br>ESE.<br>ESE.  | 19<br>12<br>12   | ENE.<br>ESE.<br>E.   | 19<br>9<br>12  | ENE.<br>E.<br>ESE.   | 18<br>9<br>14                             | ENE.<br>E.<br>ESE.   | 18<br>8<br>13   | ENE.<br>E.<br>ESE.   | 18<br>9  | ENE<br>E.<br>E.  | · 20<br>7<br>15   | ENE.<br>E.<br>ESE.   | 18<br>8<br>15   |
| Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8   | NE.<br>NE.<br>ESE.   | 20<br>19<br>23<br>16<br>11                               | E.<br>NE.<br>NE.<br>E.<br>ESE.   | 23<br>20<br>24<br>15<br>9  | ESE.<br>NE.<br>NE.<br>USE.<br>SE.  | 20<br>24<br>16<br>10   | E.<br>ENE.<br>NE.<br>FSE.<br>SE.  | 20<br>24<br>23<br>15<br>7  | ESE.<br>ENE.<br>NE.<br>ESE.<br>SSE.  | 20<br>22<br>24<br>16<br>10   | ESE.<br>NE.<br>ESE.<br>SSE.   | 19<br>20<br>24<br>15<br>8  | ESE.<br>ENE.<br>ESE.<br>SSE.   | 19<br>21<br>20<br>13<br>9  | E.<br>ENE.<br>ESE.<br>SSE.   | 19<br>20<br>20<br>15<br>8                 | E.<br>NE.<br>ENE.<br>ESE.<br>SSE.  | 19<br>18<br>20<br>16<br>9   | E.<br>NE.<br>NE.<br>ESE.<br>S.   | 20<br>18<br>19<br>17<br>8  | ESE.<br>NE.<br>ENE<br>SE.<br>S.  | . 19<br>18<br>20<br>17  | E.<br>NE.<br>NE.<br>SE.<br>S.  | 2:<br>20<br>18<br>17  |
| Aug. 9<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13   | ESE.   | 9<br>13<br>18<br>6<br>9                                  | ESE.<br>SW.<br>ESE.<br>ENE.  | 9<br>11<br>12<br>10  | ESE.<br>SW.<br>SE.<br>E.   | 8<br>9<br>11<br>15<br>6  | ESE,<br>E.<br>SW.<br>SE,<br>E.  | 10<br>8<br>12<br>11<br>9   | ESE.<br>SW.<br>SE.<br>E.   | 0<br>5<br>10<br>8<br>8   | ESE.<br>ESE.<br>ESE.  | 8<br>6<br>8<br>11  | ESE.<br>ESE.<br>SW.<br>ESE.<br>ESE.  | 5<br>8<br>6<br>10<br>15  | ESE.<br>ESE.<br>SW.<br>ESE.<br>E.  | 10<br>13<br>3<br>11<br>11                 | ESE.<br>E.<br>SW.<br>ESE.<br>E.  | 10<br>13<br>3<br>10<br>5  | SE,<br>ESE,<br>SW,<br>ESE,<br>E.   | 10<br>13<br>2<br>10<br>7   | SE.<br>ESE.<br>Calm<br>E.  | 7<br>12<br>4<br>9   | SE.<br>SE.<br>NW.<br>ESE.<br>E.  | 7<br>14<br>1<br>10<br>10  |
| Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18  | NNE.<br>SW.<br>S.<br>E.<br>SSE.  | 8<br>6<br>13<br>12                                       | NNE.<br>SW.<br>SSW.<br>ENE.<br>ESE.  | 7<br>4<br>13<br>12   | NE.<br>SW.<br>SSW.<br>ENE.<br>ESE.   | 9<br>5<br>2<br>12<br>12  | NE.<br>SW.<br>SW.<br>E.<br>E.   | 10<br>3<br>6<br>8<br>8   | NE.<br>SW.<br>SSW.<br>E.<br>ESE.   | 4<br>5<br>6<br>9   | NE.<br>SSW.<br>E.<br>ENE.   | 3<br>9<br>3<br>10  | NE.<br>S.<br>SSW.<br>ESE.<br>ESE.  | 7<br>4<br>10<br>1<br>12  | NNE.<br>SW.<br>SW.<br>SSW.<br>NE.  | 6<br>4<br>7<br>3                          | NE.<br>SW.<br>W.<br>W.   | 8<br>1<br>5<br>22<br>16   | ENE.<br>SSE.<br>W.<br>W.<br>NNE  | 7<br>1<br>4<br>23<br>22  | E.<br>ENE<br>W.<br>W.<br>NNE   | 3<br>25   | E.<br>E.<br>N.<br>W.   | 9<br>8<br>5   |
| Aug. 19<br>Aug. 20<br>Aug. 21<br>Aug. 22<br>Aug. 23  | N.<br>ESE.<br>ENE.<br>NNE.<br>WSW.   | $\begin{array}{c} 20 \\ 7 \\ 30 \\ 14 \\ 20 \end{array}$ | N.<br>E.<br>ENE.<br>NNE.   | 17<br>12<br>29<br>12<br>21   | N.<br>ESE.<br>ENE.<br>N.<br>SW.  | 19<br>14<br>19<br>10<br>25   | NNW.<br>E.<br>ENE.<br>NNW.<br>SW.   | 19<br>15<br>30<br>4<br>25  | NNW.<br>E.<br>NE.<br>NNW.<br>SW.   | 16<br>16<br>20<br>3<br>24  | NNW.<br>E<br>NE.<br>NW.<br>SW.  | $\frac{14}{18}$ $\frac{29}{25}$                                    | N.<br>E.<br>NE.<br>NW.<br>SW.  | 14<br>20<br>30<br>5<br>24  | N.<br>ESE.<br>NE.<br>WNW.<br>WSW.  | 14<br>21<br>29<br>7<br>24                 | N.<br>ESE.<br>NE.<br>WNW.<br>WSW.  | 13<br>22<br>28<br>6<br>25   | NNW.<br>ESE.<br>NE.<br>WNW<br>WSW.   | 10<br>23<br>30<br>7<br>25  | NNV<br>E.<br>NE.<br>W.   | 7. 11<br>25<br>30<br>10<br>25   | N.<br>E.<br>NE.<br>W.  | 12<br>27<br>28<br>10<br>26  |
| Aug. 24<br>Aug. 25<br>Aug. 26<br>Aug. 27*  | SW.<br>NE.<br>SSE.<br>NE.  | 30<br>10<br>22<br>7                                      | SW.<br>NE.<br>S.<br>N.   | 29<br>7<br>20<br>4   | SW.<br>NE.<br>SSW.<br>NNE.   | 29<br>3<br>21<br>8   | SW.<br>ENE.<br>SSW.<br>NE.  | 28<br>21<br>21<br>7  | SW.<br>ESE.<br>SSW.<br>L.  | 29<br>3<br>32<br>5   | SW.<br>ESE.<br>SW.<br>E.  | 33<br>2<br>32<br>9   | SW.<br>SE.<br>SW.<br>ESE.  | 32<br>4<br>23<br>10  | SW.<br>SSE.<br>SW.<br>ESE.   | 30<br>6<br>32<br>13                       | SW.<br>SSE.<br>SW.<br>ESE.   | 30<br>9<br>28<br>13   | WSW.<br>S.<br>WSW.<br>ESE.   | 30<br>10<br>34<br>16   | WSW<br>SSE,<br>W.<br>ESE.  | 7. 29<br>12<br>28<br>18   | WNV<br>8SE.<br>W.<br>ESE.  |   |
| Means  | . 14.7   | 7  | 14. 2  | 2  | 14. 2  | 5  | 13. 77  | ī  | 13. 2  | 9  | 13, 40  | )  | 13. 4  | 0  | 14.00  | )   | 14. 37   | !   | 15, 1  | 1  | 15   | . 33  | 15   | .77   |
|  | Tel 1000 100   |  |  |  |  |  |   |  |  |  |   |  |  |  |  |   |  |   |  |  |  |   |  |   |
|  | 1 p. m   | '<br>h '   | 2 p. n   | n. :   | 3 p. n   | n.   | 4 p. m  | l.   | 5 p. n   |  | 6 p. n  | ı. İ   | 7 p. m   | ı. j   | S p. m.  | -21                                       | 9 p. m.  | 10  | p. m.  | 11 p.  | m.   | <br>12 p.   | <br>m.   |   |
| Date.  |  | ion  | 2 p. n<br>Direct<br>and<br>velocit   | ion  | 3 p. n<br>Direct<br>and<br>veloci  | ion  | 4 p. m Directi  | ion  |  | i.<br>iou  | 6 p. n<br>Directi<br>and<br>velocit   | on   | 7 p. m<br>Directi<br>and<br>velocit  | on   | S p. ta.  Direction and velocity.  |   | 9 p. m.  Direction and velocity.   | Dir   | p. m.<br>ection<br>and<br>locity.  | Direct an veloci   | tion<br>d  | 12 p.  Direct   | ion "  | Daily<br>lean ve-<br>ocity,   |
|  | Directi  | ion  | Direct<br>and  | ion  | Direct   | ion  | Directi   | ion  | 5 p. n<br>Direct   | i.<br>iou  | Directi<br>and  | on   | Directi<br>and   | on<br>y.<br>19   | Direction and velocity.  | <br>17 1                                  | Direction<br>and   | Dir   | ection   | Direc  | tion<br>d  | Direct  | ion "  | ean ve.   |
| Date.  1883. Aug. 1 Aug. 2   | Directi<br>and<br>velocit<br>ENE.  | 20<br>10<br>15<br>21<br>21<br>20                         | Direct<br>and<br>velocit   | ion<br>ty.   | Direct<br>and<br>veloci  | ty.  | Directi<br>and<br>velocit<br>ENE.   | ion<br>y.<br>20<br>10  | Direct<br>and<br>velocit<br>E.   | ion<br>ty.   | Directi<br>and<br>velocit<br>E.   | ion<br>y.<br>16<br>10  | Directi<br>and<br>velocit<br>E,<br>E.  | 19<br>11<br>19<br>21<br>22<br>20<br>15   | Direction and velocity.  E. E. E. S. | 17<br>10<br>20<br>19<br>19<br>21          | Direction<br>and<br>velocity.<br>E. 18<br>E. 12  | Dir<br>ve   | ection<br>and<br>ocity.<br>17<br>12<br>23<br>E. 18   | Direct an velocity ENE   | tion<br>d<br>city.   | Direct<br>and<br>veloci   | ion <sup>B</sup>   | lean've-<br>locity.   |
| 1883.<br>Aug. 1<br>Aug. 2<br>Aug. 3<br>Aug. 4<br>Aug. 5<br>Aug. 7  | Directi<br>and<br>velocit<br>ENE.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E   | 20<br>10<br>15<br>21<br>21<br>20<br>22<br>6              | Direct and velocit  ENE. E. E. NNE. ENE.   | 20<br>8<br>17<br>21<br>22<br>20  | Direct<br>and<br>veloci<br>ENE,<br>E.<br>E.<br>NNE,<br>ENE,<br>SSE,  | 20<br>9<br>18<br>20<br>23<br>17<br>21                                    | Directi<br>and<br>velocit<br>ENE.<br>E.<br>E.<br>NE.<br>ENE.<br>SE.   | 20<br>10<br>10<br>20<br>25<br>18   | Direct<br>and<br>velocit<br>E.<br>E.<br>ESE.<br>E.<br>NE.<br>E.<br>SSE.  | 18<br>9<br>18<br>17<br>25<br>19<br>21  | Directi<br>and<br>velocit<br>E.<br>E.<br>E.<br>E.<br>SSE.   | 16<br>10<br>17<br>18<br>24<br>19                                   | Directi<br>and<br>velocit<br>E.<br>E.<br>E.<br>E.<br>NE.<br>ESE.<br>SSE.   | 19<br>11<br>19<br>21<br>22<br>20<br>15<br>3  | Direction and velocity.  E. E. SE. SE. N. ESE. N. SSW. SNW. SNW. SNW. SNW. SNW. SNW.   | 17 10 10 10 10 10 10 10 10 10 10 10 10 10 | Direction and velocity.  E. 18 E. 12 E. 22 E. 18 NE. 23 E. 17 E. 17  | Dir<br>vel<br>E.<br>E.<br>E.<br>E.<br>NE  | ection and locity.  17 12 23 E. 18 24 17 17 15 5 E. 20 E. 9 10   | Direct an velocity ENE ESE. E. ENE NE. E. E.   | tion d ity.  | Direct<br>and<br>veloci<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E. | 15 13 20 19 23 17 11   | 18.37<br>10.55<br>10.55<br>10.79<br>19.75<br>21.74<br>19.74   |
| Date.  1883. Aug. 1 Aug. 2 Aug. 3 Aug. 6 Aug. 6 Aug. 6 Aug. 8 Aug. 8 Aug. 11 Aug. 11 Aug. 11   | Direction and velocity the second velocity the | 20 10 15 21 21 22 6 6 9                                  | Direct and velocit ENE. E. E. E. NNE. ENE. SE. SW. SE. SW. ENE. ENE. ENE. ENE. ENE. ENE. ENE. EN   | 20<br>8<br>17<br>21<br>22<br>22<br>22<br>25<br>11<br>11<br>8<br>9                      | Direct and veloci ENE. E. E. E. NNE. ENE. SSE. SSE. ESE. SE. SE. SE.   | 20<br>9<br>18<br>20<br>23<br>17<br>21<br>5                               | Directi<br>and<br>velocit<br>ENE.<br>E.<br>E.<br>NE.<br>ENE.<br>SE.<br>WSW.<br>ESE.<br>SSE.<br>ESE.<br>SSE.   | 20<br>10<br>10<br>10<br>20<br>25<br>18<br>22<br>5<br>10<br>9<br>8<br>6                 | Direct and velocity E. E. E. E. SSE. E. SSE. WSW. E. SW. E. E. E. E. E. E. E. E. E. E. E. E. E.  | 18 9 18 17 25 19 21 4 10 9 12 7 7  | Directi<br>and<br>velocit<br>E.<br>E.<br>NE.<br>E.<br>WSW.<br>ESE.<br>SW.<br>E.<br>WSW.   | 16<br>10<br>17<br>18<br>24<br>19<br>19<br>2<br>13<br>12<br>12<br>8 | Directi<br>and<br>velocit<br>E. E.<br>E. E.<br>NE. ESE.<br>SSE.<br>WSW.<br>ESE.<br>SW. E.<br>WSW.                      | 19<br>11<br>19<br>21<br>22<br>20<br>15<br>3<br>12<br>12<br>12<br>14<br>11  | Direction and velocity.  E. HENE IE. SE. SE. N. SE. N. SE. N. SE. N. N. E. SSW. N. N. E. S. N. N. E. S. N. N. E. S. N. N. E. S. N. S. S. N. S. S. S. N. S. S. S. S. S. S. S. S. S. S. S. S. S.   | 17 10 10 10 10 10 10 10 10 10 10 10 10 10 | Direction and velocity.  E. 18 E. 12 E. 22 E. 28 E. 17 E. 10 N. 4  ESE. 12 SW. 24 ENE. 12 ENE. | E. E. E. N. E. E. N. E. S. W. N. N. N. N. N. E. S. E. S. W. E. S. W. N. N. N. N. E. S. E. S. W. E. S. W. E. S. W. E. S. W. N. N. N. N. N. E. S. E. S. W. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. W. E. S. W. E. S. W. W. E. S. W. E. S. W. E. S. W. W. E. S. W. | 17<br>12<br>23<br>E. 18<br>24<br>17<br>12<br>5<br>E. 24<br>17<br>12<br>5<br>E. 12<br>20<br>E. 9              | ENE ESE. E. ENE ESE. E. ENE ENE ENE ENE ENE ENE ENE ENE EN   | tion d ity.  | Direct<br>and<br>veloci<br>E.<br>E.<br>E.<br>E.<br>ESE.<br>E.<br>ESE.<br>ESE.<br>SW.<br>ESE.<br>N.E.  | 15 13 20 49 23 17 11 8 12 16 11 9  | 18.55<br>19.58<br>19.58<br>19.75<br>21.49<br>19.75<br>6.77<br>10.12<br>25.85<br>6.77  |
| 1883. Aug. 1 Aug. 2 Aug. 6 Aug. 6 Aug. 6 Aug. 10 Aug. 12 Aug. 13 Aug. 13 Aug. 14 Aug. 15 Aug. 14 Aug. 15 Aug. 14 Aug. 14 Aug. 15 Aug. 14 Aug. 16 Aug. 16 Aug. 16 Aug. 16 Aug. 16 Aug. 16 Aug. 17   | Direction and velocity velocit | 20 10 15 15 21 220 22                                    | Direct and velocit ENE. E. E. E. E. ENE. SE. SW. SE. SW. ENE. ESE. NNE. ESE. NNE. ESE SE. N. W.  | 200 8 17 21 222 25 5 11 11 8 9 9 9 8 10 7 7 12 12                                      | Direct and veloci energy energ | 200 9 18 20 23 177 21 5 14 11 7 7 8 8 8 16 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Directi<br>and<br>velocit<br>ENE.<br>E.<br>E.<br>E.<br>E. NE.<br>ESE.<br>SSE.<br>ESE.<br>SSE.<br>ESE.<br>NE.<br>SE.<br>NE.<br>SE.<br>SE.<br>NE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>SE.<br>S | 20<br>19<br>19<br>20<br>25<br>18<br>22<br>25<br>5<br>10<br>9<br>8<br>6<br>8<br>16<br>7 | Direct and velocity E. E. E. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. E. S. W. S. W. E. S. W | 18 9 18 17 25 19 10 9 12   7 11  | Directi<br>and<br>velocit<br>E.<br>E.<br>NE.<br>E.<br>SSE.<br>WSW.<br>ESE.<br>WSW.<br>NNE.<br>E.<br>WSW.<br>NNE.<br>SSW.  | 16 10 17 18 24 19 19 2 12 12 8 8 8 12 11 11                        | Directi<br>and<br>velocit<br>E.<br>E.<br>E.<br>NE.<br>ESE.<br>SSE.<br>WSW.<br>ESE.<br>SW.<br>E.<br>Calm.<br>NE.<br>SW. | 19 11 19 22 20 15 3 12 12 12 14 11 10 11 7 20 6 32 19 17   | Direction and velocity.  E. H. F. E. E. SE. S. S. S. S. S. S. S. S. S. S. S. S. S.   | 17 110 110 110 110 110 110 110 110 110 1  | Direction and velocity.  E. 18 E. 12 E. 22 E. 28 E. 17 E. 17 E. 10 N. 4 ESE. 12 S.W. 24 ENE. 12 S.W. 25 E. 10 S.E. 10 SE. 10 SE. 10 SE. 11   | E. E. E. E. N. E. E. N. E. S. W. E. N. N. N. N. N. N. N. N. E. S. | 17 12 23 E. 18 20 E. 10 E. 10 E. 10 E. 10 E. 10 E. 10 E. 10 E. 8 W. 4 12 12 12 12 12 12 12 12 12 12 12 12 12 | Direct and velocity to the series of the ser | 16 12 23 24 18 11 5 5 10 10 11 1 5 15 19 6 6 28 16 16                        | Direct and veloci E. E. E. E. E. E. E. E. E. E. E. E. E.  | ion n 15 13 20 19 23 17 11 8 12 16 16 11 19 8 5 5 3 13 14 18 5 5 50 14 14  | 18.57<br>10.58<br>16.59<br>19.75<br>19.75<br>19.75<br>19.75<br>19.75<br>10.12<br>12.25<br>7.50<br>8.75<br>7.50<br>8.75<br>7.50<br>8.75<br>7.50<br>8.75<br>7.50  |
| 1883, 1<br>Aug. 2<br>Aug. 3<br>Aug. 5<br>Aug. 7<br>Aug. 7<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13<br>Aug. 14<br>Aug. 15<br>Aug. 14<br>Aug. 14<br>Aug. 18<br>Aug. 14<br>Aug. 18<br>Aug.  Direction and velocity energy  | 20 10 15 21 12 20 22 6 17 12 25 26 17 31 20              | Direct and velocity to the control of the control o | 200 8 17 21 22 22 25 5 11 11 8 8 9 9 30 7 7 12 12 22 22 22 22 21 12 22 22 21 10 226 20 | Direct and veloci and veloci and veloci ENE, E. E. E. ENE, SSE, WSW. SSE, ESE, NNE, E. E. E. E. E. E. E. E. E. E. E. S. W. NNE, NNE, NNW, E. NNE, NNE, NNE, NNE, NNE, NNE, NNE,  | 200 18 200 233 177 5 5 144 111 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1           | Directi and velocit  ENE. E.  | 20 19 20 25 18 22 25 5 10 9 8 6 6 8 16 7 31 22 15 22 26 26 25 24                       | 5 p. n.  Direct and velocit except the series of the serie | 18 9 18 17 25 10 1 17 8 12 17 17 6 6 32 2 2 1 19 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 | Direction and velocity and velocity e. E. E. E. E. WSW. E. SW. WSW. NNE. E. WSW. NNE. SSW. NNE. NNE. NNE. NNE. WSW. N. W. E. NNE. WSW. WSW. WSW. WSW. WSW. WSW. WSW. WS | 16 10 17 18 24 19 2 18 8 8 12 20 21 19 24 24 110 24                | Directi<br>and<br>velocit<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.<br>E.                | 19<br>11<br>19<br>11<br>11<br>12<br>22<br>20<br>13<br>13<br>12<br>12<br>12<br>12<br>14<br>11<br>10<br>6<br>8<br>32<br>19<br>17<br>20<br>20<br>20<br>4<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>11<br>1 | E. SE. SSW. SNW. SW. NNW. SSE. SSW. SW. NNW. SSW. SSW. SW. SW. SW. SW. SSW. S  | 17 10 10 10 10 10 10 10 10 10 10 10 10 10 | Direction and velocity.  E. 18 E. 12 E. 22 E. 22 E. 17 F. 17 E. 10 N. 4 ESE. 12 SW. 24 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 12 ENE. 11 NNE. 9 ENE. 12 ENE. 11 NNE. 16 ENE. 11  | E. E. E. N.E. E. N.E. E. N. N. N. N. N. N. N. N. N. N. N. N. N.   | ection and ocity.  17 12 23  E. 18 24 147 12 5  E. 19 5  E. 10 10 10 10 10 10 10 10 10 10 10 10 10           | Direct and velocity to the control of the control o | tion d 12 23 23 24 18 11 5 10 10 10 11 14 14 14 14 15 19 10 27 7 13 21 11 15 | Direct and velocide to the velocide E. E. E. E. E. E. E. E. E. E. E. E. E.                            | ion n 1 15 13 20 23 177 11 8 12 16 13 13 14 18 19 27 11 15 5 5 5 6 19 27 11 15 5 5 6 19 27 11 15 5 6 19 27 11 15 5 | 18.57 10.58 10.59 10.15 11.59 10.12 11.59 10.12 11.59 10.12 11.49 15.95 10.12 11.25 11.59 |

Station abandoned August 27, 1883.

† Approximated.

Direction.

Table sho

X. 28 8.
X. 28 9.
X. 28 9.
X. 20 10 20.
EXE 205 16.
E. 95 10.
E. 95 10.
E. 37 13.
SE 37 13.
SE 37 13.
SE 37 12.
SW 2 16.
W. 10 10.
W. 10 2 12.
XW 2 12.
XW 2 16.
XW 2 16.
XW 2 17.
XW 2 17.
XW 3 17.
XW 3 17.
XW 3 17.
XW 18 5.
XW 1 18 5.
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XW 1 18 5.
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XW 1 18 5.
XW 1 18 5.
XW 1 18 5.
XW 1 18 5.
XW 1 18 5.
XW 1 18 5.
XW 1 18 5.
XW 1 18 5.

November .... December ....

March
April
May
June
July
August
Soptember
October

3—Continued.

ven in miles per hour.] 11 a. m.

Direction Direction and and velocity.

20 ENE. 7 E. 15 ESE.

9 E. 8 E. 3 N. 25 W. 22 NNE.

11 N. 25 E. 30 NE. 10 W. 25 W.

29 WNW, 12 SSE, 28 W, 18 ESE,

12 p. m. on Direction and velocity.

Daily mean velocity.

14.37

16.12 18.15 8.45 7.01 8.05 7.74 11. +

21,10 111,-20,19 15,41

NE.

NE. NW.

SE. ŠE. 15. 33 12 m

Table showing the number of calms and 16 different wind directions, also mean monthly force of different winds after deducting number of calms.

|   |   |   |  |   |  |   |  |  | ,  |   |  |  |  |   |  |  |  |   |  |
|---|---|---|--|---|--|---|--|--|--|---|--|--|--|---|--|--|--|---|--|
| October,<br>1881.   | November<br>1881.   | De  | cember,<br>1881.   | J ដ   | nusry ,<br>1882.   | Feb.  | гнагу,<br>882.   | Mar  | ch, 1882.  | Apr   | il, 1882.  | May,   | 1882.  | -<br>June, 18a  | 82. July   | r, 18m.  | August<br>1882.  |   | ember,<br>882.   |
| Direction. Number of hours.* Mean force.  | Number of<br>hours.<br>Mean force.  | Number of   | Mean force.  | Number of<br>hours.   | Mean force.  | Number of hours.  | Mean force.  | Number of<br>hours.  | Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.  | Mean force.  | Number of<br>hours.   | Number of<br>hours.  | Mean force.  | Number of<br>hours.  | Number of<br>hours.   | Mean force.  |
| XXE 03 20,022<br>XXE 54 18,13<br>XXE 37 18,15<br>XXE 65 5,00<br>L 02 11,191<br>ESE 8 10,62<br>SSE 44 13,62<br>SSE 44 13,62<br>SSE 44 13,62<br>SSE 44 13,62<br>SSE 44 13,62<br>XSW 0 1 7,00<br>XSW 1 7,00<br>XSW 1 7,00<br>XSW 1 7,00<br>XSW 1 7,00<br>XSW 1 7,00<br>XSW 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 7,00<br>XSW 1 1 1,00<br>XSW   | 26 11, 35 21, 6 112 22, 8 243 18, 95 18, 15 17, 6 9 15, 19 84 12, 27 7, 14 22, 3 18, 42 12 18, 6 25 20, 6 14, 6 5 12, 6   | 5<br>5<br>5<br>1<br>4<br>6<br>6<br>5<br>5<br>7<br>7<br>1<br>1<br>1<br>1<br>6<br>6<br>6<br>6<br>7<br>7<br>7<br>1<br>1<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9<br>9 | 27 12,000<br>16 8,33<br>18 11,25<br>18 4 4,55<br>18 7,77<br>18 12,26<br>18 18 18 18 18 18 18 18 18 18 18 18 18 1                         | 3<br>9<br>10<br>11<br>2<br>2<br>2<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | 7 9.83<br>4 7.10<br>5 17.48<br>6 13.71<br>8 11.10<br>3 10.15<br>0 28.05<br>23.65<br>24.90<br>1 41.18<br>6 38.61<br>2 31.07<br>10.84<br>1 10.00 | 29<br>49<br>0<br>0<br>0<br>14<br>50<br>88<br>104<br>114<br>32                                     | 14. 27<br>12. 25<br>0<br>0<br>7. 85<br>9. 02<br>12. 97<br>13. 08<br>12. 52<br>17. 06<br>7. 15<br>10. 27<br>3. 00                       | 15<br>24<br>55<br>109<br>27<br>41<br>41<br>45<br>46<br>46<br>47<br>44<br>40                            | 19. 79<br>26. 18<br>20. 22<br>7 10. 62<br>7 11. 67<br>13. 87<br>14. 56<br>17. 88<br>2 19. 95<br>15. 24<br>10. 27<br>3, 00                                  | 9<br>22<br>0<br>8<br>155<br>130<br>94<br>27<br>48<br>74<br>43<br>39<br>63<br>131<br>0<br>0<br>22    | 5. 68<br>0<br>4. 33<br>13. 40<br>10. 27<br>11. 59<br>14. 66<br>0, 94<br>13. 63<br>9. 69<br>6. 89<br>9. 09<br>13. 90<br>0                     | 34<br>130<br>158<br>67<br>39<br>43<br>37<br>21<br>19<br>50<br>34<br>52 | 12. 40<br>10. 38<br>16. 55<br>18. 89<br>14. 51<br>19. 77<br>9. 98<br>9. 19<br>7. 84<br>10. 30<br>11. 32<br>17. 73<br>8. 36<br>18. 00<br>14. 06         | 65 12,<br>99 9,<br>92 9,<br>66 11,<br>95 15,<br>49 8,<br>38 9,<br>1 6,<br>4 7,<br>11 5,<br>43 10,<br>29 7,<br>10 7,<br>21 12,<br>42 10,<br>53 10, | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 9, 05<br>13, 00<br>13, 13<br>11, 46<br>12, 51<br>12, 12<br>13, 44<br>8, 12<br>11, 91<br>14, 89<br>10, 38<br>6, 86<br>6, 32<br>5, 76<br>6, 53 | 14 10. 51 13. 117 13. 75 9. 117 15. 69 16. 33 15. 40 14. 37 10. 28 26. 21 19. 27 19. 24 10. 36 16. 26 15.                              | 27 : 29<br>96   73<br>35   86<br>37   110<br>41   67<br>15   36<br>58   20<br>35   28<br>607   46<br>52   31<br>11   27<br>93   25<br>61   28 | 14. 51<br>15. 23<br>15. 81<br>10. 24<br>9. 75<br>13. 20<br>12. 30<br>14. 65<br>16. 77<br>12. 04<br>14. 04<br>12. 70<br>10. 31                                |
| October, 2<br>1882.   | November,<br>1882.  | Dece<br>18  | mber,<br>82.   | Janu<br>18  | ary,   | Febru<br>188  | ary,   | March  | , 1883.  | April,  | 1883.  | May,   | 1883.  | June  | , 1883.  | July   | , 1883.  | Augusi  | t, 1883.   |
|   | hours. Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.  | Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.  | Mean force.  | Number of<br>hours.   | Mean force.  | Number of<br>hours.  | Mean force.  | Number of<br>hours.   | Mean force.  |
| X 28 8.43<br>XXE 4 7.50<br>XE 126 20.62<br>EXE 205 16.83<br>ES 95 12.37<br>ES 43 7.13.03<br>SE 27 13.03<br>SE 27 13.03<br>SE 28 6.25<br>W 10 19.50<br>W 10 19.50<br>W 10 19.50<br>XW 42 16.50<br>XW 12 2.00<br>XW 18 5.22<br>XW 18 5.22<br>XW 19.50<br>XW | 5 11. 20<br>4 23.75<br>114 22.14<br>178 19. 80<br>103 21. 12<br>109 20. 92<br>20 7.75<br>13 8. 08<br>8. 62<br>7 16. 14<br>13 17. 62<br>14. 09<br>49 19. 29<br>11 6. 69<br>49 19. 29<br>10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 33<br>64<br>87<br>82<br>49<br>97<br>4<br>20<br>33<br>33<br>11<br>26<br>28<br>44   | 7. 39<br>9. 53<br>9. 75<br>8. 77<br>7. 12<br>8. 86<br>7. 74<br>6. 25<br>13. 17<br>12. 15<br>13. 44<br>11. 17<br>10. 82<br>7. 43<br>8. 18 | 119<br>73<br>19<br>133<br>77<br>68<br>39<br>5<br>3<br>7<br>7<br>13<br>36<br>68<br>167<br>8              | 8. 10<br>11. 46<br>8. 78<br>13. 19<br>26. 29<br>15. 77<br>10. 87<br>7. 40<br>8. 66<br>4. 85<br>24. 23<br>24. 02<br>14. 54<br>8. 37<br>14. 33   | 23<br>6<br>27<br>8<br>27<br>41<br>39<br>16<br>32<br>64<br>49<br>70<br>100<br>43<br>26<br>42<br>11 | 9. 60<br>7. 83<br>4. 44<br>7. 27<br>8. 40<br>12. 85<br>12. 79<br>11. 00<br>13. 22<br>19. 12<br>19. 78<br>11. 02<br>9. 34<br>9. 26<br>0 | 19<br>7<br>43<br>117<br>47<br>81<br>73<br>43<br>34<br>38<br>63<br>86<br>50<br>22<br>6                  | 6, 94<br>7, 85<br>8, 97<br>16, 54<br>21, 48<br>12, 72<br>10, 76<br>0, 86<br>14, 52<br>8, 86<br>8, 85<br>9, 54<br>11, 44<br>12, 13<br>11, 33<br>14, 40<br>0 | 72<br>28<br>52<br>104<br>55<br>42<br>7<br>15<br>21<br>34<br>21<br>36<br>110<br>86<br>42<br>25<br>20 | 5. 54<br>7. 75<br>9. 01<br>15. 57<br>9. 92<br>11. 96<br>12. 42<br>6. 20<br>8. 95<br>6. 76<br>4. 09<br>4. 04<br>4. 04<br>4. 14<br>12. 28<br>0 | 28 82 98 96 75 65 65 15 15 19 96 11 17 7 13                            | 14. 92<br>14. 47<br>13. 77<br>15. 55<br>15. 06<br>12. 07<br>10. 79<br>10. 48<br>9. 73<br>9. 63<br>10. 52<br>8. 00<br>7. 22<br>9. 60<br>6. 90<br>10. 28 | 26<br>91<br>83<br>101<br>48<br>22<br>9<br>15<br>13<br>36<br>12<br>15<br>20<br>36<br>20<br>25<br>25<br>27  | 6. 76<br>9. 38<br>11. 55<br>17. 65<br>15. 68<br>10. 93<br>8. 95<br>8. 77<br>9. 93<br>7. 15<br>9. 35<br>7. 41<br>6. 33<br>7. 13<br>6. 92<br>7. 33 | 34<br>108<br>103<br>171<br>109<br>55<br>13<br>6<br>8<br>2<br>2<br>14<br>4<br>9<br>9<br>3<br>6<br>5<br>5                                      | 11. 88<br>13. 64<br>14. 69<br>14. 29<br>10. 80<br>6. 23<br>10. 66<br>15. 12<br>8. 50<br>7. 50<br>8. 06<br>9. 84<br>4. 33<br>1. 66<br>0 | 37<br>41<br>51<br>51<br>129<br>97<br>36<br>29<br>10<br>14<br>58<br>32<br>21<br>9<br>12<br>17<br>2   | 14, 79<br>12, 48<br>18, 80<br>18, 49<br>14, 49<br>11, 32<br>14, 00<br>15, 72<br>10, 00<br>11, 14<br>16, 38<br>17, 62<br>19, 76<br>14, 11<br>10, 16<br>10, 41 |
| Year and  | month.  | I   | revailing<br>rection   | di-   | Maxim<br>ourly vel   |   | Total :  |  |  | Ye  | ar and r   | nonth.   |  |   | iling di-  |  | cimum<br>velocity.   | Total :   |  |
| 1881.<br>November   |   |   | ENE.   |   |  | 43<br>44<br>44  |  | 12, 849<br>6, 361<br>19, 210   | Nove   | mber  | 1882.  |  |  |   | NE.<br>SE.   |  | 44<br>42<br>100  |   | 13, 570<br>6, 200<br>116, 897  |
| January 1882. January March April May June June June June May General September October October May May May May May May May May May May   |   |   | E. SW. W. ESE. ENE. NNE. SW. and E. E. and E. ENE.   | 1   |  | 100<br>28<br>40<br>38<br>20<br>27<br>26<br>41<br>39<br>38   |  | 12, 102<br>7, 952<br>11, 839<br>7, 752<br>10, 379<br>7, 356<br>8, 621<br>11, 322<br>10, 032<br>10, 363 | Mar<br>Apr<br>May<br>June<br>July  | nary  |  |  |  | F<br>E<br>Inco  | NW.<br>W.<br>NE.<br>W.<br>NE.<br>NE.<br>ME.<br>mplete.   | Inco   | 57<br>80<br>36<br>33<br>30<br>37<br>28<br>mplete.  | Incom   | 10, 149<br>9, 279<br>8, 888<br>6, 131<br>9, 201<br>8, 631<br>8, 958<br>splete.   |

<sup>\*</sup> Number of hours observed blowing from the direction stated.

# Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, —5 hours 17 minutes. Precipitation is given in Inches. In this

|  |   |                             |  |                      |   | -                          |   |                            |  |                | great in inches. In this   |
|--|---|-----------------------------|--|----------------------|---|----------------------------|---|----------------------------|--|----------------|--|
|  | 1 a. m.   |                             | 2 a. m.  |                      | 3 a. m.   |                            | 4 a. m.   |                            | 5 a. m.  |                | 6 a. m.  |
| Date.  | Amount, kind, and direction of clouds.                        | Precipitation.              | Amount, kind, and direction of clouds.                                 | Precipitation.       | Amount, kind, and direction of clouds.                            | Precipitation.             | Amount, kind, and direction of clouds.                    | Precipitation.             | Amount, kind, and direction of clouds.           | Precipitation. | Amount, kind, and direction of clouds.   |
| 1881,<br>Oct. 18<br>Oct. 19<br>Oct. 20<br>Oct. 21<br>Oct. 22 | 1 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0      | 00                          | 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                      | 00                   | 0 0 10 at. W.* 10 at. 0 10 at. 0 10 at. 0                         | 00<br>00<br>00<br>00<br>00 | 6 st. 0<br>10 st. W.*<br>10 st. 0<br>10 st. 0<br>10 st. 0 | 00<br>00<br>00<br>00<br>00 | 10 st. 0 0                                       | 00             | 10 st. 0 00<br>10 st. W.f 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00      |
| Oct. 28<br>Oct. 24<br>Oct. 25<br>Oct. 26<br>Oct. 27          | 10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0 | . —<br>. 01<br>. 01<br>. 01 | 10 nim. 0  | . 01<br>. 01<br>. 02 |   | 01                         | 0 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0   | .01<br>.01<br>.01          | 10 nim. 0<br>10 nim. 0 .0<br>10 nim. 0 .0        | )2<br>)1       | 9 10 nim. 0 00<br>10 nim. 0 01<br>10 nim. 0 01<br>10 nim. 0 01<br>10 nim. 0 01 |
| Oct. 28<br>Oct. 29<br>Oct. 30<br>Oct. 31                     | 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0                        | 00<br>00<br>00              | 2 st. 0<br>10 nim. 0<br>10 nim. 0<br>10 st. 0                          | 00                   | 2 st. 0<br>10 nim. 0<br>10 nim. 0<br>10 st. 0                     | 00                         | 2 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0              | 00 01 00                   | 10 st. 0 0                                       | _ '            | 4 st. 0 00<br>10 st. 0 00<br>10 nim. 0 .—<br>10 st. 0 00                       |
| Means  | 8, 64   |                             | 8. 71  |                      | 8. 00   |                            | 8. 43   |                            | 8. 57  | -              | 8, 86  |
| Date.  | 1 p. m.   |                             | 2 p. m.  |                      | 3 p. m.   |                            | 4 p. m.   |                            | 5 p. m.  | ,              | 6 p. m.  |
| 1881.<br>Oct. 18<br>Oct. 19<br>Oct. 20<br>Oct. 21<br>Oct. 22 | 10 nim. W, † 10 st. 0 Dense fog. 0 10 st. 0 10 st. 0          | ,                           | 10 st. W. 1<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 nim. 0           | 00                   | 10 st. W.* Dense fog. 0 10 st. 0 9 st. NE. t 10 nim. 0            | 00                         | 10 st. W.* Dense fog. 0 10 st. 0 9 st. N.† 10 st. NE.*    | 00                         | Dense fog. 0 0<br>10 st. SE." 0<br>10 st. N. † 6 | 00<br>00<br>00 | 10 st. W.* hi<br>Dense fog. 0 , 10<br>10 st. SE.* (b)<br>10 st. NE.* (c)       |
| Oct. 28<br>Oct. 24<br>Oct. 25<br>Oct. 26<br>Oct. 27          | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>8 st. 0      | 00<br>.01<br>00<br>00       | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>10 nim. 0<br>5 st. 0 |                      | 10 nim. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>1 cir. 2 st. 0 | . 02<br>00<br>. 02<br>00   | 10 st. N. †   | . 01                       | 10 nim. 0 :-                                     | )2 ;           | 10 nim. NE.*.02 10 nim. 0 .01 10 nim. 0 .01 10 nim. 0 .01 3 st. NE.† w         |
| Oct. 28<br>Oct. 29<br>Oct. 30<br>Oct. 31                     | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0                 | . —<br>00<br>00             | 10 st. 0<br>10 nim. 0<br>9 st. 0<br>10 st. 0                           | 00                   | 10 st. 0<br>10 nim. 0<br>Dense fog. 0<br>10 st. 0                 | 00                         | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0             | 00                         | 10 nim. 0  | 00             | 10 nim. 0 .01<br>10 nim. 0 .—<br>10 st. 0 00<br>10 st. E. 0                    |
| Means  | 9. 14   | ٩                           | 9. 57  |                      | 8. 00   |                            | 8.71  |                            | 9.14   |                | 8, 79  |

character

10 nim. 10 st. Dense fog. 10 st. 10 st.

7 p. 10 st. Dense fog. 10 st. 10 st. 10 nim.

10 nim. 10 st. 2 cir. 4 st. 10 st. 8, 50 character of precipitation, at Uglaamie, from October, 1881, to August, 1883.

Daily means of amount of clouds on the right below, amount of precipitation on the right above.]

| 7 a. m.   |                | 8 a. m.  |  | 9 a. m.   |                | 10 a. m.  |                        | 11 a. m.  |                              | 12 m.  |  | cipi                       |
|---|----------------|--|--|---|----------------|---|------------------------|---|------------------------------|--|--|----------------------------|
| Amount, kind, and<br>direction of clouds.   | Precipitation. | Amount, kind, and direction of cloud                     | Precipitation.                           | Amount, kind, and direction of clouds.                        | Precipitation. | Amount, kind, and direction of clouds.                          | Precipitation.         | Amount, kind, and<br>direction of clouds.                     | Precipitation.               | Amount, kind, and direction of clouds.                       | Precipitation.                               | Amount of precipi-         |
| 0 nim. 0 0 (1 st. 0 st. 0 st. 0 st. 0 st.   | 00<br>00       | 10 nim.<br>10 st.<br>Dense fog. S.<br>10 nim.<br>10 nim. | 0 . —<br>0 00<br>E. 1 00<br>0 . —        | 10 nim. 0<br>10 st. 0<br>Dense fog. 0<br>10 nim. 0            | 00             | 10 nim. 0<br>10 st. 0<br>Dense fog. 0<br>10 nim. 0<br>10 nim. 0 | . —<br>00<br>00<br>: — | 10 nim. 0<br>10 st. 0<br>Dense fog. 0<br>9 st. 0<br>10 nim. 0 | 00                           | 10 nim. 0<br>10 st. 0<br>Dense fog. 0<br>9 st. 0<br>10 st. 0 | 00<br>00                                     |                            |
| 0 nim. 0 |                | 10 nim.<br>10 nim.<br>10 nim.<br>10 nim.<br>10 st.       | 0 .02<br>0 .03<br>0 .03<br>0 .02<br>0 00 | 10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0 | . 01           | 10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0   | $01 \\ 02 \\ 05 \\ 00$ | 10 nim. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>9 st. 0    | . 01<br>. 03<br>. 02<br>. 00 | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>9 st. 0     | 01<br>00<br>01                               | .0<br>.2<br>.1<br>.2<br>.0 |
| 0 et. 0<br>0 nim. 0<br>4 et. 0<br>0 et. 0   | 00             | 9 st. NI<br>10 nim.<br>1 cir. 3 st.<br>10 st.            | 0 .02<br>0 .02<br>0 00<br>0 00           | 10 st, 0<br>10 nim, 0<br>3 st. 0<br>10 st. 0                  |                | 9 nim. 0<br>10 nim. 0<br>1 cir. 2 st. 0<br>10 st. 0             | . 01<br>00<br>00       | 10 nim. 0<br>10 nim. 0<br>2 cir. 2 st. 0<br>10 st. 0          | 00                           | 10 nim. 0<br>10 nim. 0<br>4 st. 0<br>10 st. 0                | 00   |                            |
| 8.79  |                | 8. 79  |  | 8.79  |                | 8.71  |                        | 8.71  |                              | 8.71   | 1  | .1                         |
| 7 p. m.   |                | 8 pî m.  |  | 9 p. m.   |                | 10 p. m.  |                        | 11 p. m.  |                              | 12 p. m.   |  | Daily<br>means.            |
| Dense fog. 0<br>0 st. SE.   | 00<br>00<br>00 | Dense fog.   | V.* 00<br>0 00<br>0 00<br>N.* 00<br>0 .— |   | 00             | 10 st. 0 Dense fog. 0 10 st. 0 10 st. N. 1 10 st. 0             | 00                     | 10 nim. 0 Dense fog. 0 10 nim. 0 10 st. 0 10 nim. 0           | 00                           | 10 st. (   | 00   | 7. 0                       |
| 9 nim. NE. 9 nim. 0 nim. 0 nim. 0 nim. 0 nim. 3 st. NE.   | =              | 10 nim.<br>10 nim.<br>10 nim.                            | E.*.01<br>0.01<br>0.01<br>0.01<br>E.† 00 | 10 nim. NE. 10 nim. 0 10 st. 0 10 nim. 0 4 st. NE.            | . 02           |   | 00<br>00<br>01         | 10 nim. 0<br>10 at. 0   | . 01<br>. 01<br>. 01<br>. 00 | 10 nim.<br>10 nim.<br>10 nim.                                | 0 . 01<br>0 . 01<br>0 . 01<br>0 . 01<br>0 00 | 10. 0<br>10. 0<br>10. 0    |
| 0 nim. 0<br>0 st. 0<br>2 cir. 4 st. 0<br>0 st. E.   |                | 10 nim.<br>10 st.<br>5 cir. 1 st.<br>10 st.              | 0<br>0 .00<br>0 .06<br>E.* 00            | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. E.                | 00             | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. E.                   | 00<br>00<br>00         | 10 st. 0<br>10 st. 0<br>Dense fog. 0<br>10 nim. 0             | 00<br>00<br>00               | 10 st. (   | 00   | 10.                        |
| 8, 50   | 1              | 8, 57  |  | 8, 86   | -              | 8,71  |                        | 7, 93   |                              | 8,71   |  | 8,0                        |

ds, and amount and is given in inches. In this

6 a. m.

Amount, kind, and direction of clouds.

10 st. 0 4 st. 0 10 st. 0 10 nim. 0 10 st. 0

6 p. m.

10 st. W.\* o.
Denso fog. 0 : 00
10 st. SE.\* o.
10 st. X.\* (a)
10 st. XE.\* o.

10 st. SE. 01
10 st. X, 10
10 st. X 50
10 nim. NE. 02
10 nim. 0 .01
10 nim. 0 .01
10 nim. 0 .03
3 st. NE 10
10 nim. 0 .01
10 nim. 0 .01
10 nim. 0 .01

Statement showing the amount, kind, and direction of clouds, and amount  $a_{\rm ind}$ 

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.  |  | 2 a. m.   |  | 3 a. 1   | n.                      |                                  | 4 a. m.  |                      | 5 a. m.  |                      | 6 a. m.  |   |
|---|--|--|---|--|--|-------------------------|----------------------------------|--|----------------------|--|----------------------|--|---|
| Date.   | Amount, kind, and direction of clouds                              | Precipitation.                                 | Amount, kind, andirection of clouds             | Precipitation.                                 | Amount, kindirection of a                              | d, and<br>louds.        | Precipitation.                   | Amount, kind, and direction of clouds.                                       | Precipitation.       | Amount, kind, and direction of clouds.   | Precipitation.       | Amount, kind, and direction of clouds.   | Proceignified feets.                                      |
| 1881.<br>Nov. 1                                     | 10 nim.  | 0 .01  | 10 nim.   | 0.01   | 10 nim.  | 0.                      | 01                               | 10 nim. 0  |                      | 10 nim. 0  | . 01                 | 10 nim.  |   |
| Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5<br>Nov. 6      | 10 nim.<br>10 st.<br>10 st.  | 0<br>0 . 01<br>0   00<br>0   00<br>0   00      | 10 nim. N1<br>10 st.<br>10 st.                  | E.*.01<br>E.*.01<br>0 00<br>0 00<br>E.* 00     | 10 nim.<br>8 st.<br>10 st.<br>10 st.<br>2 st.          | NE.*.<br>0<br>0<br>NE.* | (°0<br>00                        | 10 nim. NE.<br>2 st. E.<br>10 st. 0<br>10 st. 0<br>2 st. NE.                 | 00                   | 10 st. NE. 1   | 00<br>00<br>00       | 10 st. NE. 3 st. E. 10 st. 0   | * (9)<br>(0)<br>(0)                                       |
| Nov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11    | 10 st.<br>10 st.   | 0 00<br>0 00<br>0 00<br>0 00                   | 10 st. SI<br>10 nim.<br>10 st. NI               | E. † 00<br>E. † .—<br>0 .—<br>E. 00<br>0 00    | 2 cir. 6 st.<br>10 st.<br>10 nim.<br>7 st.<br>9 st.    | NE.  <br>0<br>0<br>0    | 00<br>01<br>00                   | 1 cir. 8 st. NE.<br>10 n/m. 0<br>10 n/m. 0<br>Dense haze. 4 st. 0<br>6 st. 0 | 01                   |  | 00<br>               | 2 st. NE. 10 nim. 0 st. 0 st. 0 st.  | t (n<br>: 1   |
| Nov. 12<br>Nov. 13<br>Nov. 14<br>Nov. 15<br>Nov. 16 | 0<br>: 10 st.<br>10 nim,   | 0 : 00<br>0 : 00<br>0 : 00<br>0 : 01<br>0 : 01 | 10 at.  | 0 00 0<br>0 00 0<br>0 00 0<br>0                | 0<br>10 at.<br>9 at.<br>10 st.                         | 0 ,                     |                                  | 0 0 0<br>0 0 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                           | 00<br>00<br>00       | 0 0 0<br>0 0 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                                   | 00<br>00<br>00<br>00 | 1 st. 0 0 10 st. 10 nim. (c)   |   |
| Nov. 17<br>Nov. 18<br>Nov. 19<br>Nov. 20<br>Nov. 21 | 4 st.<br>Dense haze.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 01   | Dense haze.  3 st. Dense haze. 10 nim.          | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 .01  | Dense haze. 3 st. Dense haze. 10 st.                   | 0                       | 00<br>00<br>00<br>00<br>00<br>01 | 0 Dense haze, 0 4 st. 0 1 at. 0 10 st.                                       | 00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00       | Dense haze. 5 st. 0  | (40)<br>(40)<br>(40)<br>(40)                              |
| Nov. 22<br>Nov. 23<br>Nov. 24<br>Nov. 25<br>Nov. 26 | 0<br>0<br>Dense haze.  | 0 00<br>0 00<br>0 00<br>0 00                   |   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00           | 0<br>0<br>0<br>0<br>10<br>10 st.                       | 0 0                     | 90<br>00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00             | 0 0 0 0 0 0 0 0 0 0 0 0 0 8 st. 0  | 00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 84 <sub>3</sub><br>Inc.<br>Did<br>4 <sub>4</sub> 3<br>exe |
| Nov. 27<br>Nov. 28<br>Nov. 29<br>Nov. 30            | 9 st.<br>4 cir. st. 4 st.  | ) 00   | 1 st.   | 0 00<br>0 00<br>0 00                           | 10 st.<br>1 st.<br>1 cir. st. 5 st.<br>10 st.          | 0                       | 00                               | 10 st. 0<br>0 0<br>3 cir. st. 2 st. 0<br>10 st. 0                            | 00                   | 10 st. 0<br>0 0<br>2 cir. st. 5 st. 0<br>5 st. 0                                     | 00<br>00<br>00       | 10 st. 0<br>10 st 0<br>4 st. 0   | th<br>this<br>the   |
| Means.  | 6. 23  |  | 6. 03   | 1.   | 5, 77  |                         |                                  | 5. 27  |                      | 5. 27  |                      | 5. 13  |   |
| Date.   | 1 p. m.  |  | 2 p. m.   |  | 8 p. n   | 1,                      | 1                                | 4 p. m.  |                      | 5 p. m.  |                      | 6 р. т.  |   |
| 1881.<br>Nov. 1                                     | 10 nim.  | 0 . 01   | 10 nim.   | 0  | 10 nim.  | 0 .                     | _                                | 10 nim. 0  |                      | 10 nim. 0  | . 01                 | 10 nim.  |   |
| Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5<br>Nov. 6      | 10 nim. E<br>10 st. 6<br>9 st. E                                   | 0 00<br>.* 01<br>0 00<br>.* 00<br>0 00         | 10 nim. I<br>10 at.<br>10 st. F                 | 0 00<br>E.*. 00<br>E. † 00<br>0 00             | 10 nim.<br>10 st.<br>10 nim.<br>10 st.<br>9 st.        | 0<br>0<br>0<br>E.*      | - :                              | 10 nim. 0<br>10 at. 0<br>10 nim. 0<br>10 st. 0<br>2 st. 0                    | . 02<br>. 00         | 10 nim. E.* 10 st. NE.† 10 nim. 0 2 cir. 3 st. NE.†                                  | . 01<br>00<br>. 05   | 10 nim. E<br>10 st. NE<br>10 nim. 0<br>2 cir. 5 st. NE<br>1 st. 0              | 5   |
| Nov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11    | 10 at.   | 0 00   | 1 cir. 8 st.<br>10 st.<br>10 st.                | 0 00 :<br>0 00 :<br>0 00 0<br>0 00 0           | 6 cir. 4 st.<br>8 st. Light h<br>10 st.<br>10 st.<br>0 | NNE.*                   | 00                               | 4 cir. 3 st. NE.<br>7 st. Lighthaze. 0<br>10 st.<br>10 st.<br>0 0            | 00                   | 3 cir. 4 st. NE. † 5 st. NE. † Lt. haze. NNE. † 10 st. NE. † 0                       | 00                   | 2 cir, 7 st. NE * 8 st. NE.* Lt. haze, 10 st. NE * 0                           | . 01  |
| Nov. 12<br>Nov. 13<br>Nov. 14<br>Nov. 15<br>Nov. 16 | 0<br>0<br>2 cir. 3 st. 6<br>10 st. 6<br>1 st. 6                    | 0 00   | 0<br>1 cir. 4 st.<br>10 st.                     | 0 : 00<br>0 : 00<br>0 : 00<br>0 : 00<br>0 : 00 | 0<br>0<br>1 cir. 5 at.<br>10 st.<br>1 st.              | 0 0                     | 00<br>00<br>00<br>00             | 0 0 0<br>0 1 cir. 8 st. 0<br>10 st. 0<br>1 st. 0                             | 00                   | 0 0 0 8 8t. 0 10 st. 0 1 st. 0   | 00<br>00<br>00<br>00 | 0 0 0 0 10 st. 1 cir. 1 st. 0  |   |
| Nov. 17<br>Nov. 18<br>Nov. 19<br>Nov. 20<br>Nov. 21 | 0<br>Light haze. 4 st. 0<br>10 st. 2 cir. st. 1 st. 0<br>10 nim. 0 | 00   | Light haze. 8 st.<br>10 st.<br>2 cir. st. 1 st. | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 01   | 7 cir.<br>1 cir. 2 st.<br>9 st.<br>8 st.<br>8 st.      | 0 (<br>8W.* (           | 00                               | 7 cir. 0<br>1 cir. 2 st. 0<br>8 st. 0<br>10 nim. WSW.<br>2 cir. st. 2 st. W. | . 00                 | 5 cir. 2 st. 0<br>1 cir. 3 st. 0<br>8 st. 0<br>10 nim. WSW.*<br>3 cir. st. 3 st. W.* |                      | 7 cir. st. 2 st. 0<br>5 st. 0<br>2 cir. st. 7 st. E :<br>10 st. W.<br>9 st. W. |   |
| Nov. 22<br>Nov. 23<br>Nov. 24<br>Nov. 25<br>Nov. 26 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                              | 00   | 0<br>0<br>10 st.                                | 0 00<br>0 00<br>0 00<br>0 00<br>0 00           | 0<br>0<br>1 cir. st.<br>10 st.<br>10 st.               | 0   0                   | )0 !<br>)0                       | 10 at. 0   | 00<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00 | 1 at. 0<br>0 6<br>1 at. 6<br>10 at. 6<br>10 at. 0                              |   |
|   | 10 st. 0<br>3 st. 0<br>10 nim. 0<br>10 st. 0                       | . 00   | 4 st.<br>10 st.                                 | 0 00   | 10 st.<br>9 st.<br>6 cir. st. 4 st.<br>10 st.          | 0 : 0                   | )0<br>)0                         | 10 st. 0<br>9 st. 0<br>6 cir. st. 4 st. 0<br>10 st. 0                        | 00 00 00             | 2 cir. st. 5 st. 0<br>10 st. WSW. †  | 00                   | 10 nim.<br>2 cir. st. 7 st.<br>10 st.<br>10 st.<br>WSW.                        |   |
| Means.  | 5. 93  |  | 6. 23   |  | 6. 97  | !                       | 1                                | 6. 67  |                      | 6, 37  | 1                    | 7.00   |   |

churac

Amount

10 mim. 10 st. 10 st. 2 st. 10 st. 10 st. 1 st. 1 st.

Light haze.
Pense haze.
Pense haze.
Pense haze.
Acir. st. 3 st.

5, 57
7 p. 1
10 nim.
10 nim.
10 st.

st. 3 st.

et. et. et. et. ein. pim. eir. et. 7 et.

H

character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

s, and amount and

given in inches. In this

6 a. m.

Amount, kind, and direction of clouds.

> NE. + 00 E.\* 00 0 00 0 09 NE. + 00

10 nim. 10 st. 3 st. 10 st. 10 st. 4 st.

2 st. 10 nim. 10 st. 5 st. 2 st.

1 st. 0 10 st. 10 nim. 10 st.

0 Dense haze. Light haze. 5 st. Dense haze. 10 st.

> 5. 13 6 p. m.

01 10 nim.

00 00 00

00 | 1 st. 00 | 0 00 | 1 st. 00 | 10 st. 00 | 10 st.

00 00 00

10 nim. 10 st. 10 nim. 2 cir. 5 st. 1 st.

2 cir. 7 st. NE : 8 st. NE.\* Lt. haze. 10 st. NE.\* NNE.\*

0 0 10 st. 10 st. 1 cir. 1 st.

7 cir. st. 2 st. 5 st. 2 cir. st. 7 st. 10 st. 9 st.

10 mim. 2 cir. st. 7 st. 10 st. 10 st. 7.00

NE.

NE.

table \* signifies rapid, † signifies slow. Daily means of amount of clouds on the right below, amount of precipitation on the right above.]

| 7 a. m.   |                            | 8 a.m.  |                            | 9 a. m.  |                            | 10 a. m.  |   |                            | 1a. m.  |                      | 12 m.  | - 1                        | predpi                                  |
|---|----------------------------|---|----------------------------|--|----------------------------|---|---|----------------------------|---|----------------------|--|----------------------------|---|
| Amount, kind, and<br>direction of clouds.                     | Precipitation              | Amount, kind, and<br>direction of clouds.                               | Precipitation.             | Amount, kind, and direction of clouds.                         | Precipitation.             | Amount, kind, and direction of clouds.                    | Precipitation.  | -                          | Amount, kind, and direction of clouds.                    | Precipitation.       | Amount, kind, and direction of clouds.   | Precipitation.             | Amount of pretation.                    |
| nim. 0  | 00                         | 10 nim. 0   | 00                         | 10 nim. 0  | . —                        | 10 et.  | 0 00  | 0                          | 10 st. 0  | 00                   | - 10 nim. 0  | . —                        | . 10                                    |
| st. 0 NE. st. NE. st. st. 0                                   | 00<br>00<br>00             | 10 nim. 0<br>10 st. 0<br>1 st. NE.*<br>2 st. 0                          | 00<br>00<br>00             | 10 nim. 0<br>10 at. 0<br>7 at. E.†<br>2 cir. 1 at. NE.†        | 00<br>00<br>00             | 9 at. E   | 0 04  | 10                         | 10 nim. E.* 10 st. 0 10 st. E.* 4 st. 0                   | . 01<br>00<br>00     | 10 nim. E. 10 st. 0 6 st. E. 10 st. 0  | 00                         | . 19<br>. 10<br>00                      |
| st. 0<br>st. 0<br>st. 0<br>st. 0<br>st. NE.                   | 00<br>00<br>00             | Dense hase. 2 st. 0<br>10 nim. 0<br>10 st. 0<br>2 st. 0<br>3 st. 0      | 00<br>00<br>00             | 10 st. NE.* 10 nim. 0 10 st. 0 2 st. 0 2 st. 0                 | 00<br>01<br>00<br>00<br>00 | 2 at.   | 0 0   | 10                         | 5 at. NE.† 10 at. 0 10 at. 0 2 at. 0 2 at. 0              | 00<br>00<br>00       | 4 st. NE. 10 st. 0 10 st. 0 4 st. 0 4 st. 0 1 st. 0  | 00                         | . 01                                    |
| 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00 00                      | 0 0 0<br>10 st. 0<br>10 nim. 0  | 00 00 00                   | 0 0<br>0 0<br>1 st. 0<br>10 st. 0                              | 00 00 00                   | 0<br>0<br>10 nim.   | 0 0 0   | 90                         | 0 0 0 0 0 0 0 10 st. 0 0                                  | 00<br>00<br>00<br>00 | 0 0 0 2 cir. 0 10 st. 0 0  | 00<br>00<br>00<br>00<br>00 | . 0-                                    |
| ot. 0<br>ot. 0<br>ht haze. 4 st. 0                            | 00<br>00<br>00<br>00       | 0 0<br>4 st. 0<br>10 st. 0<br>Light haze. 1 st. 0<br>10 st. NW.*        | 00<br>00<br>00<br>00       | 0 Light haze. 3 st. 0 10 st. 0 Light haze. 1 st. 0 9 st. 0     | 00<br>00<br>00<br>00       | Light haze. 2 st.<br>10 st.<br>Light haze. 1 st.<br>2 st. | 0 0 0 0 0 0 0   | )0<br>)0<br>)0             | 0 Light haze. 2 st. 0 10 st. 0 10 st. 0                   | 00<br>00<br>00<br>00 | 10 at. 0<br>0 0<br>10 st. 0  | 00<br>00<br>00             | 0 |
| ght haze. 0   | 00<br>00<br>00<br>00       | 0 0 0<br>Light haze. 2 st. 0 0<br>10 st. 0                              | 00<br>00<br>00<br>00<br>00 | 0 0 0<br>0 1.ight haze. 2 st. 0<br>9 st. 0<br>10 st. 0         | 00<br>00<br>00<br>00<br>00 | Ught haze.  | $     \begin{bmatrix}       0 &   & 0 \\       0 &   & 0 \\       0 &   & 0     \end{bmatrix}   $ |                            | 0 0 0 0 0 0 0 10 st. 0 0 10 st. 0                         | 00<br>00<br>00<br>00 | 0 0 0<br>8 st. 0   | €0                         | 0<br>0<br>0<br>0                        |
| nse hase. 0<br>0<br>nim. 0<br>cir. st. 3 st. 0                | $\frac{00}{00}$            | 0 0<br>0 0<br>10 st. 0<br>10 st. 0                                      | 00                         | 8 st. 0<br>3 st. 0<br>10 nim. 0<br>10 st. 0                    | 00                         | 2 st.<br>8 nim.   | 0 0   | 00<br>00<br>02<br>00       | 10 nim. 0<br>2 st. 0<br>10 nim. 0<br>9 st. 0              | . 00                 | 10 nim. 0  | .00                        | , 0<br>0<br>.0                          |
| 5, 57   |                            | 5, 20   |                            | 5. 67  |                            | 5, 23   |   |                            | 5. 53   |                      | 5. 67  |                            | 7                                       |
| 7 p. m.   |                            | 8 p. m.   |                            | 9 p. m.  |                            | 10 p. m.  |   |                            | 11 p. m.  |                      | 12 p. m.   |                            | Daily<br>means.                         |
| nim. 0  | . 01                       | 10 nim. 0   | -                          | 10 nim. 0  | . 01                       | 10 st.  | 0   | -                          | 10 nim. 0   |                      | - 10 nim. 0  | ·                          | 10. 0                                   |
| nim. E.' st. 0 nim. 0 cir. 7 8t. NE. st. 0                    | 00<br>00<br>00<br>00       | 10 nim. F. 10 st. 0<br>10 st. 0<br>9 st. NE. 1<br>1 st. 0               | 00                         | 10 nim. E. t<br>10 st. 0<br>10 st. 0<br>9 st. NE. t<br>2 st. 0 | 00                         | 10 st.<br>10 st.<br>9 st. NI                              | 0 0   | 00<br>00<br>00<br>00       | 10 nim. 0<br>10 st. E.<br>4 st. NE.<br>2 st. 0<br>1 st. 0 | † 01<br>† 01         | 10 st. E.<br>0 4 st. NE.<br>1 st. 0  | † 00<br>† 00               | 10. 0<br>8, 9<br>9, 5<br>8, 3<br>3, 0   |
| rir. 8 st. NE. st. NE.† Lt. haze st. NNE. st. 0               | 00                         | 10 st. NE. 10 nim. N. 10 st. NNE. 10 st. NNE. 10 st. 0                  | , —                        | 10 at. NE. 10 nim. N.* 10 at. 0 10 at. 0 10 at. 0 0            | 00<br>00<br>00             | 10 st.<br>8 st.<br>10 st.<br>10 st.<br>0                  | 0 .   | 00<br>00<br>00<br>00       | 10 st. 0<br>8 st. 0<br>10 st. 0<br>10 st. 0<br>1 st. 0    | 0                    | 0 10 st. (0<br>0 10 st. (0<br>0 10 st. (0  | 00 00                      | 7, 2<br>9, 2<br>10, 0<br>7, 3<br>2, 3   |
| st. 0   | 00                         | 0 0 0<br>0 0<br>10 st. 0<br>10 st. 0<br>0 0                             | 00<br>00<br>00<br>00       | 0 0 0<br>10 st. 0<br>10 st. 0<br>0 0                           | 00<br>00<br>00<br>00       | 0<br>0<br>10 st.<br>10 st.                                | 0 0   | 00<br>00<br>00<br>00<br>00 | 0 0 0<br>0 0 0<br>10 nim. 0<br>10 st. 0<br>0 0            | 0                    | 0 : 10 st. (<br>- 10 nim. (<br>0 : 10 st. (  | 00 00                      | 7. 7<br>9. 9<br>3. 1                    |
| cir. st. 3 st. 0<br>st. 0<br>st. SE.:<br>nim. W.:<br>st. W.:  | 00                         | 2 cir. st. 7 st. 0<br>8 st. 0<br>9 st. SE.*<br>10 nim. W.*<br>9 st. W.* | 00                         | 10 st. 0<br>7 st. 0<br>4 st. 0<br>10 nim. W.<br>6 st. 0        | 00                         | Dense fog.<br>7 st.<br>2 st.<br>10 nim.<br>4 st.          | 0 (   | 00<br>00<br>00<br>00       | Dense fog. 0 8 st. 0 1 st. 0 10 nim. 0 2 st. 0            | 0                    | 5 st. (6 2 st. (7 10 nim. (7 10 n | 00                         | 2. 4<br>3. 5<br>6. 8<br>4. 6<br>7. 8    |
| 0 cir. 0 0 st. 0 st. 0  | 00                         | 0 0 0 0 0 0 0 10 at. 0 10 at. 0   | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                          | 00                         | 0<br>0<br>0<br>10 at.<br>10 st.                           | 0 6   | 00<br>00<br>00<br>00<br>00 | 0 1 st. 0 0 10 st. 10 st. 0                               | 0                    | 0 0<br>0 D. haze. D. haze. 0<br>0 10 st.   | 00 00                      | 6. 4<br>0. 0                            |
| nim. 0<br>cir. st. 7 st. 8<br>st. WSW.                        | . 01<br>00<br>. 10<br>. 10 | 10 nim. 0<br>6 st. 0<br>10 st. WSW.                                     | . 01<br>00<br>00<br>00     | 10 at. 0<br>6 at. 0<br>10 at. WSW.<br>10 at. 0                 | . 01<br>00<br>00<br>00     | 10 at.<br>8 st.<br>10 st.<br>10 st.                       | 0 0   | 00<br>00<br>00<br>00       | 10 st. 0<br>2 cir. st. 3 st. 0<br>8 st. 0<br>10 st. 0     | 0                    | 0 3 cir. st. 3 st. (0 8 st. (  | 00                         | 9. 0<br>4. 2<br>9. 0<br>9. 2            |
| 7. 10   |                            | 7. 10   | 1                          | 6. 87  |                            | 6, 30   |   |                            | 5, 70   |                      | 5. 93  |                            | 6. (                                    |

H. Ex. 44---37

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, —5 hours 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.   |                                      | 2 a. m.   |                                      | 8 a. m.  |                            | 4 a. m.   |                            | 5 s. m.   |                            | 6 a. m.  |
|---|---|--------------------------------------|---|--------------------------------------|--|----------------------------|---|----------------------------|---|----------------------------|--|
| Date.   | Amount, kind, and direction of clouds.  | Precipitation.                       | Amount, kind, and direction of clouds.  | Precipitation.                       | Amount, kind, and direction of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.                                    | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.   |
| 1881.<br>Dec. 1                                     | 3 cir. Light haze. 0  | 00                                   | 1 nt. 0   | 00                                   | 1 st. 0  | 00                         | 0 0   | 00                         | 0 0   | 00                         | 10 st. NW.   |
| Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5<br>Dec. 6      | 10 nim. 0<br>10 nim. 0<br>Light hase. 5 st. 0<br>D. haze. Lt. haze. 0<br>3 st. 0            | . 02<br>. 03<br>. 00<br>. 00<br>. 00 | 10 nim. 0<br>10 nim. 0<br>Light haze. 5 st. 0<br>D. haze. D. haze. 0<br>2 st. 0 | . 02<br>. 03<br>. 00<br>. 00<br>. 00 | 10 st. 0<br>10 nim. 0<br>Light haze. 4 st. 0<br>D. haze. D. haze. 0<br>2 st. 0 | . 01<br>. 03<br>00<br>00   | 10 st. 0<br>10 nim. 0<br>Dense fog. 0<br>D. haze. D. hase. 0<br>4 st. 0   | 00                         | 10 st. 0<br>10 nim. 0<br>Dense fog. 0<br>D. haze. D. haze. 0<br>2 st. 0               | 00<br>. 92<br>00<br>00     | 10 st. 0<br>10 nim. 0<br>Dense fog. 0<br>D. haze. D. haze. 0<br>1 st. 0            |
| Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10<br>Dec. 11    | 8 st. W. 1 st. 0 0 0 0 10 nim. 0 D. haze. D. haze. 0  | 00<br>00<br>00                       | 10 nim. 0<br>1 st. 0<br>0 0<br>10 nim. 0<br>D. haze. D. haze. 0                 | 00 00                                | 10 nim. 0<br>1 st. 0<br>0 0<br>10 st. 0  | 00                         | 10 st. W.<br>1 st. 0<br>0 0<br>10 st. 0<br>0                              | 00                         | 10 at. W. 1<br>8 at. 0<br>0 0<br>10 st. 0<br>0  | 00<br>00<br>00<br>00       | 9 st. W.† 9 st. 0<br>1 cir. 0<br>10 st. 0<br>3 st. 0                               |
| Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15<br>Dec. 16 | D. haze. D. haze. 0<br>0 0<br>1 st. 0<br>0<br>Lt. haze. Lt. haze. 0                         | 00<br>00<br>00<br>00                 | 1 st, 0<br>0 0<br>Lt. haze. D. haze. 0<br>0 Lt. haze. Lt. haze. 0               | 00<br>00<br>00<br>00                 | 8 st. 0<br>0 0<br>9 st. 0<br>0<br>Lt. haze. Lt. haze. 0                        | 00<br>00                   | 9 at. 0<br>0 0<br>10 st. 0<br>1.t. haze. Lt. haze. 0                      | 00<br>00<br>00<br>00<br>00 | 8 st. W. † 0 0 0 10 st. 0 Lt. haze. Lt. haze. 0 Lt. haze. Lt. haze. 0                 | 90<br>90<br>90<br>90       | 9 st. W.†<br>2 st. 0<br>10 st. 0<br>Lt. huze. Lt. haze. 0<br>Lt. haze. Lt. haze. 0 |
| Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20<br>Dec. 21 | Light haze. 0 0 0 0 0 0 0 0 0 0 0 Lt. haze. Lt. haze. 0                                     | 00<br>00<br>00<br>00<br>00           | Light haze. 0 0 0 0 0 0 0 0 0 Lt. haze. Lt. haze. 0                             | 00<br>00<br>00<br>00                 | 0 0 0<br>0 0 0<br>0 0 0<br>Lt. baze, Lt. baze, 0                               | 00                         | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                     | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00       | Light haze. 0<br>0 0 0<br>0 0 0<br>0 Lt. haze. Lt. haze. 0                         |
| Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25<br>Dec. 26 | 0 Lt. haze. Lt. haze. 0 4 st. 0 0 2 cir. 0 0  | 00<br>00<br>00<br>00<br>00           | 0 Lt. haze. Lt. haze. 0 Light haze. 4 st. 0 0 2 cir. 1 st. 0                    | 00<br>00<br>00<br>00                 | 0 Lt. haze. Lt. haze. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                    | 00                         | 0 Lt. hase. Lt. haze. 0 2 st. 0 Clight haze. 8 st. 0                      | 00<br>00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>Light haze. 4 st. 0<br>0<br>Light haze. 3 st. 0              | 00<br>00<br>00<br>00       | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                              |
| Dec. 27<br>Dec. 28<br>Dec. 29<br>Dec. 30<br>Dec. 31 | Dense haze. 2 st. 0 2 cir. 0 0 0 Dense haze. 1 st. 0 10 st.                                 | 00<br>00<br>00<br>00<br>00           | Lt. haze. Lt. haze. 0<br>0 0 0<br>Dense haze. 2 st. 0<br>10 st. 0               | 00<br>00<br>00<br>00                 | Dense haze. 1 st. 0<br>0 0 0<br>Dense haze. 2 st. 0<br>10 st. 0                | 00<br>00<br>00<br>00       | Lt. haze. Lt. haze. 0<br>0 0 0<br>Dense haze. 3 st. 0<br>10 st. 0         | 00<br>00<br>00<br>00       | 10 st. 0<br>0 0<br>0 0<br>Dense haze. 3 st. 0<br>Dense haze. 6 st. 0                  | 00<br>00<br>00<br>00       | 10 st. 0<br>0 0 0<br>Dense haze. 2 st. 0<br>0                                      |
| Menns.  | 2.82  |                                      | 2. 22   |                                      | 2, 58  |                            | 2. 64   |                            | 3, 03   |                            | 3, 32  |
| Date.   | 1 a. m.   |                                      | 2 a. m.   |                                      | 3 a. m.  |                            | 4 a. m.   |                            | 5 a. m.   |                            | 6 a. m.  |
| 1881.<br>Dec. 1                                     | 10 st. 0  | 00                                   | 10 st. 0  | 00                                   | 10 st. 0   | 00                         | 10 st. 0  | 00                         | 10 st. 0  | 00                         | 10 st. 0   |
| Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5<br>Dec. 6      | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>D. haze. Lt. haze. 0<br>10 st. 0                       | 00<br>00<br>00<br>00                 | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>D. haze. Lt. haze. 0<br>10 st. 0           | 01<br>00<br>00<br>00<br>00           | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>2 cir. st. 3 st. 0<br>10 st. 0            |                            | 10 nim. 0<br>6 cir. st. 3 st. 0<br>10 st. NE.:<br>10 st. 0<br>10 st. NE.: | 00                         | 10 nim. 0<br>5 cir. 1 st. 0<br>2 cir. st. 5 st. 0<br>3 cir. st. 6 st. 0<br>16 st. S.† | 00<br>00<br>00<br>00       | 10 nim. 0<br>2 cir. 0<br>1 cir. at. 8 st. 0<br>3 cir. at. 6 st. 0<br>10 st. 8.†    |
| Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10<br>Dec. 11    | 2 st. 0<br>3 st. SW.†<br>9 st. 0<br>10 st. 0<br>4 st. 0                                     | 00<br>00<br>00<br>00                 | 3 st. 0<br>4 st. SW.†<br>10 st. 0<br>10 st. 0<br>1 st. 0                        | 00<br>00<br>00<br>00                 | 2 st. 0<br>3 cir. st. 4 st. 0<br>10 st. 0<br>0 0                               | 00<br>00<br>00<br>00<br>00 | 10 st. SW. 10 st. 0 0   | 00                         | 10 st. W. t<br>8 st. SW. t<br>10 st. 0<br>10 st. 0<br>4 st. 0                         | 00<br>00<br>00<br>00       | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                               |
| Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15<br>Dec. 16 | 0 0 0 0 0 0 0 3 st. 0 Light haze. 0 10 st. 0  | 00<br>00<br>00<br>00                 | 0 0 0 0 0 0 3 st. 0 Light haze. 0 4 st. 0                                       | 00<br>00<br>00<br>00<br>00           | 1 cir. 2 st. 0<br>0 0<br>1 cir. 2 st. 0<br>Light baze. 0<br>1 cir. 4 st. 0     | 00<br>00<br>00<br>00       | 4 st. 0 0 0 1 cir. 2 st. 0 0 1 cir. 4 st. 0                               | 00<br>00<br>00<br>00       | 4 st. NW.* 0 0 4 cir. 3 cir. st. 1 st. 0 0 0 2 st. 0                                  | 00<br>00<br>00<br>00       | 8 st. 0<br>0 0<br>5 cir. 1 st. 0<br>1 cir. 0<br>1 st. 0                            |
| Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20<br>Dec. 21 | 1 st. 0<br>0 0<br>0 0<br>Lt. haze. Lt. haze. 0  | 00<br>00<br>00<br>00<br>00           | 1 st. 0<br>0 0<br>0 0<br>Lt. haze. Lt. haze. 0<br>2 cir. st. 2 st. 0            | 00<br>00<br>00<br>00                 | 2 st. 0<br>0 0<br>0 0<br>2 cir. 3 st. 0<br>7 cir. st. 0                        | 00<br>00<br>00<br>00       | 1 st. 0<br>0 0 0<br>3 cir. 3 st. 0<br>6 cir. st. 2 st. 0                  | 00<br>00<br>00<br>00       | 1 st. 0<br>0 0 0<br>0 0<br>3 cir. 2 st. 0<br>5 cir. st. 2 st. 0                       | 00<br>00<br>00<br>00       | 7 cir. 0<br>0 0<br>0 0<br>1 cir. 1 st. 0<br>5 cir. st. 1 st. 0                     |
| Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25<br>Dec. 26 | Lt. haze. Lt. haze. 0<br>4 st. 0<br>Lt. haze. Lt. haze. 0<br>3 st. 0<br>D. haze. D. haze. 0 | 00<br>00<br>00<br>00<br>00           | 4 st. 0<br>5 cir. 4 st. 0<br>2 st. 0<br>2 st. 0<br>D. haze. D. haze. 0          | 00<br>00<br>00<br>00                 | 1 cir. 2 st. 0<br>10 st. 0<br>1 st. 0<br>0 0<br>10 st. 0                       | 00<br>00<br>00<br>00       | 1 cir. 8 st. 0<br>10 st. 0<br>1 st. 0<br>2 st. 0<br>10 st. 0              | 00<br>00<br>00<br>00       | 1 cir. 7 st. 0<br>10 st. 0<br>1 cir. 1 st. 0<br>2 st. 0<br>10 st. 0                   | 00<br>00<br>00<br>00<br>00 | 3 cir. 2 st. 0<br>10 st. 0<br>3 cir. 1 st. 0<br>2 st. 0<br>10 st. 0                |
| Dec. 30   | I.t. haze. 4 st. 0<br>0 0<br>I.t. haze. 4 st. 0<br>10 st. 0<br>10 st. 0                     | 00<br>00<br>00<br>00<br>00           | 4 cir. 3 st. 0<br>0 0<br>9 st. 0<br>10 st. 0                                    | 00<br>00<br>00<br>00                 | 5 cir. st. 3 st. 0<br>0 0<br>9 st. 0<br>10 st. 0<br>10 st. 0                   | 00<br>00<br>00<br>00       | 5 cir. st. 3 st. 0<br>1 st. 0<br>9 st. 0<br>10 st. 0<br>10 st. 0          | 00<br>00<br>00<br>00       | 3 cir. st. 5 st. 0<br>1 st. 0<br>9 st. 0<br>10 nim. 0<br>10 st. 0                     | 00<br>00<br>00             | 3 cir. st. 5 st. 0<br>1 st. 0<br>9 st. 0<br>10 nim. 0<br>10 st. 0                  |
| Means.  | 4. 09   |                                      | 4. 61   |                                      | 5. 46  | 1                          | 6. 29   | Г                          | 6. 16   |                            | 6.00   |

character o table \* signific

7 a. 1

Amount, kind direction of c

5 st. Light haze. 4 st 10 st. Lt haze. Lt. haz-10 nim.

1 st. Light haze. 5 st.

7 p. m.

1 cir. 1 st. 10 st. 1 cir. 2 st. 2 st. 10 st.

character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

uble signifies rapid, taignifies slow. Daily means of amount of clouds on the right below, amount of precipitation on the right above.]

| Light haze. Lt. haze. 0 Light haze. Lt. haze. 0 Light haze. 4 st. 0  | 00 00 00 00 00 00 00 00 00 00 00 00 00 | Lt. haze. D. haze. 0 10 at. 0 10 at. 0 10 h. haze. Lt. haze. 0 10 at. 0 10 haze. Lt. haze. 0 0 2 at. W. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 0 11 at. 0 12 at. 0 11 at. 10  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | Amount, kind, and direction of clouds.    0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | Amount, kind, and direction of clouds.  2 st. 0 10 st. 0 9 st. 0 10 st. 0 10 st. 0 10 st. 0 | 90 00 00 Precipitation.    | 10 st. 0   | 00                         |  | 90 Precipitation.          |                                      |
|--|--|--|--|--|--|---|----------------------------|--|----------------------------|--|----------------------------|--------------------------------------|
| Selections. D. hase. 0 10st. 10st. 10st. 10st. 10st. 20st. 2 | 00 00 00 00 00 00 00 00 00 00 00 00 00 | Lt. haze. D. haze. 0 10 at. 0 10 at. 0 10 haze. Lt. haze. 0 10 haze. Lt. haze. 0 0 9 at. W. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 1 10 at. 1 10 at. 1 10 at. 1 10 at. 0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                   | 10 st. 0 10 nim. 0 10 st. 0 10 st. 10 | 00<br>.02<br>.00<br>.00<br>.00   | 10 st. 0<br>9 st. 0<br>10 st. 0<br>D. hase. Lt. base. 0<br>10 st. 0                         | . 02<br>. 02<br>00         | 10 nim. 0 .  | 00                         | 10 pim. 0  | . 01                       | . 00                                 |
| 1 st   | 00 00 00 00 00 00 00 00 00 00 00 00 00 | 9 at. W. 0 10 at. 0 Dense haze. 0 2 at. 0 2 at. 0 10 at. 10 nim. 0 0   | 00<br>00<br>00<br>00<br>00   | 5 st. W.†<br>0 0<br>10 st. 0   | 00   |   | 00                         | D. haze. Lt. haze. 0   | 00 i                       | 10 at. 0<br>D. haze. Lt. Laze. 0<br>10 at. 0                                     | 00<br>00<br>00             | . 16                                 |
| Jost. Light haze. 4 st. 10 st. | 00 00 00 00 00                         | 2 st. 0<br>10 st. 0<br>Lt. haze. Lt. haze. 0<br>10 nim. 0  | 00   | D. Haze. U. Haze. U  | 00<br>00<br>00   | 9 st. NW.* 4 st. W. 0 0 10 at. W. D. haze. D. haze. 0                                       | 00                         | 4 st. W.†  | 00<br>00<br>00<br>00<br>00 | 8 at. 0<br>4 at. W.t<br>0 0<br>10 at. 0  | 00<br>00<br>00<br>00<br>00 | . 01                                 |
| D. haze. D. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. U. haze. 4 st. 0   | 00 00                                  | 0 • 0  | . 01   | 1 st. 0<br>10 st. 0<br>1 st. 0<br>1 st. 0<br>10 nim. 0   | 00<br>00<br>00<br>00<br>00   | n 0 0 0 10 at. 0 0 10 nim. 0  | 00<br>00<br>00<br>00<br>00 | 1 st. 0<br>4 st. 0   | 00<br>00<br>00             | 0 0 0<br>0 0<br>4 st. 0<br>Light haze. 0<br>10 st. 0                             | 00<br>00<br>00<br>00       | . 00<br>. 00<br>. 00<br>. 00         |
| Lt. haze. Lt. haze. 0  | 100                                    | Dense haze. 0  | 00<br>00<br>00<br>00   | 0 0 0<br>0 0 0<br>D. haze, Lt. haze, 0<br>0 0  | 00<br>00<br>00<br>00   | 0 0 0<br>0 0 0<br>Light haze. 5 st. 0   | 00<br>00<br>00<br>00       | 0 0 0 4 st. 0 0  | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00 | . 00                                 |
| Light haze. 5 st. 0  | 00                                     | 1 st. 0<br>Light baze. 4 st. 0   | 00<br>00<br>00<br>00   | Lt. haze. Lt. haze. 0<br>10 st. 0<br>Light haze. 1 st. 0<br>1 st. 0<br>Light haze. 4 st. 0   | 00<br>00<br>00<br>00   | 10 nim. 0<br>Lt. haze. Lt. haze. 0<br>1 st. 0<br>D. haze. D. haze. 0                        | 00                         | I.t. haze. Lt. haze. 0   | 00<br>00<br>00             | Lt. haze. Lt. haze. 0 10 st. 0 Lt. haze. Lt. haze. 0 4 st. 0 D. haze. D. haze. 0 | 00<br>00<br>00<br>00       | .0                                   |
| Lt haze. D. haze. 0<br>0<br>1 st. 0<br>19 st. 0<br>9 st. W.  | 00                                     | 9 st. 0<br>0 0<br>Dense haze. 1 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>Dense haze. 1 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00   | 10 st. 0<br>Uense haze. 0<br>10 st. 0<br>10 st. 0   | 00                         | 0<br>Light haze. 3 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00<br>00 | Light haze. 5 st. 0<br>0 0<br>4 st. 0<br>10 st. 0<br>10 st. 0                    | 00<br>00<br>00<br>00<br>00 | .0                                   |
| 3. 41  |  | 3.48   | 1  | 4. 22  | -  | 4. 19   |                            | 4. 16  |                            | 4. 25  |                            | . 4                                  |
| 7 p. m.  |  | 8 p. m.  |  | 9 p. m.  |  | 10 p. m.  |                            | 11 p. m.   |                            | 12 p. m.   |                            | Daily<br>means.                      |
| 10 st. 0   | 00                                     | 10 st. 0   | 00   | 10 st. 0   | 00   | 1 cir. st. 6 st. 0  | 00                         | Dense haze, 0  | 00                         | 5 st. Lt. haze. 0  | 00                         | 6. 0                                 |
| 10 nim. 0 1 cir. 1 st. 0 2 cir. st. 7 st. 0 1 cir. st. 7 st. 0 1 cir. st. 7 st. 5.   | 00                                     | 10 nim. 0<br>1 cir. 1 st. 0<br>2 cir. st. 7 st. 0<br>10 st. 0<br>10 st. 8.   | 00   | 10 nim. 0<br>0 0<br>10 st. 0<br>10 st. 0<br>10 nim. 0  | .01<br>00<br>00<br>00  | 10 nim. 0<br>0 0<br>10 st. 0<br>Lt. hase. 7 st. 0<br>10 nim. 0                              | . 01<br>00<br>00<br>00     | D. haze. D. fog. 0   | 02<br>00<br>00<br>00       | 10 nim. 0<br>0 0<br>D. haze. D. fog. 0<br>1 st. 0                                | . 02<br>00<br>00<br>00     | 9. 2<br>7. 0<br>7. 0<br>2. 9<br>7. 2 |
| 10 st. · W. · 8 st. · 0 10 st. · 0 10 st. · 0 2 cir. st. 4 st. · 0   | 00<br>00<br>00                         | 8 st. W. 9 st. 0 10 st. 0 10 st. 0 10 st. 0  | 00<br>00<br>00<br>60   | 4 st. 0<br>9 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00   | 2 st. 0<br>9 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0  | 00                         | 10 nim. 0 .  | 00 00                      | 1 st. 0<br>Lt. haze. 0<br>10 nim. 0<br>Lt. hase. 0<br>1 st. 0                    | 00 00 00                   | 6, 2<br>5, 5<br>5, 0<br>8, 7<br>2, 4 |
| 2 st. 0<br>0 0<br>1 cir. 0<br>1 cir. 0<br>1 st. 0  | 00                                     | 0 0 0 0 0 0 0 0 0 0 2 cir. at. 2 at. 0   | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 10 st. 0 1 st. 0   | 00<br>00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 2 at. 0  | 00<br>00<br>00<br>00       | 0 0 0<br>0 0 0<br>D. haze. 2 st. 0<br>Lt. haze. 0                                | 00<br>00<br>00<br>00       | 2. 4<br>4. 7<br>1. 0<br>3. 7         |
| 2 cir. 1 st. 0<br>0 0<br>0 0<br>1 cir. 2 st. 0<br>2 cir. st. 4 st. 0   | 00<br>00<br>00<br>00<br>00             | 2 cir. 2 st. 0<br>0 0<br>0 0<br>1 st. 0<br>4 st. 0   | 00<br>00<br>90<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 D. haze. Lt. haze. 0   | 00<br>00<br>00<br>00       | 0 0 0<br>0 0 0<br>D. haze. Lt. haze. 0<br>0                                      | 00<br>00<br>00<br>00       | 1.5<br>2.1                           |
| l cir. l at. 0 10 st. 0 1 cir. 2 st. 0 2 st. 0 0 st. 0 0 st.   | 00<br>00<br>00<br>00                   | 1 st. 0<br>10 st. 0<br>1 cir. 2 st. 0<br>3 st. 0<br>10 at. 0   | 00<br>00<br>00<br>00<br>00   | 1 st. 0<br>2 st. 0<br>2 st. 0<br>Lt. haze. Lt. haze. 0<br>10 st. 0   | 00<br>00<br>00<br>00   | 1 st. 0<br>2 st. 0<br>2 st. 9<br>Lt. hase. Lt. hase. 0<br>Lt. haze. 5 st. 0                 | 00<br>00<br>00<br>00       | 1 at. 0 0 1 at. 0  | 00<br>00<br>00<br>00       | Lt. hage, Lt. hage, 0<br>3 st. 0<br>0 0 0<br>1 cir. 1 st. 0<br>Lt. hage, 4 st. 0 | 00<br>00<br>00<br>00       | 1, 4<br>5, 0<br>1, 9<br>1, 2<br>4, 7 |
| 2 cir. st. 6 at. 0<br>1 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0   | 00                                     | 1 cir. st. 5 st. 0<br>0 0<br>10 st. 0<br>10 nim. 0   | 00<br>00<br>00   | 2 cir. st. 4 st. 0<br>0 0<br>Lt. haze. 4 st. 0   | 00<br>00<br>00   | 3 cir. st. 3 st. 0<br>0 U<br>Lt. haze. 5 st. 0<br>10 nim. 0                                 | 00<br>00<br>00             | 1 cir. 2 cir. st. 0 0 1 1 cir. 2 cir. st. 0 0 1 1 cir. 2 cir. st. 0 0 1 cir. st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00<br>00                   | 3 cir. 0   | 00                         | 5. 76                                |
| 5. 67  | 00                                     | 10 at. 0   | 00   | 10 nim. 0<br>10 st. 0  |  | 10 nim. 0<br>10 st. 0   | 00                         | 10 st. 0   | 00                         | 3 cir. st. 3 st. 0<br>10 st. 0<br>10 st. 0                                       | 00<br>00<br>00             | 4. 08<br>8. 04<br>9. 37              |

and amount and iven in inches. In this

nount, kind, and ection of clouds.

haze. Lt. haze. 0 00

haze. Lt. haze. 0 00

haze. 4 st. 0 00

ght haze. 3 st. 0 00

st.
onse haze. 2 st.
3.32

6 a. m.

st. 0 00

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Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.  |   | 2 a. m.   |  | 3 a. m.  |  | 4 n. m.  |  | 8 a. m.  |  | 6 а. п.  |
|---|--|---|---|--|--|--|--|--|--|--|--|
| Date.   | Amount, kind, and<br>direction of clouds   | Precipitation.                          | Amount, kind, and direction of clouds.                          | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitatian.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   |
| 1882.<br>Jan. 1<br>Jan. 2<br>Jan. 3<br>Jan. 4<br>Jan. 5   | 1 cir.<br>0<br>5 cir. cum. 4 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00    | 10 st. 0<br>0 0<br>2 cir. cum. 3 st. 0                          | 00   | 10 st. 0<br>0 0<br>0 0<br>3 cir, cum. 3 st. 0  | 00<br>00<br>00<br>00   | 3 cir. 2 st. 0<br>0 0<br>1 st. 0<br>4 cir. cum. 2 st. 0  | 00   | Light haze. 4 st. SE. † 0 0 2 st. 0 4 cir. cum. 2 st. 0 1 cir. 0   | 00<br>00<br>00<br>00   | Light haze, 4 at. 0 or<br>Light haze, 2 at. 0 or<br>1 cir. cum. 3 at. 0 or   |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10   | 1 cir.<br>0  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00    | 0 1 cir. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                  | 00 00 00 00  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0  | 00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15   | 10 nim. (  | 0 00<br>0 01<br>0 02<br>0 00<br>0 00    | Light hase. 0<br>10 nim. 0<br>10 nim. 0<br>10 nt. 0<br>10 at. 0 | 00<br>.01<br>.01<br>.00  | 0 0 0<br>10 nim. 0<br>10 nim. 0<br>10 at. 0  | . 01<br>. 01<br>. 00<br>00   | Light hase. 0<br>10 nim. 0<br>10 nim. 0<br>10 at. 0<br>0 0   | . 01   | I.ight haze. 0<br>10 nim. 0<br>10 nim. 0<br>10 st. 0<br>0  | . 02<br>. 01<br>. 00<br>. 00   | Light haze. 0 m<br>10 nim. 0 m<br>10 nim. 0 m<br>10 st. 0 m<br>0 0 0   |
| Jan. 16<br>Jan. 17<br>Jan. 18<br>Jan. 19<br>Jan. 20   | 0  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00    | 0 0 0<br>Light haze. 0<br>9 st. 0<br>10 st. 0                   | 00   | 0 0 0<br>0 0 0<br>10 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00   | O 10 st. 0 0 10 10 st.   |
| Jan. 21<br>Jan. 22<br>Jan. 23<br>Jan. 24<br>Jan. 25   | 10 st. (0<br>10 nim. (0<br>0 0<br>0 0  | 0 . 02                                  | 10 st. 0<br>10 nim. 0<br>0 0<br>0 0<br>0 0                      | . 01   | 10 nim. 0<br>10 nim. 0<br>9 st. 0<br>0 0   | . 01   | 10 st. 0<br>10 nim. 0<br>4 st. 0<br>0 0  | . 01<br>00<br>00<br>00   | 10 st. 0<br>10 nim. 0<br>1 st. 0<br>0 0  | 00<br>00<br>00<br>00   | 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Jan. 26<br>Jan. 27<br>Jan. 28<br>Jan. 29<br>Jan. 30   | 10 nim. 0<br>0 0<br>0 0<br>0 0<br>0 0  | 00 00                                   | 10 nim. 0<br>0 0<br>0 0<br>0 0<br>0 0                           | 00<br>00   | 10 nim. 0<br>θ 0 0<br>0 0 0<br>θ 0 0   | 00<br>00<br>00<br>00   | 10 nim. 0 0 0 Lt. haze. D. haze. 0 0 0   | . 01<br>00<br>00<br>00<br>00   | 10 nim. 0<br>0<br>Lt. haze. Lt. haze. 0<br>0 0   | . 01<br>00<br>00<br>00<br>00   | Lt. haze. Lt. haze. 0  |
| Jan. 31   | 2 cir. 0   | 00                                      |   | 00   | 2 cir. 0   | 00   | 1 cir. 0   | 00   |  | 00   | 1 cir. 0 0   |
| Means.  | 3. 19  | <u> </u>                                | 3. 12   |  | 3. 45  |  | 3. 12  |  | 3. 12.   |  | 2. 61.   |
| 1 te.   | 1 p. m.  |   | 2 p. m.   |  | \$ p. m.   |  | 4 p. m.  |  | 5 p. m.  |  | 6 p. m.  |
| 1882.<br>Jan. 1<br>Jan. 2<br>Jan. 3<br>Jan. 4<br>Jan. 5   | 1 st. 0<br>0<br>Lt. haze, Lt. haze, 0  | 00                                      | Light haze. 5 st. 0   | 00   | 10 st. SE.   | 00   | 8 at. 0  | 00   | Dense haze. 2 st. 0  | 00   | Dense haze. 4 st. E. 10  |
| can o .   | 0<br>1 cir. st. 4 st. 0  | 00                                      | 0 0<br>2 st. 0<br>0 0<br>9 st. 0                                | 00   | 0 0<br>1 st. 0<br>0 0<br>9 st. E.  | 00   | 0 0 1 st. 0 0 10 st. 0   | 00   | 0 0<br>1 cir. 0<br>10 cir. st. 0<br>10 st. 0   | 00<br>00<br>00<br>00   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9  | 0 0  | 00 00 00 00 00 00 00 00 00 00           | 2 st. 0   | 00   | 1 at. 0  | 00   | 1 at. 0  | 00   | 1 cir. 0   | 00   | 1 st. 0 16<br>5 cir. st. 5 st. 0 16  |
| Jan. 6<br>Jan. 7<br>Jan. 8  | 0 1 cir. st. 4 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 0 00 00 00 00 00 00 00 00 00 00 00 00 0 | 2 st. 0<br>0 0<br>9 st. 0<br>0 0<br>0 0<br>0 0                  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                               | 1 et. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                               | 1 st. 0<br>0 10 st. 0<br>10 st. 0<br>2 cir. st. 0<br>1 cir. cum. 1 st. 0<br>0 1 cir. 1 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 1 cir. 0 10 cir. st. 0 10 st. 0  3 cir. st. 0 1 cir. cum. 1 st. 0 0 0 2 cir. 1 st. 0   | 00<br>00<br>00<br>00<br>00<br>00   | 1 st, 0 iii 5 cir. st. 5 st, 0 iii 10 st, E. + 0 2 cir. st, 0 0 0 0 0 0 0 3 cir. 1st, 0 0  |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10<br>Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15<br>Jan. 16<br>Jan. 17<br>Jan. 17   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 0 00 00 00 00 00 00 00 00 00 00 00 00 0 | 2 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                     | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00             | 1 st. 0<br>0 st. E.<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>3 cir. cum. 0<br>10 st. 0<br>10 ott. 0<br>10 nim. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 1 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 1 cir. 0 10 cir. st. 0 10 st. 0 3 cir. st. 1 1 cir. cum. 1 st. 0 0 2 cir. 1 st. 0 1 st. 0 10 ntm. 0 10 ntm. 0 10 at. 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                         | 1 st.   0 m   5 cir. st. 5 st.   0 m   10 st.   0 s   |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10<br>Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15<br>Jan. 16<br>Jan. 17<br>Jan. 18<br>Jan. 17<br>Jan. 18   | 0 1 cir. st. 4 st. 0 | 0 00 00 00 00 00 00 00 00 00 00 00 00 0 | 2 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                     | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 1 as. 0 0 0 at. E. 1 at. 0 1 a | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 1 at. 0 0 0 0 0 0 10 at. 0 10 at. 0 1 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 0 10 cir. st. 0 10 cir. st. 0 3 cir. st. 1 1 cir. cum. 1 st. 0 2 cir. 1 st. 0 1 st. 0 10 st. 0 0 0 1 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 at. 0 10 at. 1 |
| Jan. 6 Jan. 7 Jan. 8 Jan. 9 Jan. 10 Jan. 10 Jan. 11 Jan. 12 Jan. 13 Jan. 14 Jan. 15 Jan. 16 Jan. 17 Jan. 17 Jan. 18 Jan. 19 Jan. 20 Jan. 21 Jan. 22 Jan. 23 Jan. 23 Jan. 23   | 0 1 cir. st. 4 st. 0 | 00 00 00 00 00 00 00 00 00 00 00 00 00  | 2 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                     | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 as. 0 9 at. E.  1 at. 0 1 at. 0 1 at. 0 1 at. 0 10 at. 0 10 at. 0 10 at. 1 10 at. 1 10 at. 1 10 at. 1 10 at. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 0 0 0 1 cir. 1 at. 0 10 at. | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 0 10 cir. st. 0 10 cir. st. 0 10 cir. st. 0 1 cir. cum. 1 ct. 0 1 cir. 0 1 cir. 0 10 cir. | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 at. 0 10 at. 1 10 at. 0 10 at. 1 10 a |
| Jan. 6 Jan. 7 Jan. 8 Jan. 9 Jan. 10 Jan. 10 Jan. 12 Jan. 13 Jan. 14 Jan. 15 Jan. 16 Jan. 16 Jan. 17 Jan. 17 Jan. 22 Jan. 22 Jan. 22 Jan. 22 Jan. 25 Jan. 25 Jan. 25 Jan. 25 Jan. 26 Jan. 27 Jan. 28 Jan. 28 Jan. 28 Jan. 28 | 0   1   1   1   1   1   1   1   1   1  | 00 00 00 00 00 00 00 00 00 00 00 00 00  | 2 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                     | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 as. 0 9 at. E.  1 st. 0 1 at. 0 1 at. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 0 10 at. 0 0 0 1 cir. 1 st. 0 10 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 at. 0 0 0 0 0 0 0 1 cir. 1 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 1 cir. 0 10 cir. st. 0 10 cir. st. 0 10 st. 0 1 cir. cum. 1 st. 0 1 cir. cum. 1 st. 0 1 cir. cum. 1 st. 0 1 cir. st. 0 1 cir. st. 0 1 cir. 1 cir. 0 1 cir. 0 1 cir. 0 1 cir. 0 1 cir. 0 1 cir. 1 cir. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 at. 0 at.  |

character

Amount, ki

4 cir. 2 st. 0 Lt. hase. Lt. 1 1 st. 0

Dense haze. 3 10 nim. 10 st. 0 Light haze. 0 10 st.

10 st.
10 at.
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Lt. haze. Lt. h
10 st.
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7 p. m. Dense haze, 2 st 1 st. 2 cir. st. 7 st.

3. 19.

1 cir. st.
0
6 cir. 1 st.
1 cir. 1 st.
10 st.
10 nim.
10 st.
1 cir. 1 st.
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1 cir. 0 st.
1 cir. 1 cir. 0 st.
1 cir. 0 st.
1 cir. 0 st.

10 st.
10 nim.
10 st.
Lt. haze. 4 st.
Dense haze. 3 st.
1 cir.
10 nim.
1 st.
0

8 cir. st. D. haze. 4, 58. character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

table signifier rapid, + signifier slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  |                            | 5 a. m.                               | •                                    | 9 a. m.  |                            | 10 a. m.   |                              | 11 a. m.  |                            | 12 m.  |                | 曹              |
|--|----------------------------|---------------------------------------|--------------------------------------|--|----------------------------|--|------------------------------|---|----------------------------|--|----------------|----------------|
| monnt, kind, and<br>rection of clouds.           | Precipitation.             | Amount, kind, and direction of clouds | Precipitation.                       | Amount, kind, and direction of clouds.                         | Precipitation.             | Amount, kind, and direction of clouds.           | Precipitation.               | Amount, kind, and direction of clouds.                        | Precipitation.             | Amount, kind, and direction of clouds.                                     | Precipitation. | Amount of pre- |
| ir. 2 st. SE, t<br>haze. Lt. haze. 0<br>ot. 0    | 00<br>00<br>00<br>00       | Lt. haze. Lt. haze.                   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 2 cir. 0<br>0 0<br>Light base, 0<br>0 0                        | 00<br>00<br>00<br>00       | 1 cir. 0 0 0 Light haze. 0 0 1 cir. 0            | 00<br>00<br>00<br>00         | 10 st, 0<br>0 0<br>Light haze. 0<br>0 0<br>2 cir, st. 1 st. 0 | 00<br>00<br>00<br>00       | Light haze. 7 st. 0<br>0 0 0<br>Light haze. 0<br>0 0<br>2 cir. st. 2 st. 0 | 00             | . (            |
| ot. 0<br>0<br>0<br>0<br>0<br>0<br>0              | 90<br>00<br>00<br>00<br>00 | 0 0                                   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 0 0 0  | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                    | 00<br>00<br>00<br>00         | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                         | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                      | 00             |                |
| nse baze. 3 st. 0 nim. 0 nim. 0 st. 0            | 00<br>00<br>00             | 10 nim.<br>10 nim.<br>10 st.          | 0 00<br>0 00<br>0 00                 | Dense haze. 2 st. 0<br>10 nim. 0<br>10 nim. 0<br>10 st. 0<br>0 |                            | Dense haze. 2 st. 0 9 st. 0 10 nim. 0 10 st. 0 0 | . 00<br>. 01<br>. 00<br>. 00 | Dense haze. 3 st. 0 9 st. 0 10 nim. 0 10 st. 0 0              | 00 00                      | Dense hare. 3 st. 0<br>10 st. 0<br>10 nim. 0<br>4 st. 0                    | 00             |                |
| th haze. 0<br>0<br>0<br>0<br>0<br>0<br>0<br>1. 0 | 00<br>00<br>00<br>00       | Lt. haze. 4 st.<br>0<br>10 st.        | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 0 Light haze. 3 at. 0 0 0 0 0 0 0 10 at. 0 0                   | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0            | 00<br>00<br>00<br>00         | 0 0 0 0 10 at. 0 0 0 10 st. 0 10 st. 0 0                      | 00<br>00<br>00<br>00       | 0 10 st. 0 0 10 st. 10 st. 0 0   | 00<br>00       |                |
| t. 0<br>nim. 0<br>0<br>hase. Lt. hase. 0         | 00<br>00<br>00             | 10 nim.<br>0<br>0                     | 0   00<br>0   00<br>0   00<br>0   00 | 10 at. 0<br>10 nim. 0<br>0 0<br>0 0<br>2 at. 0                 | 00<br>00<br>00             | 10 st. 0<br>10 st. 0<br>0 0<br>0 0               | 00 00 00                     | 4 st. 0<br>10 st. 0<br>0 0<br>0 0<br>0 0                      | 00<br>00<br>00<br>00       | Dense haze. 4 st. 0<br>10 st. 0<br>0 0 0<br>10 st. 0                       | 00             |                |
| ot. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0        | 00<br>00<br>00<br>00       | 0 0                                   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 0 0 0 0 1 at, 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00 | 0 0 0<br>0 0 0<br>0 0 0<br>0 0 0                 | 00<br>00<br>00<br>00         | 0 0 0 0 0 0 0 0 0 0 0 0 0                                     | 00<br>00<br>00<br>00       | 0 0 0  | 00<br>00       |                |
| 3, 19.   | 00                         | 3 cir.<br>2, 83.                      | 00                                   | 8 cir. 0   | 00                         | 3 cir. 0   | 00                           | 5 cir. 1 st. 0  | 00                         | 6 cir. 4 st. 0   | 00             |                |

| 7 p. m.   | _                   |                            | 8 p. m.   | -                |                      | 9 p. m.  |                          |                            | 10 p. m.  |                  |                            | 11 p. m.  |                  |                            | 12                                    | p. m.            |  | Daily<br>means.                |
|---|---------------------|----------------------------|---|------------------|----------------------|--|--------------------------|----------------------------|---|------------------|----------------------------|---|------------------|----------------------------|---------------------------------------|------------------|--|--------------------------------|
| Dense haze. 2 st.<br>0<br>1 st.<br>2 cir. st. 7 st.<br>10 st.       | E. †                | 00<br>00<br>00<br>00       | 2 st.<br>0<br>Dense haze, 1 st<br>10 st.<br>1 st.                 | t. 0<br>0<br>0   | 00<br>00<br>00<br>00 | 2 at.<br>0<br>1 at.<br>9 at.<br>1 st.                      | 0<br>0<br>0<br>0         | 00<br>00<br>00<br>00<br>00 | 2 cir.<br>0<br>2 at.<br>1 cir. at. 4 at.                        | 0 0              | 00<br>00<br>00<br>00       | 2 cir.<br>0<br>Light haze.<br>0                   | 0 0 0            | 00<br>00<br>00<br>00       | 2 clr.<br>0 10 st.<br>0               | 0<br>E.<br>0     | 1 00   | 04<br>1.08<br>3.75             |
| 1 cir. st.<br>0<br>0<br>6 cir. 1 st.<br>1 cir. 1 st.                | 0<br>0<br>0<br>0    | 00<br>00<br>00<br>00       | 2 st.<br>0<br>0<br>7 cir. st. 2 st.<br>1 st.                      | 0<br>0<br>0<br>0 | 00<br>00<br>00<br>00 | 2 st.<br>0<br>0<br>4 cir. st. 2 st.<br>1 st.               | 0<br>0<br>0<br>0         | 00<br>00<br>00<br>00       | 2 st.<br>0<br>0<br>3 st.<br>1 st.                               | 0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00 | 1 at.<br>0<br>0<br>2 st.<br>1 at.                 | 0<br>0<br>0<br>0 | 00<br>00<br>00<br>00       | 0<br>0<br>0<br>0                      | 0<br>0<br>0<br>6 | 00   | , 45<br>, 04<br>, 1, 54        |
| 10 st.<br>10 nim.<br>10 st.<br>0<br>1 cir. 1 st.                    | 0<br>0<br>0<br>0    | 00<br>00<br>00<br>00       | 10 st,<br>10 nim.<br>10 st.<br>0<br>1 cir. 1 st.                  | 0<br>0<br>0<br>0 | 00<br>01<br>00<br>00 | 10 st,<br>10 nim.<br>10 st.<br>0<br>1 st.                  | 0<br>0<br>0<br>0         | .01<br>.00<br>.00          | 10 st.<br>10 nim.<br>10 st.<br>0                                | 0<br>0<br>0<br>0 | 00<br>02<br>00<br>00<br>00 | 10 st.<br>10 nim.<br>10 st.<br>0                  | 0<br>0<br>0<br>0 | 00<br>00<br>00             | 10 nim.<br>10 nim.<br>10 st.<br>0     | (<br>(<br>(      | 0 0  | 9. 91<br>9. 10. 00<br>9. 4. 75 |
| 1 st.<br>1 cir. 9 st.<br>10 st.<br>10 st.<br>5<br>10 nim.           | 0<br>0<br>8E.*<br>0 | 00<br>00<br>00<br>00       | 1 st.<br>2 cir. 4 st.<br>10 st.<br>10 st.<br>10 st.               | SE.*             |                      | 1 cir. 2 st.<br>1 cir. 3 st.<br>10 st.<br>10 st.<br>10 st. | 0<br>0<br>8E.*<br>0<br>0 | 00<br>00<br>00<br>00       | 1 cir. 2 st.<br>1 cir. 1 st.<br>1 cir. 3 st.<br>10 st.<br>9 st. | 0 0              | 00<br>00<br>00<br>00<br>00 | Light haze.<br>2 st.<br>3 st.<br>10 st.<br>10 st. |                  | 00<br>00<br>00<br>00<br>00 | Light haze. 0 2 st. 10 st. 5 st.      | (                | 0 : 00<br>0 : 00<br>0 : 00<br>0 : 00<br>0 : 00 | 5, 04<br>0 2, 91<br>0 9, 75    |
| 10 st.<br>Lt. haze. 4 st.<br>Dense haze. 3 st.<br>1 cir.<br>10 nim. | W.*<br>0<br>0<br>0  | 00<br>00<br>00<br>00       | 10 st.<br>Lt. haze. 5 st.<br>Lt. haze. 6 st.<br>1 cir.<br>10 nim. | W.*<br>W.*       | 00<br>00             | 10 st.<br>2 st.<br>1 st.<br>1 cir.<br>10 nim.              | W.*                      |                            | 10 st.<br>2 st.<br>1 st.<br>1 cir.<br>10 nim.                   | W.*<br>W.*<br>0  | 00<br>00<br>00<br>00<br>00 | 10 nim.<br>0<br>1 st.<br>0<br>10 nim.             | 0<br>0<br>0<br>0 | 00<br>00<br>00             | 10 nim.<br>0<br>3 st.<br>0<br>10 nim. | w                | 0 , 0:<br>0 *, 0:<br>0 (ii)                    | 7.91<br>0 1.29<br>0 .20        |
| 1 st.<br>0 .<br>0 0   | 0<br>0<br>0<br>0    | 00<br>00<br>00<br>00<br>00 | 1 st.<br>0<br>0<br>0<br>0   | 0<br>0<br>0<br>0 | 00<br>00<br>00<br>00 | 1 st.<br>0<br>0<br>0<br>0<br>1 st.                         | 0<br>0<br>0<br>0         | 00<br>00<br>00<br>00       | 1 st.<br>0<br>0<br>0<br>1 st.                                   | 0 0              | 00<br>00<br>00<br>00<br>00 | 0<br>0<br>0<br>0<br>0                             | 0<br>0<br>0<br>0 | 00<br>00<br>00<br>00       | 0<br>0<br>0<br>0                      |                  | 0 00<br>0 00<br>0 00<br>0 00                   | 0 .00<br>0 .04<br>0 .00        |
| 8 cir. st. D. haze.   | 0                   | 00                         | 9 st. Dense haz   | te. 0            | 00                   | D. haze. D. haze   | . 0                      | 00                         | D. haze. D. haze  | e. 0             | 00                         | D. haze. D. haze.                                 | 0                | 00                         | D. haze. D                            |                  | 0 0  |                                |
| 4. 58.  |                     |                            | 4. 41.  |                  |                      | 3. 74.   |                          |                            | 3, 22.  |                  |                            | 2. 64.  |                  | 1                          | 2. 0                                  | 34.              |  | 3, 42                          |

s, and amount and given in inches. In this

Amount, kind, and lirection of clouds

6 a. m.

Light haze. 4 st. 0
Light haze. 2 st. 0
1 cir. cum. 3 st. 0
0

10 st. 0
10 nim. 0
0 0
0 0
0
Ut. haze. Lt. haze. 0
Lt. haze. Lt. haze. 0
0 0
1 cir. 0

Statement showing the amount, kind, and direction of clouds, and amount out

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.  |   | 2 a. m.                                  | -                          | ð a. m.   |                      | 4 a. m.   | genetics .           | 5 a. m.  | -                          | 0 n. m.  |
|---|--|---|--|----------------------------|---|----------------------|---|----------------------|--|----------------------------|--|
| Date.   | Amount, kind, and<br>direction of clouds.                                    |   | t, kind, and<br>of clouds.               | Precipitation.             | Amount, kind, and direction of clouds.  | Procipitation.       | Amount, kind, and direction of clouds.  | Precipitation.       | Amount, kind, and<br>direction of clouds.  | Precipitation              | Amount, kind, and direction of clouds,   |
| 1882.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | D. haze. Lt. haze. 0<br>1 st. 0<br>Lt. haze. Lt. haze. 0<br>D. haze. 2 st. 0 | 00 1 st.  | Lt. base. 0<br>D. base. 0<br>Lt. base. 0 |                            | D. haze. Lt. haze. 0<br>1 st. 0<br>D. haze. D, haze. 0<br>Lt. haze. Lt. haze. 0             | 00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>0<br>D. haze. D. haze. 0<br>Lt. haze. 2 st. 0                                    | 00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>0 0 0<br>D. haze. D. haze. 0<br>Lt. haze. 2 st. 0                   | 00<br>00<br>00<br>00       | 0<br>3 cir, 0 00<br>10 at. D. hase. 0 00<br>D. hase. 2 st. 0 00                            |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | 1 st. 0<br>D. haze. 4 st. 0<br>1 st. 0<br>0<br>Lt. haze. D. haze. 0          | 00 0<br>00 10 st. D<br>00 Lt. haze.<br>00 Lt. haze.<br>00 Lt. haze.     | Lt. haze. 0                              | 00<br>00<br>00<br>00       | 3 cir. 0 10 st. 0 Lt. hase. Lt. hase. 0 Lt. hase. D, hase. 0 Lt. hase. Lt. hase. 0          | 00<br>00<br>00<br>00 | 5 cir. 0<br>10 st. 0<br>Lt. haze. D. haze. 0<br>10 st. D. haze. 0<br>Lt. haze. Lt. haze. 0                | 00<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0<br>Lt. haze. Lt. haze. 0<br>10 st. 0                                    | 00<br>00<br>00<br>00       | 10 at, 0 00<br>10 at, 0 00<br>1.t. hane. 8 at. 0 00<br>10 at, 0 00                         |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 18<br>Feb. 14 | Lt. hase. D. hase. 0 0 0 0 Lt. hase. D. hase. 0 1 st. 0                      | 00   D. haze.<br>00   0<br>00   0<br>00   Lt. base.<br>00   0           | D. haze. 0<br>0<br>D. haze. 0<br>0       | 00<br>00<br>00<br>00       | D. haze. D. haze. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                     | 00<br>00<br>00<br>00 | D. haze. D. haze. 0<br>0 0<br>0 0<br>Lt. haze. Lt. haze. 0<br>0   | 00<br>00<br>00<br>00 | D. haze. D. haze, 0 0 0 1.t. haze. 0 0 0   | 00<br>00<br>00<br>00       | D. hazə. D. haze. 0 00<br>0 0 0 0<br>0 Lt. hase. 0 00<br>0 0 0                             |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | 0 0 0 0 1 ci. st. Lt.haze, 1 st. 0 10 st. 0 1 st. 0 Lt haze. D. haze. 0      | 00 2 st.<br>00 L base 2<br>00 10 st.<br>00 D hase.<br>00 Lt base.       | at. D. haze. 0<br>0<br>0<br>D. haze. 0   | 00<br>00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0 Lt. haze. D. haze. 0 16 st. Lt. haze. D. haze. 0 Lt. haze. D. haze. 0 | 00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>Lt. haze. D. haze. 0<br>10 st. 0<br>Lt. haze. D. haze. 0<br>Lt. haze. D. haze. 0 | 00<br>00<br>00<br>00 | D. hase. Lt. hase. 0 Lt. hase. Lt. hase. 0 10 st. 6 D. hase. Lt. hase. 0 D. hase. D. hase. 0 | 00<br>00<br>00<br>00       | Lt. haze. Lt. haze. 0 00<br>Lt. haze. Lt. haze. 0 00<br>10 at. 0 00<br>10 at. 0 00         |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | 10 st. 0<br>Lt. haze. Lt. haze. 0<br>0 0<br>0 0                              | 00   10 st.<br>00   Lt. haze.<br>00   0<br>00   0<br>1 cir.             | Lt. haze. 0<br>0<br>0<br>0               | 00<br>00<br>00<br>00       | 10 at. 0<br>Lt. base. Lt. l.aze. 0<br>0 0<br>0 0<br>1 cir. 0                                | 00<br>00<br>00<br>00 | 10 gt. 0<br>Lt. haze. Lt. haze. 0<br>0 0<br>1 st. 0<br>1 cir. 0   | 00<br>00<br>00<br>00 | 10 at. 0<br>D. haze. 0<br>0 0<br>1 at. 0<br>0  | 00<br>00<br>00<br>00       | 10 at. 0 00<br>Lt. haze. 0 00<br>0 0 0 00<br>0 0 0 00<br>0 0 00                            |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | 0<br>1 cir. 1 st. 0<br>5 cir. 0<br>D. hase. 3 st. 0                          | 00 1 cir.<br>00 0<br>00 7 cir. st.<br>00 D. haze.                       | 0<br>0<br>0<br>Lt. hase. 0<br>D. hase. 0 | 00<br>00<br>00<br>00       | 0 0 0<br>0 0 0<br>2 cir. 0<br>D. hase. D. haze. 0   | 00<br>00<br>00       | 0 0<br>0 0<br>3 ctr. 0<br>Lt. ha. 4 ct. s. D. ha. 0   | 00<br>00<br>00       | 0 0<br>0 0<br>5 cir. st. 0<br>10 st. 0   | 00<br>00<br>00             | 0 0 0 00<br>0 0 0 0 00<br>Lt. haze. 4 st. 0 00<br>8 cir. st. Lt. haze. 0 00                |
| Means.  | 1. 3g  | 1   | . 57                                     |                            | 1. 32   |                      | 2.00  |                      | 2.78   |                            | 4. 10  |
| Date.   | 1 p. m.  |   | 2 p. m.                                  |                            | \$ p. m.  |                      | 4 p. m.   |                      | 5 p. m.  |                            | 6 p. m.  |
| 1882.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | 2 cir. 3 st. 0<br>D. haze. 3 st. 0   | 00 Lt. hase.<br>00 4 cir. st.<br>00 4 cir. 6 st<br>00 3 st.             | 5 at. 0                                  | 00<br>00<br>00             | Lt. hase. 4 st. 0<br>4 cir. 6 st. 0<br>10 st. 0<br>3 st. 0                                  | 00<br>00<br>00       | 1 cir. 3 st. 0<br>3 cir. 3 st. 0<br>10 nim. 0<br>2 st. 9  | 00                   | 2 st. 0<br>2 cir. 3 st. 0<br>10 nim. 0   | 00                         | 1 cir. at. 1 at. 0 00<br>2 cir. 2 at. 0 00<br>10 at. 0 0 00                                |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | 4 st. 0<br>3 st. 0<br>D. haze, 5 st. 0                                       | 00 10 st.<br>00 10 st.<br>00 2 cir. 3 s<br>5 cir. 4 s<br>D. haze.       | t. 0                                     | 00<br>00<br>00<br>00<br>00 | 2 cir. 8 st. 0<br>10 st. 0<br>2 cir. 2 st. 0<br>8 cir. 8 st. 0<br>1 st. 0                   | 00<br>00<br>00<br>00 | 10 st. 0<br>4 cir. 6 st. 0<br>1 cir. 2 st. 0<br>4 cir. 5 st. 0<br>1 st. 0                                 | 00<br>00<br>00<br>00 | 10 st. 0<br>3 cir. st. 3 st. 0<br>2 cir. st. 4 st. 0<br>2 cir. 6 st. 0                       | 00<br>00<br>00<br>00       | 10 st. 0 00<br>3 cir. st. 3 st. 0 00<br>2 cir. st. 3 st. 0 00<br>1 cir. 6 st. 0 00<br>0 00 |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 13<br>Feb. 14 | 0 0 0  | 00 2 st.<br>00 0<br>00 0<br>00 0<br>00 2 cir. 2 st                      | 0  | 00<br>00<br>00<br>00<br>00 | 3 st. 0<br>0 0<br>0 0<br>0 0<br>4 cir. 3 st. 0  | 00<br>00<br>00<br>00 | 2 st. 0<br>0 0<br>0 0<br>0 0<br>4 cir. 3 st. 0  | 00<br>00<br>00<br>00 | 0 0 0<br>0 0 0<br>0 0<br>0 0<br>3 cir. st. 2 st. 0   | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | 10 st. 0   | 00   1 cir. st.  <br>00   10 nim.  <br>00   0   10 st.  <br>00   10 st. | 0  | 00<br>00<br>00             | 1 at. 0<br>10 nim, 0<br>4 cir. 0<br>10 st. 0  | 00<br>00<br>00<br>00 | 0 0 0 10 nim. 0 6 cir. 0 10 st. 0 10 st.  | <br>00<br>00<br>00   | 0 0 10 at. 0 0 5 cir. 0 10 at. 0 10 at. 0  | 00<br>00<br>00             | 0 0 0 0 0 0 7 oir. 0 0 0 0 10 st. 0 0 0 10 st. 0 0 0 0 10 st.                              |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | 0 0<br>1 st. 0<br>1 cir. 0   | 00 10 st.<br>00 0<br>00 1 st.<br>00 1 cir.<br>00 1 cir.                 | 0  | 00<br>00<br>00<br>00<br>00 | 3 cir. 7 st. 0<br>0 0<br>0 0<br>1 cir. 0<br>1 cir. 0  | 00<br>00<br>00<br>00 | 6 cir. 3 st. 0<br>0 0<br>0 0<br>2 cir. 0<br>1 cir. 0  | 00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>0 0<br>0 0<br>3 cir. 0<br>1 cir. 0                                  | 00<br>00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0 00 0 00 0 00 0 00 00 00 00 00 00 00                                  |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | 0 0  | 00 0<br>00 0<br>00 0<br>01 10 st.                                       | 0  | 00<br>00<br>00<br>00       | 5 cir. 0<br>0 0<br>0 0<br>10 st. 0  | 00<br>00<br>00<br>00 | Lt. haze. Lt. haze. 0<br>0 0 0<br>0 0<br>10 st. 0   | 00<br>00<br>00       | 3 cir. st. 0<br>1 cir. 0<br>0 0<br>10 st. 0  | 00<br>00<br>00<br>00       | 3 cir. st. 1 st. 0 00<br>1 cir. 0 00<br>0 0 0 0<br>8 st. 0 00                              |
| Means.  | 3. 28  | 4.  | . 42                                     |                            | 4. 78   | _                    | 4. 85   |                      | 3.75   |                            | 3.71   |

character o

7 a. ;

10 st. D. base. D.

10 st. 10 st.
10 st.
Lt. haze. 5 s.
10 st.
D. hase. D. l.

D. hare. 7 at. D. haze Lt. | 10 at. 10 st

Lt. hare. 4 st

2 at 3 st. 10 st. 0 st. 2 cir. st. 4 st. 1 cir. 7 st. 1 st.

0 5 cir. at. 3 at. 0 10 at. 7 cir. 10 at. 10 at. 10 at. 10 at. 10 at. Lt. hage. Lt. h 0 0 4 cir. 2 cir.

4 cir. st. 1 at, 3 cir. 0 1 cir. 3 at, 3.85 elaracter of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.   |                            | 9 a. m.  |                              | 9 a. m.  |                                      | 10 a. m.   |                                      | II a. m   |                            | 12 m.   |                      | precipi        |
|---|----------------------------|--|------------------------------|--|--------------------------------------|--|--------------------------------------|---|----------------------------|---|----------------------|----------------|
| Amount, kind, and irrection of glouds.                                | Precipitation.             | Amount, kind, and<br>direction of clouds.  | Precipitation                | Amount, kind, and direction of clouds                              | Precipitation.                       | Amount, kind, and direction of clouds.   | Precipitation.                       | Amonut, kind, and<br>direction of clouds.   | Precipitation              | Amount kind, and direction of clouds.   | Precipitation.       | Amount of per- |
| o o o o o o o o o o o o o o o o o o o                                 | 00<br>00<br>00             | 0 Lt. haze. 0 D. haze. 0 D. haze. D. haze. 0   | 00                           | 1 cir.<br>D. hazo. D. haze.  | 0 00<br>0 00<br>0 00<br>0 00         | 0 0<br>Lt. haze. 2 st. 0<br>D. haze. D. haze. 0<br>Lt. haze. 0                     | 00                                   | Lr. haze. 0<br>Lt. haze. 3 st. 0<br>10 st. D. haze. 0<br>Lt. haze. 0                | 00<br>00<br>00             | Lt. haze. Lt. haze. 0<br>3 cir. 3 st. 0<br>Lt. haze. Lt. haze. 0<br>Lt. haze. 1 at. 0       | 00<br>00<br>00<br>00 |                |
| ost. 0 ost. 0 ost. 0 ost. 0 ost. 0 ost. 0 ost. 0 ost. 0 ost. 0        | 00<br>00<br>00<br>00       | 10 mt. 0<br>10 mt. 0<br>4 cir. mt. 4 mt. 0<br>10 mt. 0   | 00<br>00<br>00<br>00         | 10 at.<br>10 at.<br>2 cir. at. 6 at.<br>10 at.                     | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | D. haze. 8 st. 0<br>10 st. 0<br>Lt. haze. 5 st. 0<br>10 st. 0<br>Lt. haze. 5 st. 0 | 00                                   | 2 st. 0<br>10 st. 0<br>4 st. 0<br>0 st. 0<br>Lt. buse. 3 st. 0                      | 00<br>00<br>00<br>00       | 3 at. 0<br>5 at. 0<br>4 at. 0<br>8 at. 0<br>Lt. hase. 3 at. 0                               | 00<br>00<br>00<br>00 |                |
| st. haze, D, haze, 0 0 0 0 0  | 00<br>00<br>00<br>00       | D. hoze. D. haze. 0<br>0 0 0<br>0 tt. haze. 0<br>0 0   | 00                           | 0<br>0<br>Lt. base.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | D. haze. D. haze. 0<br>0 0 0<br>Lt, haze. 0<br>0 0                                 | 60<br>00<br>00                       | D. haze. 4 st. 0<br>0 0<br>0 0<br>Lt. haze. 0<br>0 0                                | 60<br>00<br>00<br>00       | D. haze. D. haze. 0<br>0 0<br>0 0<br>0 0<br>0 0   | 00<br>00<br>00<br>00 |                |
| haze. 7 at. 0 haze. 0 ist. 0 ist. 0                                   | 00<br>00<br>00<br>00<br>00 | D. haze, 8 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0   | 00<br>00                     | 10 st.<br>10 st.<br>0 0<br>10 st.<br>10 st.                        | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | Lt. haze. D. haze. 0<br>10 st. 0<br>0 0<br>10 st. 0<br>10 st. 0                    | 00                                   | D, hase. 4 st. 0<br>10 st. 0<br>0 0<br>10 st. 0<br>10 st. 0                         | 00<br>00<br>00<br>00       | 3 at. 0<br>10 at. 6<br>0 0<br>10 at. 0<br>10 at. 0  | 00<br>00<br>00<br>00 |                |
| at. 0<br>0<br>0<br>0<br>0   | 00<br>00<br>00<br>00       | 10 st. 0<br>0 0<br>0 0<br>0 0<br>0 0<br>0 0  | . 00                         | 10 nt.<br>0<br>0<br>0  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 10 st. 0<br>0 0<br>0 0<br>0 0<br>0 0   | 00                                   | 10 at. 0 0 0 0 0 0 0 0 0 0 0 0  | . 00<br>60<br>00<br>00     | 10 st. 0 0 1 st. 0 1 cir. 0 1 cir. 0  | 00<br>00<br>00<br>00 | 1              |
| t haze. 4 st. 0   | 00<br>00<br>00             | 0 0 0<br>0 Lt. haze. Lt. haze. 0<br>10 st. 0   | 00                           | 0<br>0<br>0<br>10 st.  | 0 00<br>0 00<br>0 00                 | 0 0<br>0 0<br>10 nim.  | 00                                   | 0 0 0 0 0 0 0 0 0 10 nim. 0   | 00<br>00<br>00<br>. 02     | 0 0<br>0 0<br>0 0<br>10 nim. 0  | 00                   |                |
| 4.21  |                            | 4.14   |                              | 3, 82  |                                      | 3. 21  |                                      | 3. 53   |                            | 3. 07   |                      |                |
| 7 p. m.   | _                          | 8 p. m.  |                              | 9 p. m.  |                                      | 10 p. m.   |                                      | 11 p. m.  |                            | 12 p. m.  |                      | Da             |
| 2 at. 0 3 st. 0 6 st. 0 0   | 00<br>00<br>00             | 2 st. 0<br>4 st. 0<br>10 st. 0   | 00                           | 2 at.<br>4 at.<br>10 at.   | 0 00<br>0 00<br>0 00<br>0 00         | 4 st. 0<br>Lt. haze. 4 st. 0<br>10 st. 6   | 00                                   | D. haze. 3 st. 0<br>D. haze. 2 st. 0<br>D. haze. 4 st. 0<br>1 st. 0                 | 00<br>00<br>00             | 1 st. 0<br>Lt. haze. Lt. haze. 0<br>D. liaze. 3 st. 0<br>1 st. 0                            | 00<br>00             |                |
| 0 st. 0<br>2 cir. st. 4 st. 0<br>1 cir. st. 4 st. 0<br>1 cir. 7 st. 0 | 00<br>00<br>00<br>00       | 10 at. (<br>2 cir. at. 3 at. (<br>2 cir. at. 2 at. (<br>9 at. (  | 00 00 00 00                  | 10 st.<br>  10 st.<br>  2 cir. st. 1 st.<br>  9 st.<br>  2 st.     | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 10 st.<br>10 st.<br>1 cir. st. 1 st.<br>10 st.<br>2 st.                            | 00 00 00 00 00                       | Lt. haze. 3 st. 0<br>1 cir. 2 st. 0<br>1 st. 0<br>10 st. 0<br>Lt. haze. Lt. haze. 0 | 00<br>00<br>00<br>00<br>00 | D. haze. 5 st. 0 2 st. 0 0 0 1.t. haze. D. haze. 0 Lt. haze. Lt. haze. 0                    | 00<br>00             |                |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                 | 00<br>00<br>00<br>00       | 0 0<br>2 cir. st. 1 st. 0<br>1 cir. st. 0  | 00                           | 0<br>0<br>3 cir. st. 2 st.<br>1 cir. st. 1 st.<br>4 cir. st. 3 st. | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 1 st. 0<br>Lt. haze. Lt. haze. 0<br>2 st. 0<br>2 cir. 2 cir. st. 2 st. 0           | 00   00                              | 1 st. 0<br>1 st. 0<br>D. haze. 4 st. 0<br>1 st. 0<br>3 cir. st. 2 st. 0             | 00                         | l cir. 1 st. 0<br>0<br>Lt. haze. D. haze. 0<br>1 st. 0<br>1 st. 0                           | 00<br>00             |                |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                 | 00<br>00<br>00<br>00       | 2 cir. st. 2 st. (10 s | 0 00<br>0 00<br>0 00         | 1 cir. st. 3 st.<br>10 st.<br>5 cir. 2 st.<br>10 st.<br>10 st.     | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 2 cir. st. 4 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 5 cir. 1 st. 0<br>10 st. 0<br>3 cir. st. 4 st. 0<br>10 st. 0                        | 00                         | 3 cir. Lt. hage. 2 st. 0<br>10.st. 0<br>1 cir. st. 2 st. 0<br>Lt. hage. 5 st. 0<br>10 st. 0 | 00                   |                |
| Lt. haze. Lt. haze. 0<br>0 0<br>0 0<br>4 cir. 0<br>2 cir. 0           | 00<br>00<br>00<br>00<br>00 | 5 cir.   | 0 00<br>0 00<br>0 00<br>0 00 | 1 cir. D. haze.<br>0<br>0<br>4 cir. 2 st.<br>2 cir. 1 st.          | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 1 cir. st. 3 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00 | 1 st. 0   | 00                         |   | 00 00 00             |                |
| 4 cir. st. 1 st. 0<br>3 cir. 0<br>1 cir. 3 st. 0                      | 00<br>00<br>00<br>00       | 3 cir.   | 0 00<br>0 00<br>0 00<br>0 00 | 2 cir. 2 st.   | 0 00<br>0 00<br>0 00<br>0 00         | 1 cir. st. 4 st.<br>1 st.  | 0 00<br>0 00<br>0 00<br>0 00         | 5 cir. D. haze. 0<br>5 cir. st. 1 st. 0<br>8 st. 0<br>6 cir. st. 1 st. 0            | 00                         |   | 00 00 00             |                |
| 3, 85   | 1                          | 4. 58  |                              | 4, 85  | _                                    | 4.71   | _                                    | 4.14  | -                          | 2, 35   | _                    | -              |

, and amount and given in inches. In this

O a. m.

Amount, kind. and rection of clouds.

Lt. haze. Lt. haze. (c) Lt. haze. Lt. haze. Lt. haze. (d) st. (10 st.

10 at. 0
Lt. haze. 0
0 0
0 0
0 0
0 Lt. haze. 4 st. 0
8 cir. st. Lt. haze. 0

6 p. m.

1 cir. st. 1 st. 0
2 cir. 2 st. 0
10 st. 0
3 cir. st. 3 st. 0

4.10

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In  $t_{\rm bis}$ 

|   | t a. m.  |                            | 2 a. m.  |                              | 8 a. m.  |                            | 4 a. m.   |                            | 5 a. m.  |                              | 6 a. m.   |
|---|--|----------------------------|--|------------------------------|--|----------------------------|---|----------------------------|--|------------------------------|---|
| Date.   | Amount, kind, and<br>direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.                               | Precipitation.               | Amount kind, and direction of clouds,  | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.                                       | Precipitation.               | Amount, kind, and direction of clouds   |
| 1882.<br>Mar. 1<br>Mar. 2   | 2 st. (  | 00                         | 1 cir. 2 st. 0<br>1 cir. st. 2 st. 0                                 | 00                           | 0 0<br>10 st. W. *   | 00                         | 0 0<br>10 st. 0   | 00                         | 10 st. W. *  | 00                           | 2 cir. 2 st.  |
| Mar. 3<br>Mar. 4<br>Mar. 5<br>Mar. 6  | 1 cir. 1 st, (10 st. W. 10 st. W. 10 st. (10 s | 00 10                      | 1 cir. 1 st. 0<br>10 st. 0<br>10 st. 0<br>3 cir. st. 1 st. 0         | 00<br>00<br>00               | 1 cir. 1 st. 0<br>10 st. 0<br>1 cir. st. 4 st. 0<br>1 cir. 1 st. 0             | 00<br>00<br>00             | 1 cir. 0<br>10 st. 0<br>5 cir. st. 5 st. 0<br>1 cir. 1 st. 0                    | 00<br>00<br>00<br>00       | 2 cir. 0<br>10 st 0<br>6 st. 0<br>2 st. 0                                    | 00<br>00<br>00               | 3 cir,<br>10 st,<br>10 st,<br>4 cir, cum, 4 st,                                 |
| Mar. 7<br>Mar. 8<br>Mar. 9<br>Mar. 10<br>Mar. 11  | 1 st. 10 nim. 10 st. 10 st. 10 st. 10 nim. 10 st. 10 nim. 10 st. 10 nim.   | 00 00                      | 0 0<br>10 nim. •<br>10 st. 0<br>10 st. 0<br>10 st. 0                 | 00<br>02<br>00<br>00<br>01   | 5 st. 0<br>Lt. baze. 5 st. 0   | 00<br>02<br>00<br>00<br>00 | 0 0<br>10 nim, 0<br>5 st. 0<br>Light haze. 8 st. 0<br>10 nim. 0                 | 00<br>00<br>00<br>00<br>01 | 0 0 10 st. 0 5 st. 0 10 st. 0 10 nim. 0                                      | 00<br>00<br>00<br>01         | 0<br>10 st,<br>4 st,<br>10 st,<br>10 nim.                                       |
| Mar. 12<br>Mar. 13<br>Mar. 14<br>Mar. 15<br>Mar. 1  | 1 st.<br>1 cir. Lt. haze. 2 st. 0<br>10 st.<br>0<br>2 cir. 1 st. 0   | 00                         | 1 st. 0<br>1 cir. 2 st. 0<br>10 st. 0<br>0 0<br>1 st. 0              | 00<br>00<br>00<br>00         | 1 st. 0<br>1 st. 0<br>10 st. 0<br>0 0  | 00<br>00<br>00<br>00       | 1 st. 0<br>1 st. 0<br>10 st. 0<br>0 0   | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>0 0<br>10 st. 0<br>0 0   | 00<br>00<br>00<br>00         | 10 st.<br>0<br>10 st.<br>0<br>0   |
| Mar. 17<br>Mar. 18<br>Mar. 19<br>Mar. 20<br>Mar. 21   | 1 cir. 1 st. 0<br>10 st. 0<br>3 cir. 3 st. 0<br>10 nim. 0<br>Lt. haze. 4 st 0  | 00                         | 1 cir. 1 st. 0<br>10 st. 0<br>1 cir. 8 st. 0<br>10 nim. 0<br>1 st. 0 | 00 00 00                     | 1 st. 0<br>10 st. 0<br>10 nim. 0<br>3 st. 0                                    | 00                         | 0 0 0 10 st. 0 10 nim. 0 0 0 0  | 00<br>00<br>.01<br>0       | 0 0 0 10 st. 0 10 nim. 0 0 0 0 0   | 00 00 00                     | 0<br>10 st.<br>10 nim.<br>0   |
| Mar. 22<br>Mar. 23<br>Mar. 24<br>Mar. 25<br>Mar. 26   | 1 cir. 1 st. 0<br>7 st. SW.<br>8 st. 0<br>1 st. W.<br>1 st. 0  | 00<br>00<br>* 60           | 1 cir. 1 st. 0<br>1 st. 0<br>8 st. NW. 1<br>1 st. W. 1<br>1 st. 0    | 00                           | 10 st. 0   | 00<br>00<br>00<br>00       | 1 cir. Lt. haze. 1 st. 0<br>Dense haze. 1 st. 0<br>1 st. 0<br>1 st. 0<br>0      | 00<br>00<br>00<br>00<br>00 | Light haze. 3 st. 0<br>Light haze. 9 st. 0<br>6 st. 0<br>Dense haze. 1 st. 0 | 00<br>00<br>00<br>00         | Light haze. 5 st.<br>10 nim.<br>9 st.<br>Dense haze. 2 st.<br>Dense haze. 2 st. |
| Mar. 27<br>Mar. 28<br>Mar. 29<br>Mar. 30<br>Mar. 31   | 2 st. 0<br>1 cir. 1 st. 0<br>9 st. 0<br>10 st. 0   | 00<br>00                   | 3 st. 0<br>1 st. 0<br>5 cir. st. 3 st. 0<br>10 st. W.*               | 00<br>00<br>00<br>00         | 1 st. 0<br>1 cir. 2 st. W. †<br>9 st. NW. *                                    | 00<br>00<br>00<br>00<br>00 | Dense haze. 4 st. 0<br>0 0<br>1 cir. 1 st. 0<br>8 st. NW. * D. haze.<br>1 st. 0 | 00<br>00<br>00<br>00       | Light haze, 0 0 0 1 cir. 2 st. 0 10 st. NW. † Lt. haze. 1 st. 0              | 00<br>00<br>00<br>00<br>00   | 0<br>0<br>2 st.<br>10 st.<br>0  |
| Means .   | 5, 35  |                            | 5. 00  |                              | 4. 19  |                            | 3. 80   |                            | <b>4.</b> 77   |                              | 5. 12   |
| Date.   | 1 p. m.  | :                          | 2 p. m.  |                              | 8 p. m.  |                            | 4 p. m.   |                            | 5 p. m.  |                              | 6 p. m.   |
| 82.<br>Mar. 1   |  | 00                         | 3 cir.st. 5st. D.haz. 0  | 00                           | 0 0  | 00                         | 2 cir. 1 st. 0  | 00                         | 3 cir. 1 st. 0   | 00                           | 9 st.   |
| Mar. 2<br>Mar. 3<br>Mar. 4<br>Mar. 5<br>Mar. 6  | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>2 cir. 6 st. 0  | 00<br>00<br>01<br>00<br>00 | 10 st. 0<br>2 cir. st. 7 st. 0<br>10 st. 0<br>9 st. 0                | 00<br>00<br>01<br>00<br>00   | 5 cir. 2 st. 0 . 5 cir. 2 st. 0 . 10 st. 0 .                                   | 00<br>00<br>00<br>00       | 10 st. 0<br>5 cir. 0<br>6 cir. 3 st. 0<br>10 st. 0                              | 00<br>00<br>00<br>00       | 10 st. 0<br>2 cir. 0<br>0 0<br>10 st. 0<br>9 st. 0                           | 00<br>00<br>00<br>00         | 10 st.<br>4 cir.<br>0<br>10 st.<br>9 st.  |
| dar. 7<br>dar. 8<br>dar. 9<br>dar. 10<br>dar. 11  | 3 cir. 5 st. 0<br>10 st. 0<br>2 cir. cum. 3 st. 0<br>10 st. 0<br>1 cir. 2 st. 0  | 00<br>00<br>00<br>00       | 4 cir. 5 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>2 st. 0        | 00<br>00<br>00<br>00         | 10 st. 0 10 st. 0 10 st. 0   | 00<br>00<br>00<br>00<br>00 | 9 st. 0<br>4 cir. 3 st. 0<br>4 cir. 4 st. 0<br>10 st. 0                         | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>5 cir. 1 st. 0<br>5 cir. cum. 2 st. 0<br>10 st. 0                | 00<br>00<br>00<br>00         | 9 st.<br>4 cir.<br>1 cir. cum. 1 st.<br>10 st.<br>0                             |
| dar. 12<br>dar. 13<br>dar. 14<br>dar. 15<br>dar. 16   | 10 st, 0<br>3 cir. 0<br>4 cir. 4 st. 0<br>3 cir. 0<br>5 cir. 0   | 00<br>00<br>00<br>00<br>00 | 10 n in, 0<br>5 cir, 0<br>7 cir, 2 st. 0<br>5 cir. 0<br>0            | . 01<br>00<br>00<br>00<br>00 | 8 nim. 0   . 6 cir. 0  | 00                         | 10 nim. 0<br>6 cir. 2 st. 0<br>9 nim. 0<br>3 cir. 0                             | . 01<br>00<br>. —          | 10 nim. 0<br>10 st. 0<br>10 nim. 0<br>3 cir. 0<br>0                          | 00<br>01<br>00<br>00         | 10 nim.<br>10 st.<br>10 nim.<br>0   |
| Iar. 17   | 3 cir. 0<br>10 nitu. 0<br>2 cir. 1 st. 0<br>0  | 00 00 00                   | 4 cir. 3 st. 0<br>10 nim. 0<br>2 cir. 0<br>0 0                       | 00<br>00<br>00<br>00         | 10 nim. 0 .<br>1 cir. 0  | 00<br>00<br>00<br>00       | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>0 0  | 00<br>00<br>00             | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>0 0                                     | . 01<br>. 01<br>. 00<br>. 00 | 10 at.<br>10 st.<br>10 nim.<br>0  |
| dar. 18<br>Jar. 19<br>Jar. 20<br>Jar. 21  | 0 0  |                            |  |                              |  | 00                         | 2 cir. 0<br>3 st. 0<br>Lt. haze. Lt. haze. 0                                    | 00<br>00                   | 1 cir. 0<br>3 cir. 1 st. 0<br>3 cir. 1 st. 0                                 | 00                           | 1 cir.<br>4 cir. 1 st.  |
| Iar. 19<br>Iar. 20<br>Iar. 21   | 0 0 10 nim. 0 10 st. 0 5 cir. 4 st. 0 0 0 3 cir. 2 st. 0   | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0<br>3 cir. 0<br>0 0<br>2 cir. 2 st. 0            | 00<br>00<br>00               | Lt. haze. Lt. haze. 0  | 00<br>00                   | 1 cir. 0<br>6 cir. 3 st. 0  | 00<br>00                   | 8 cir. 1 st. 0<br>1 cir. 0<br>1 cir. 7 st. 0                                 | . 00<br>00                   | 2 cir. 1 st.<br>1 cir.<br>10 nim.   |
| Iar. 19<br>Iar. 20<br>Iar. 21<br>Iar. 22<br>Iar. 23<br>Iar. 24<br>Iar. 25<br>Iar. 26<br>Iar. 27<br>Iar. 28<br>Iar. 30 | 10 nim. 0<br>10 st. 0<br>5 cir. 4 st. 0  | 00                         | 10 st. 0<br>3 cir. 0   | 00                           | Lt. haze, Lt. haze, 0 3 cir. 0 4 cir. 4 at. 0 2 cir. 0 4 cir. 5 at. 0 3 cir. 0 | 00                         | 1 cir. 0  | 00                         | 1 cir. 0   | . 00                         | 2 cir. 1 st.<br>1 cir.  |

character of

table, signifies

0 10 st. 5 st. 10 at. 10 nim. 10 st. 0 10 st. 0

0 Light haze. 3 st. 10 st. 2 st.

7 p. m.

9 st. 3 cir. cum. 2 st. 3 cir. 6 cir. cum. 2 st. 9 st.

10 st. 4 cir. 3 cir. cum. 1 3 cir. 10 st. 0

10 nim. 0 4 cir. 2 st. 4 cir. 2 st. 1 cir.

character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

end amount and

en in inches. In this

5. 12

5, 41

table, signifies rapide, signifies slove. Daily means of amount of clouds on the right below, amount of precipitation on the right above.)

| 7 a. m.  |  | 8 a. m.   |   | 9 a. m.  |   |  | 10 a. m.   |   |  | 11 a. m.   |   |  | 12 m.  |  | precipi-       |
|--|--|---|---|--|---|--|--|---|--|--|---|--|--|--|----------------|
| Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and<br>direction of clouds  |   | Amount, kind, a<br>direction of clou   | nd<br>ids.  | Precipitation.   | Amount, kind, and<br>direction of clouds   |   | Precipitation.   | Amount, kind, and direction of cloud   | i<br>s.   | Precipitation.   | Amount, kind, and direction of clouds,   | Precipitation.                               | Amount of pre- |
| ) st. 0 (st. 0) st. 0 (st. 0) st. 0  | 00   | Light haze. 5 st.<br>10 st.<br>10 st.<br>10 st.   | 0                                       | 0   3 cir. st. 3 st.<br>0   10 st.<br>0   10 nim.<br>0   10 st.  | 0 0   | 00<br>00<br>01<br>00   | 10 st.<br>10 st.<br>10 nim.<br>10 st.  | 0   | 00<br>00<br>02<br>00   | 1 st.<br>10 st.<br>10 st.<br>10 nim.<br>10 st.   | 0   | 00 00  | 1 cir. at. 2 at. 0 10 at. 0 10 at. 0 10 nm. 0 10 at. 0   | 00   |                |
| st. 0 st. 0 st. 0 st. 0 st. 0 st. 0 st. 0  | 00<br>00<br>00<br>00<br>00   | 4 cir. Light haze.<br>10 st.<br>6 st.<br>10 st.   | 0                                       | 0   10 at.<br>0   5 cir. Light haz<br>0   10 at,<br>0   10 at,<br>-   10 nim.  | 0<br>e. 0<br>0<br>0   | 00<br>00<br>00<br>00<br>00   | 3 cir. st. 5 st.<br>10 st.<br>10 st.   | 0 0 0 0 0   | 00<br>00<br>00<br>00   | 10 st.<br>2 cir. 4 st.<br>10 st.<br>2 st.<br>10 st.<br>10 nim.   | 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00   | 5 cir. 3 st. 0<br>6 cir. 2 st. 0<br>10 st. 0<br>3 cir. 3 st. 0<br>10 st. 0<br>8 st. 0  | 00<br>00<br>00                               |                |
| st. 0<br>et. 0<br>et. 0  | 00<br>00<br>00<br>00   | 0<br>10 st.   | 0                                       | 0 10 st.<br>0 0 10 st.<br>0 10 st.<br>0 0 0  | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00<br>00   | 10 st.<br>0<br>10 st.<br>0<br>0  | 0 0   | 00<br>00<br>00<br>00   | 10 st.<br>0<br>5 cir. 3 st.<br>0   | 0 0 0 0   | 00<br>00<br>00<br>00   | 10 st. 0<br>0 0<br>4 cir. 3 st. 0<br>1 cir. 0<br>3 cir. 0  | 00   |                |
| st. 0<br>nim. 0  | 00<br>00<br>01<br>00<br>00   | 10 st.<br>10 nim.<br>0  | 0 .                                     | 0 0 10 nim.<br>- 10 nim.<br>0 0 Light fog.   | 0<br>0<br>0<br>0  | .01<br>.01<br>.00<br>00  | 4 cir. st.<br>10 nim.<br>3 cir. st. 4 st.<br>0<br>Light haze. 4 st.  | 0 0   | 00<br>02<br>00<br>00   | 3 cir.<br>10 st.<br>3 cir. st. 2 st.<br>0<br>D. haze. Lt. fog.   | 0<br>0<br>0<br>0  | 00<br>01<br>00<br>00<br>00   | 3 cir. 0<br>10 st. 0<br>4 cir st. 2 st. 0<br>Dense haze. 0   | 00   |                |
| ght haze. 4 st. 0<br>nim. 0<br>st. 0<br>ght haze. 5 st. 0<br>ght haze. 6 st. 0   | . 01<br>00<br>00   | 10 nim.<br>10 st.<br>Light haze. 5 st.  | 0                                       | 0 10 st.<br>10 nim.<br>0 2 st.<br>0 2 st.<br>0 2 st.<br>8 st.  | 0<br>0<br>0<br>0  | 00   | 10 nim.<br>10 nim.<br>2 st.<br>3 cir. 2 st.<br>2 cir. st. 8 st.  | 0 0 0   | 00 00 00   | 10 nim.<br>10 nim.<br>2 st.<br>0<br>5 cir. 2 st.   | 0 0 0   | 00<br>00<br>00   | 10 nim.<br>10 st.<br>6 cir. 3 st.<br>0 t.<br>3 cir. 2 st.  | 00 00 00                                     |                |
| ight baze. 0 st. 0 st. 0 st. 0   | 00<br>00<br>00<br>00   | 4 st.<br>10 st.   | 0                                       | 0 1 st.<br>0 10 st,<br>0 1 st.<br>0 1 st.<br>0 10 st.<br>0 4 st.   | 0 0 0   | 00<br>00<br>00<br>00   | 2 st.<br>10 st.<br>1 st.<br>10 st.<br>10 st.   | 0 0 0 0   | 00<br>00<br>00<br>00<br>00   | 1 st.<br>10 st.<br>1 st.<br>10 st.<br>10 st.<br>10 st.   | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00   | 1 st.<br>10 st.<br>0<br>4 cir. st. 4 st. N. W.<br>10 st.   | 1 00   |                |
| 5, 38  |  | 6. 00   | j                                       | 6.41   |   |  | 7. 00  |   |  | 6. 00  |   |  | 6. 32  |  |                |
| 7 p. m.  |  | 8 p. m.   |   | 9 p. m.  |   |  | 10 p. m.   |   |  | 11 p. m.   |   |  | 12 p. m.   |  | me             |
| st. 0 st. 0 cir. cum. 2 st. 0 cir. cur. cum. 2 st. 0 st. 0   | 00<br>00<br>00<br>00<br>00   | 9 st.<br>4 cir. cum. 2 st.<br>3 cir. cum. 2 st.<br>2 cir. cum. 6 st.  | 0                                       | 0 10 st.<br>0 8 st.<br>0 1 cir. cum. 7 st.<br>0 2 cir. cum. 5 st.<br>0 5 cir. cum. 2 st.<br>0 4 cir. 2 st.   | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00<br>00   | 10 st,<br>4 cir. 2 st.<br>10 st.<br>9 st.<br>7 cir. cum. 1 st.<br>5 cir. 2 st.   | 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00   | 10 st.<br>3 cir. 1 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>1 cir. st. 3 st.   | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00<br>00   | 1 cir. 1 st. W<br>10 st. W<br>10 st. 3 cir. cum. 4 st.   | . 1 00                                       |                |
|  | 00   |   |   |  |   |  |  |   |  |  |   | i  |  |  |                |
| st. 0<br>sir. 3 cir. cum. 1 st. 0<br>sir. 0<br>cir. 0  | 00   | 1 cir. 8 st.<br>1 cir.<br>10 st.  | 0 .                                     | 0 1 cir. 7 st.<br>0 10 st.<br>0 7 st.<br>0 10 st.<br>0 10 st.  | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00   | 1 cir. 7 at.<br>10 at.<br>8 at.<br>10 nim.   | 0<br>0<br>0<br>0                                    | 00 00  | 10 nim.<br>3 cir. cum. 4 st.<br>10 st.<br>10 nim.<br>1 st.   | 0<br>0<br>0<br>0  | 00<br>00<br>01<br>01   | 10 nim.<br>9 st.<br>10 st.<br>10 nim.<br>1 st.   |  |                |
| ir. 3 cir. cum. 1 st. 0 cir. 0 tt. 0 aim. 0 td. 0 aim. 0 td. N. W. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                         | 1 cir. 8 st.<br>1 cir.<br>10 st.<br>0<br>10 nim.<br>3 cir. 2 st.<br>10 st.<br>0   | 0 | 0 10 st.<br>7 st.<br>0 10 st.<br>0 10 st.<br>0 4 cir. 3 st.<br>1 2 cir.<br>10 1 cir.   | 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                               | 1 cir. 7 st.<br>10 st.<br>8 st.<br>10 nim.<br>0<br>1 cir. 7 st.<br>3 cir. 4 st.<br>1 st.<br>2 cir.   | 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 3 cir. cum. 4 st.<br>10 st.<br>10 nim.<br>1 st.<br>1 cir. 3 st.<br>6 cir. cum. 3 st.<br>1 st.<br>3 cir. 1 st.<br>1 cir.  | 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 0 st.<br>10 st.<br>10 nim.<br>1 st.<br>8 st.<br>3 cir. cum. 3 st.<br>1 st.<br>3 cir. 1 st.<br>1 cir. 1 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00 |                |
| ir. 3 cir. cum. 1 st. 0 cir. cum. 1 st. 0 cir. 0 dt. 0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                   | 1 cir. 8 st. 1 cir. 10 st. 0  10 nim. 3 cir. 2 st. 10 st. 0  10 st. 10 st. 0  0  10 st. 10 st. 10 st.   | 0 | 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 1 10 nim. 0 4 cir. 3 st. 1 2 cir. 0 1 cir. 0 10 st. 1 2 cir. 1 2 cir. 1 2 cir. 1 2 cir. 1 2 cir. 1 cir. 0 1 cir. 1 0 st. 1 2 cir.   | 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                               | 1 cir. 7 st. 10 st. 10 st. 10 st. 10 st. 10 nim. 10 cir. 7 st. 3 cir. 4 st. 1 st. 2 cir. 0 10 st. 10 nim. 10 cir. 4 st. 10 nim. 1 cir. 1 cir. 1 st.  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00   | 3 cir. cum. 4 st. 10 st. 10 st. 10 nim. 1 st. 10 nim. 1 st. 6 cir. cum. 3 st. 1 st. 3 cir. 1 st. 1 cir. 1 ot. 1 cir. 2 st. 1 cir. 1 cir. 2 cir. 2 st. 1 cir. 9 nim. 2 cir. 2 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st.   | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0                     | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                   | 9 st. 10 st. W 10 nim. 1 st. S st. 3 cir. cum. 3 st. 1 st. 3 cir. 1 st. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st.   | 0 00 00 00 00 00 00 00 00 00 00 00 00 0      |                |
| ir. 3 cir. cum. 1 st. 0 iv. 0 it. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 8 st. 1 cir. 10 st. 0  10 nim. 3 cir. 2 st. 10 st. 0  10 st. 10 st. 10 st. 10 st. 11 cir. 1 cir. 7 st. 5 cir. 1 st. 0 10 nim.  | 0 | 0 10 st. 0 1 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 7 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 nim. 0 1 cir. 7 st. 3 cir. 4 st. 1 st. 2 cir. 0 10 st. 10 nim. 1 cir. 1 cir. 1 cir. 1 cir. 1 cir. 1 cir. 1 cir. 2 cir. 1 cir. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 10 nim. 1 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 10 cir. 1 st. 2 cir. 1 st. 10 cir. 1 st. 2 cir. 1 st. 10 cir. 1 st. 10 cir. 1 st. 2 cir. 1 st. 10 cir. 1 st. 1 st. 10 cir. 1 st. 10 c | 000000000000000000000000000000000000000             | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 3 cir. cum. 4 st. 10 st. 10 st. 10 nim. 1 st. 10 nim. 1 st. 6 cir. cum. 3 st. 1 st. 3 cir. 1 st. 1 cir. 10 st. 4 cir. 1 st. 1 cir. 9 nim. 2 cir. 2 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 3 cir. st. 2 st.  | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 9 st. 10 st. W 10 nim. 1 st. S st. 3 cir. cum. 3 st. 1 st. 3 cir. 1 st. 1 cir. 1 st. 10 st. 3 cir. 3 st. 10 nim. 1 cir. Lt. haze. 3 st. 10 nim. 1 cir. 5 st. 10 nim. 1 cir. 5 st. 10 nim. 1 cir. 5 st. 10 nim. 1 cir. 5 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 10 nim. 1 cir. 1 st. 1 cir. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0       |                |
| ir. 3 cir. cum. 1 st. 0 iv. 0 it. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 8 st. 1 cir. 10 st. 0 10 nim. 3 cir. 2 st. 10 st. 0 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 2 cir. 4 st. 2 cir. 6 st. 2 cir. 4 st. | 000000000000000000000000000000000000000 | 0 10 st. 0 10 st. 0 10 st. 0 10 rst. 0 10 lost. 0 10 lost. 0 10 lost. 0 4 cir. 3 st. 1 2 cir. 0 1 cir. 0 1 cir. 1 2 cir. 1 2 cir. 4 st.  | 000000000000000000000000000000000000000   | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 1 cir. 7 st. 10 st. 10 st. 10 st. 10 st. 10 sit. 10 nim. 0 1 cir. 7 st. 3 cir. 4 st. 1 st. 2 cir. 0 10 st. 10 nim. 1 cir. 1 cir. 1 cir. 1 st. 2 cir. 1 cir. 1 cir. 1 st. 2 cir. 1 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 0   | 000000000000000000000000000000000000000             | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 3 cir. cum. 4 st. 10 st. 10 st. 10 nm. 1 st. 10 nm. 1 st. 1 cir. 3 st. 1 cir. 1 st. 1 cir. 1 st. 1 cir. 2 st. 1 cir. 2 st. 1 cir. 2 st. 1 cir. 2 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 9 nm. 2 cir. 2 st. 1 cir. 1 cir. 1 st. 1 cir. 1 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 9 st. 10 st. W 10 nim. 1 st. S st. 3 cir. cum. 3 st. 1 st. 3 cir. ast. 1 cir. 1 st. 1 cir. 1 st. 10 st. 3 cir. 3 st. 10 nim. 1 cir. Lt. haze. 3 st. 1 cir. 1 st. W 1 cir. 7 st. W 1 cir. 7 st. W 2 st. 1 cir. 1 st. W 2 st. 4 cir. st. 1 cir. 1 cir. 1 ci | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0        |                |

# Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In the

|   | 1 a.m.   |  | 2 a.m.   |  | 3 a.m.   | _  | 4 a. m.  |  | 5 a.m.   |  | 6 а. ш.  |
|---|--|--|--|--|--|--|--|--|--|--|--|
| Date.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation                          | Amount, kind, and direction of clouds  | Precipitation.                               | Amount, kind, and direction of clouds.   | Precipitation                                | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   |
| 1882.<br>Apr. 1<br>Apr. 2<br>Apr. 3<br>Apr. 4<br>Apr. 5   | 10 st. 0<br>10 st. 0<br>. 7 st. 0<br>. 1 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00   | 10 st. 0<br>10 st. 0<br>9 st. 0<br>1 st. 0<br>10 st. 0   | 00                                     | 10 st. 0<br>10 st. 0<br>7 st. 0<br>1 st. 0   | 00<br>00<br>00<br>00<br>00                   | 10 st. 0<br>10 st. 0<br>2 cir. Lt. haz. 3 st. 0<br>1 st. 0<br>10 st. Dense haze. 0   | 00<br>00<br>00<br>00<br>00                   | 10 st. 0<br>10 st. 0<br>Light haze, 4 st. 0<br>0 0<br>10 nim. 0                      | 00<br>00<br>00<br>00                                     | 10 st. 0 0 0 0 10 st. 3 cir. st. 5 st. 0 0 10 nim. 0 0 0   |
| Apr. 6<br>Apr. 7<br>Apr. 8<br>Apr. 9<br>Apr. 10   | 1 cir. 1 st, 0<br>10 st. 0<br>3 cir. 3 st. 0<br>9 st. 0<br>5 cir. st. 3 st. 0  | 00<br>00<br>00<br>00   | 1 cir. 1 st. 0<br>10 st. 0<br>4 cir. 2 st. 0<br>10 st. 0<br>Dense haze. 3 st. 0  | 00<br>00                               | 1 cir. 1 st. 0   10 st. 0   4 cir. 2 st. 0   Light haze. 7 st. 0   Deuse haze. 1 st. 0   | 00<br>00<br>00<br>00<br>00                   | 1 st. 0<br>10 st. 0<br>1 ctr. 1 st. 0<br>Dense haze. 5 st. 0<br>Dense haze. 1 st. 0  | 00<br>00<br>00<br>00<br>00                   | 2 st. 0<br>10 st. 0<br>1 st. 0<br>Dense haze. 7 st. 0<br>Light haze. 8 st. 0         | 00<br>00<br>00<br>00<br>00                               | Light haze. 4 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Apr. 11<br>Apr. 12<br>Apr. 13<br>Apr. 14<br>Apr. 15   | 1 cir. 1 st. 0<br>10 st. WNW.*   | 00 00  | Dense fog. 0<br>1 cir. 1 st. 0<br>1 cir. 1 st. 0<br>10 st. 0   | 00<br>00<br>00                         | Light haze, D. fog. 0<br>1 cir. 1 st. 0<br>1 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00                         | Lt. haz. 1 st. D. haz. 0<br>1 cir. 1 st. 0<br>1 cir. 2 st. 0<br>10 st. 0<br>0 st. 0  | 00<br>00<br>00<br>00                         | Light base. 0 1 st. 0 5 st. 0 10 st. 0 3 cir. st. 6 st. 0                            | 00<br>00<br>00<br>00<br>00                               | 1 st. 0 (1 st. 0 (1 st. 10 st. 10 st. 0 (1 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 (1 st. 10 st. 10 st. 10 st. 10 (1 st. 10 st. 10 st. 10 (1 st. 10 |
| Apr. 19<br>Apr. 17<br>Apr. 18<br>Apr. 19<br>Apr. 20   | 10 st. 0   | 00   | 10 nim. 0<br>9 st. Dense haze. 0<br>1 cir. st. 3 st. 0<br>10 st. 0<br>2 st. 0  | 00                                     | 10 st. SSW. * W. † 2 st. 0   10 st. 9   3 st. 0  | 00   | 10 st. 8SW. 4<br>9 st. W. †<br>10 st. 0<br>10 st. 0<br>1 cir. 3 st. 0  | 00<br>00<br>00                               | 10 st. SSW * 6 st. 0 10 st. 0 10 st. 0 4 st. 0                                       | 00<br>. 01<br>00<br>00<br>00                             | 10 st. SSW.+ (5 st. 0 (10  |
| Apr. 21<br>Apr. 22<br>Apr. 23<br>Apr. 24<br>Apr. 25   | 10 at. 0   | 00 00 00 00 00   | 8 st. 9 st. NW.* D. haze.<br>1 cir. 0<br>10 st. 0<br>10 st. 0  | 00<br>00                               | 7 st. 0. haze. W.* 10 st. 0. haze. 0 10 st. 0 10 st. 0   | 00<br>00<br>00<br>00<br>00                   | 1 cir. st. D. hz. 3 st. 0<br>2 cir. st. D. hz. 3 st. 0<br>1 cir. 0<br>10 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00                         | 4 cir. st. 1 st. 0<br>Light haze. 6 st. 0<br>0 0<br>10 st. 0<br>10 st. 0             | 00<br>00<br>00<br>00                                     | 2 st. 0<br>Light haze. 5 st. 0<br>0 0<br>10 nim. 0<br>10 st. 0   |
| Apr. 26<br>Apr. 27<br>Apr. 28<br>Apr. 29<br>Apr. 30   | 10 st. W. * 1 st. 0  | 00<br>00<br>00<br>00<br>00                                     | 2 cir. st. 3 st. 0<br>9 st. S.†<br>1 cir. 7 st. W. 1<br>1 st. 0<br>10 nim. 0   | * (0                                   | 1 at. 0  | 00<br>00<br>00<br>00                         | 1 cir. 2 st. 0<br>10 st. 0<br>1 cir. D. haz. 2 st. W. †<br>1 cir. 1 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00                         | 1 cir. 4 st. 0<br>10 st. 0<br>Light haze. 4 st. 0<br>1 st. 0                         | 00<br>00<br>00<br>00<br>00                               | 5 st. 0<br>10 st. 0<br>Light haze. 4 st. 0<br>2 st. 0  |
| Means.  | 6. 93  |  | 6. 70  |  | 6. 26  |  | 6. 08  |  | 6. 80  |  | 6. 93  |
| Date.   | 1 p. m.  | _  | 2 p. m.  |  | 3 p. m.  | _  | 4 p. m.  |  | 5 p. 1/.   |  | 6 p. m.  |
| 1882.<br>Apr. 1<br>Apr. 2<br>Apr. 3<br>Apr. 4<br>Apr. 5   | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>6 cir. st. 3 st. 0<br>0   | 00<br>00<br>00<br>00   | 10 st. 0<br>10 st. 0<br>10 st. 0<br>5 cir. 4 st. 0   | 00                                     | 10 st. 0   | 00<br>00<br>00<br>00                         | 7 st. NW.* 10 st. 0 5 cir. 3 st. 0 9 st. 0 0   | 00<br>00<br>00<br>00<br>00                   | 8 at. 0<br>10 at. 0<br>4 cir. 5 at. 0<br>8 at. 0<br>0                                | 00<br>00<br>00<br>00                                     | 4 cir. 3 st. 0<br>10 st. 0<br>4 cir. 1 st. 0<br>5 cir. 1 st. 0   |
| Apr. 6<br>Apr. 7<br>Apr. 8<br>Apr. 9<br>Apr. 10   | 8 st. 0<br>10 st. 0<br>1 cir. 0<br>9 nim. 0<br>D. fog. D. fog. 0   | 00 00 00   | 8 st. 0<br>10 st. 0<br>3 cir. 0<br>9 nim. 0<br>D. fog. D. fog. 0   | 00<br>00<br>00<br>01<br>00             | 4 cir. 4 st. 0<br>10 st. 0<br>5 cir. 0<br>10 nim. 0<br>Dense fog. 0  | 00<br>00<br>00<br>00                         | 6 cir. 3 st. 0<br>5 cir. st. 3 st. 0<br>3 cir. 0<br>10 nim. 0<br>D. fog. D. fog. 0   | 00 00 00                                     | 4 cir. 2 st. 0<br>4 cir. st. 4 st. 0<br>2 cir. 0<br>10 nim. 0<br>5 cir. cum. 3 st. 0 | 00   | 5 cir. 3 st. 0<br>5 cir st. 3 st. 0<br>4 cir. 0<br>10 st. 0<br>6 cir. cum, 2 st. 0   |
| Apr. 11   | 1 cir. 0   | 00   | 3 cir. 0   | 00<br>00                               | 2 cir. 0   | 00<br>00                                     | 2 cir. 0 0 10 st. 0 1  | 00<br>00<br>. 01                             | 1 cir. 0<br>0 0<br>10 st. 0  | 00<br>00   | 0<br>0<br>0<br>10 at.  |
| Apr. 12<br>Apr. 13<br>Apr. 14   | 10 nim. 0<br>0<br>4 cir. 3 cir. st. 0  | 00   | 10 nim. 0<br>0 0<br>8 st. 0  | 00                                     | 10 nim. 0 .<br>0 0<br>9 st. 0  | 01<br>00<br>00                               | 1 cir. 0   | 00   | 2 at. 0<br>10 st. SE.  | 00   | 2 cir. 4 st. 0<br>9 st. ESE.   |
| Apr. 12<br>Apr. 13<br>Apr. 14<br>Apr. 15<br>Apr. 16<br>Apr. 17<br>Apr. 18<br>Apr. 19  | 10 nim. 0  | 00   | 0 0  |  | 9 st. 0<br>5 cr. 2 st. 0<br>4 cir. Dense fog. 0<br>10 st. 0  | 00   | 1 cir. 0   | 00   | 2 at. 0  | 00   | 2 cir. 4 st. 0 9 st. ESE. 1  Lt. haze. Lt. haze. 0 0 5 cir. 0 0  Dense fog. 0 2 cir. 6 st. 0 0   |
| Apr. 12<br>Apr. 13<br>Apr. 14<br>Apr. 15<br>Apr. 16<br>Apr. 16<br>Apr. 18<br>Apr. 18<br>Apr. 19<br>Apr. 20<br>Apr. 21<br>Apr. 22                                  | 10 nim. 0 0 0 4 cir. 3 cir. st. 0 4 cir. 2 st. 0 5 cir. Dense fog. 0 10 st. 0 3 cir. 4 st. 0 10 st. 0 1 cir. 10 nim. 0 10 nim. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00<br>00<br>00<br>00<br>00             | 0 st. 0 5 cir. 2 st. 0 0 4 cir. Dense fog. 0 10 st. 4 cir. st. 5 st. 0 D. haze. D. haze. 0 10 st. 3 cir. 0   | 00<br>00<br>00<br>00<br>00<br>00             | 1 cir. 0 10 st. SE.† 6 cir. 0 6 cir. 0 6 cir. 0 7 cir. 4 st. 0 4 cir. 5 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0   | 00<br>00<br>00<br>00<br>00                   | 2 st. 0<br>10 st. SE. t<br>2 cir. 1 st. 0<br>5 cir. 0<br>Dense fog. 0                | 00<br>00<br>00<br>00<br>00                               | 9 st. ESE. 1  Lt. haze. Lt. haze. 0 0 5 cir. 0 Dense fog. 0  |
| Apr. 12<br>Apr. 13<br>Apr. 14<br>Apr. 15<br>Apr. 16<br>Apr. 16<br>Apr. 17<br>Apr. 19<br>Apr. 20<br>Apr. 20<br>Apr. 21<br>Apr. 22<br>Apr. 24<br>Apr. 25<br>Apr. 25 | 10 nim. 0 0 4 cir. 3 cir. st. 0 4 cir. 2 st. 0 5 cir. Dense fog. 0 10 st. 0 3 cir. 4 st. 0 10 st. 0 10 st. 0 10 in. 0 1 cir. 0 10 nim. 7 st. SSW-f 1 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 0 8 st. 0 0 8 st. 0 0 10 st. Dense fog. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 3 cir. st. 0 10 in. 0 in. 0 in. 0 in. 0 in. 0 in. 0 in. 0 in. 0 in. 0 in. 0 in | 00<br>00<br>00<br>00<br>00<br>00<br>00 | 0 st. 0 5 ctr. 2 st. 0 10 st. Dense fog. 0 10 st. 0 3 ctr 0 10 st. 0 10 ntm. | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir.   0   10 st.   SE. †   6 cir.   0   0   8 cir.   0   5 cir. 4 st.   0   4 cir. 5 st.   0   10 st.   0   10 st.   0   10 st.   0   Dense baze.   0   10 nim.   0   Dense baze.   0   1 st.   0   0   0   0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 2 at. 0 SE. 1 10 at. SE. 1 10 at. SE. 1 10 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 9 st. ESE.+ Lt. haze. Lt. haze. 0 0  |

character

Amount,

10 st. 10 st. 3 cir. st. 3 s 10 st. 10 nim. Light baze. 10 st. 0

0 10 nim. Light haze. 1 st. 1 st. 10 st. 2 cir. st. 8 s 10 st. 6 st. 10 st.

2 cir. st. 3 st 10 st. 0 10 nim. 10 st. 4 st. 10 st. Light haze. 2 st. 10 st.

3 cir. 3 st. 10 st. 2 cir. 2 st. 3 cir. 1 st.

3 cir. 5 st. 5 cir. 8t. 4 s 5 cir. 9 st. 2 cir. 2 cir. c 0 0 10 st. Light haze. 9 st.

Lt. haze. Lt

2 cir.
Dense fog.
8 st.

D haze, D. 2 cir. 1 st. Dense haze, 10 mm. 1 cir. 1 cir. 1 cir. 1 cir. D. haze D.

l cir. st. 1 s l cir. st. character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

table a signifies rapid, t significe slow. Daily means of amount of clouds on the right below, amount of precipitation on the right above.]

| 7 a. m.   |  | 5 a. m.   | . 1   | 9 a. m.   | -                           | 10 a. m.   |                               | 11 a. m.   |                            | 12 m.   | -                                |
|---|--|---|---|---|-----------------------------|--|-------------------------------|--|----------------------------|---|----------------------------------|
| Amount, kind, and<br>lirection of clouds.   | Precipitation.                         | Amount, kind, and direction of clouds.  | Precipitation.  | Amount, kind, and direction of clouds.  | Precipitation.              | Amount, kind, and direction of clouds.                                     | Precipitation.                | Amount, kind, and<br>direction of clouds.                                | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation                    |
| st. 0<br>st. 0<br>cir. st. 3 st. 0<br>st. 0   | 00<br>00<br>00<br>00                   | 10 st. 0<br>10 st. 0<br>3 cir. st. 5 st. 0<br>10 st. 0                              | 00<br>00<br>00<br>00                                  | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>3 cir. st. 7 st. 0                      | 00<br>00<br>00<br>00        | 10 st, 0<br>10 st, 0<br>10 st, 0<br>10 st, 0<br>2 st. 0                    | 00<br>00<br>00<br>00<br>00    | 10 st. 0<br>10 st. 0<br>10 st. 0<br>9 st. 0<br>1 st. 0                   | 00<br>00<br>00<br>00<br>00 | 10 st. 0 (<br>10 st. 0 (<br>6 cir. st. 3 st. 0  | 00<br>00<br>00<br>00             |
| ght haze. 7 st. 0<br>st. 0<br>nim. 0<br>ght haze. D. fog. 0   | 00<br>00<br>00                         | Light baze. 5 st. 0<br>10 st. 0<br>0<br>10 nim. 0<br>Lt. fog. Lt. fog. 0            | 00<br>00<br>00<br>02<br>00                            | 10 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0<br>Dense fog. 0                                | 00<br>00<br>00<br>01        | 10 st. 0<br>10 st. 0<br>1 st. 0<br>10 nim. 0<br>Dense fog. 0               | 00<br>00<br>00<br>00          | 10 st. 0<br>10 st. 0<br>1 cir. 1 st. 0<br>10 nim. 0<br>Dense fog. 0      | 00<br>00<br>00<br>01<br>01 | 10 st. 0 1 cir. 0 19 nim. 0   | 00<br>00<br>00<br>01<br>00       |
| st. 0<br>st. 0<br>st. 0<br>st. 0<br>st. 0   | 00<br>00<br>00<br>00                   | 2 st. 0<br>1 at. 0<br>10 st. 0<br>10 st. 0<br>4 cir. st. 4 st. 0                    | 00<br>00<br>00<br>00                                  | Dense haze. 2 st. 0<br>1 st. 0<br>10 nim. 0<br>8 st. WNW.†<br>5 cir. st. 4 st. 0        | 00<br>00<br>01<br>00<br>00  | 0 0 0 0 1 st. 0 0 10 nim. 0 2 st. WNW.† 4 cir. st. 2 st. 0                 | 00<br>00<br>.01<br>.00<br>.00 | 0 0 0<br>10 nim. 0<br>5 cir. 0   | 00<br>00<br>00<br>00       | 0<br>10 nim. 0  | 00<br>00<br>01<br>00<br>00       |
| st. SSW.† st. 0 nit. 0 nim. 0 nit. 0  | 00 00 00                               | 10 st. SSW:1 9 st. SSW:1 10 st. 0 10 nim. 0 10 st. 0                                | 00  | 6 st, 0<br>9 st, SSW.†<br>10 st, 0<br>10 nim, 0<br>10 st, 0                             | 00 00 00                    | Lt. haze. 6 st. 88W.† 8 st. 88W.† Dense haze. 4 st. 0 10 nim. 0 10 st. 0   | 00<br>00<br>00                | 4 cir. st. 3 st. W.† 4 cir. 3 st. SSW.† Dense haze. 4 st. 0 10 st. 0     | 00<br>00<br>00<br>01<br>00 | 3 st. 0 .<br>Dense haze. 5 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00<br>00       |
| rir. st. 3 st. 0 0 ott. 0 ott. 0 ott. 0 ott.  | 00<br>00<br>00<br>02<br>00             | 9 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0<br>10 st. 0                                 | 00<br>00<br>00<br>.03                                 | 5 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0<br>10 st. 8W.†                                  | 00<br>00<br>00<br>.02<br>00 | 9 st. 0<br>10 mm. 0<br>0 0<br>10 nim. 0<br>10 st. 0                        | 00<br>00<br>03<br>00          | 9 st. 0<br>10 st. 0<br>3 cir. 0<br>10 nim. 0<br>10 st. SW.i              | .00<br>.01<br>.00<br>.01   | 10 st. 0<br>1 cir. 0<br>10 nim. 0 .   | 00<br>00<br>00<br>01<br>00       |
| t. 0<br>t. 0<br>ht haze. 1 st. 0<br>t. 0  | 00<br>00<br>00<br>00                   | 4 st. 0<br>10 st. 0<br>1 st. 0<br>4 st. W.1<br>10 st. 0                             | 00  | 1 st. 0<br>10 st. 0<br>0 0<br>2 cir. 3 st. W.†  | 00<br>00<br>00<br>00        | 1 st. 0<br>•10 st. 0<br>0 0<br>1 cir. 1 st. W.†<br>1 cir. 0                | 00<br>00<br>00<br>00          | 1 at. 0<br>10 at. 0<br>0 0<br>1 at. 0<br>1 cir. 0                        | 00<br>00<br>00<br>00       | 3 cir. 3 st. 0<br>0 0   | 00<br>00<br>00<br>00             |
| 7. 10   |  | 7. 36   |   | 6, 90   |                             | 6. 10  |                               | 6, 00  |                            | 5. 53   |                                  |
| 7 p. m.   |  | 8 p. m.   |   | 9 p. m.   |                             | 10 p. m.   |                               | 11 p. m.   |                            | 12 p. m.  | x                                |
| dr. 3 st. 0<br>d. 0<br>dr. 2 st. 0<br>dr. 1 st. 0   | 00<br>00<br>00<br>00                   | 2 cir. 8 at. 0<br>10 at. 0<br>3 cir. 3 et. 0<br>2 cir. 5 at. 0<br>0                 | 00  | 1 cir. 2 st. 0<br>10 st. 0<br>4 cir. 1 st. 0<br>4 cir. 2 st. 0                          | 00<br>00<br>00<br>00        | 2 cir. 2 st. 0<br>0 st. 0<br>2 cir. 2 st. 0<br>6 st. 0                     | 00<br>00<br>00<br>00          | 9 at. NW.* 3 cir. 5 at. 0 1 cir. 1 st. 0 1 cir. 8 at. 0 1 cir. 0         | 00<br>00<br>00<br>00       | 1 cir. 1 st. 0<br>9 st. 0   | 00<br>00<br>00<br>00<br>00<br>00 |
| cir. 5 st. 0<br>ir. st. 4 st. 0<br>cir. 0<br>it. 0<br>cir. 2 cir. cum, 1 st. 0  | 00<br>00<br>00<br>00                   | 1 cir. 8 st. 0<br>2 cir. st. 6 st. 0<br>4 cir. 2 st. 0<br>9 st. 0<br>1 cir. 1 st. 0 | 00  | 10 st. 0<br>3 cir. st. 5 st. 0<br>4 cir. 1 st. 0<br>1 cir. 8 st. 0                      | 00<br>00<br>00<br>00        | 9 st. 0<br>3 cir. 5 st. 0<br>3 cir. 2 st. 0<br>1 cir. 8 st. 0              | 00<br>00<br>00<br>00          | 9 st. 8W. 9 st. 0 9 st. 0 1 cir. 2 cir. st. 2 st. 0 1 st. Light haze, 0  | 00                         | 3 cir. 3 st. 0<br>9 st. NW.   | 00<br>00<br>00<br>00<br>00       |
| t naze. D. fog. 0   | 00<br>00<br>00<br>00                   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00  | 0 0 0<br>0 0 0<br>6 cir, cum. 1 st. 0<br>Lt. fog. D. fog. 0<br>9 st. ESE.               | 00<br>00<br>00<br>00        | 0 0 0 0 1 st. 0 0 4 cir. cum. 2 st. 0 D. fog. D. fog. 0 9 st. ESE.         | 00<br>00<br>00<br>00          | 1 st. 0<br>1 st. 0<br>9 st. NW.*<br>Dense fog. 0<br>1 cir. st. 8 st. S.* | 00                         | 1 st. 0<br>10 st. WNW.*<br>Dense fog. 0   | 00<br>00<br>00<br>00<br>00       |
| haze. Lt. haze. 0   | 00                                     | Lt. haze, Lt. haze, 0<br>0 0<br>4 cir. 1 st. 0<br>5 cir. 3 st. 0<br>4 cir. 4 st. 0  | 00<br>00<br>00  | 3 cir. D. haze. 0<br>3 cir. 0<br>3 cir. 3 cir. st. 2 st. 0<br>9 st. 0<br>3 cir. 4 st. 0 | 00<br>00<br>00<br>00        | 2 cir. D. fog. 0<br>4 cir. 1 st. 0<br>9 st. 0<br>4 cir. 2 st. 0            | 00<br>00<br>00<br>00          | 8 st. NW.  | † 00<br>† 00               | 9 st. W.†<br>9 st. NW.†<br>1 cir. st. 7 st. W.†<br>2 cir. st. 5 st. SW.†<br>9 st. W.† |                                  |
| nse fog. 0  | 00                                     |   | . 1   | 3 cir. 5 st. 0  | 00                          | 1 st. 0  | , 00<br>00<br>00              |  | 00                         | 1 cir. 1 st. 0<br>0 0<br>10 st. 0   | 00<br>00<br>00                   |
| or. 0 on the control of the control | 00<br>00<br>00                         | D. haze. D. haze. 0<br>1 cir. 0<br>D. haze. D. haze. 0<br>10 nim. 0<br>2 cir. 0     | 00 00 00 00   | D. haze. D. haze. 0<br>10 nim. 0<br>1 cir. 1 cir. st. 0                                 | . 01                        | 10 st. 0<br>10 nim. 0<br>1 ci. s. 1 ci. cu. 2 s. 0                         | 00                            | 10 nim. 0<br>9 st. E.  |                            | 10 st. 0<br>5 st. 0   | 01<br>00                         |
| eir. 0 ense fog. 0 st. 0 haze. D. haze. 0 eir. 1 st. 0 nuse haze. 0 nun. 0  | 00<br>00<br>00<br>01<br>01<br>00<br>00 | D. haze. D. haze.   | 0 00<br>00 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00 | D. haze. D. haze. 0   | 00<br>00<br>00<br>00<br>00  | 10 nim. 0<br>1 ci. s. 1 ci. cu. 2 s. 0<br>3 cir. 1 st. 0<br>2 cir. 6 st. 0 | 00 00 00                      | 9 st. E.<br>4 st. 0<br>9 st. 0<br>0 0                                    | 00<br>00<br>00             | 10 st. 0<br>5 st. 0<br>8 st. 0<br>9 st. 0<br>0 0<br>10 nim. 0<br>9 st. W.†            |                                  |

s, and amount and s given in inches. In this

6.93
6 p. m.
4 cir. 3 st. 0 0 st. 0 4 cir. 1 st. 0 0 5 cir. 1 st. 0 0

0 st. 0 6 4 cir.1 st. 0 6 9 5 cir.1 st. 0 6 9 5 cir.3 st. 0 6 9 5 cir.3 st. 0 6 9 6 cir.3 st. 0 6 9 6 cir.4 st. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 cir. 0 6 9 6 cir.4 c

t. haze. Lt. haze. 0 00
5 cir. 0 00
5 cir. 0 00
2 cir. 6 st. 0 00
. haze. D. haze. 0 00

haze. D. haze. 0 ) st. 0 cense haze. 0 ) nim. 0 2 cir. 2 cir. st. 1 st. 0 cir. 2 st. 0 0 cir. st. 0

Statement showing the amount, kind and direction of clouds, and amount and

[Washington mean time.\* Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

|  | 1 a. m.  |  | 2 a.   | m.   | 3 a. m.  | i   | 4 a. m.  | i  | 5 a. m.  |   | ба. т.  |
|--|--|--|--|--|--|---|--|--|--|---|---|
| Date.  | Amount, kind, and direction of clouds  | Precipitation.   | Amount, kin<br>direction of c  | Precipitation.   | Amount, kind, and direction of clouds.   |   | nt, kind, and<br>on of clouds.   | Precipitation.   | Amount, kind, and<br>direction of clouds.  | Precipitation.  | Amount, kind, and direction of clouds.  |
| 1882.<br>May 1<br>May 2<br>May 3<br>May 4<br>May 5   | 10 nim.<br>. 10 st. NI   | 0 00<br>0 00<br>E. † 00  | 10 nim.  | 0 00<br>0 00<br>0 00<br>NE.† 00<br>0 00  | 10 st. 0<br>9 st. 0<br>10 nm. 0<br>10 st. 0<br>10 st. 0  | 00 10 st.<br>00 10 st.<br>01 10 nim.<br>00 10 st.<br>00 10 st.  | 0  | 00   | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0  | 00<br>00<br>00<br>00  | 10 st. 0<br>10 nim. 0<br>10 nim. 9<br>10 st. 0<br>10 st. 0  |
| May 6<br>May 7<br>May 8<br>May 9<br>May 10   | 10 nim. Ni<br>10 nim.<br>10 nim.   | E. 1 00<br>E. 1 01<br>0 -<br>0 -<br>0 -<br>0 00  | 5 cir. st. 1 st.<br>10 nim.<br>10 nim.<br>10 nim.<br>9 st.   | NF. + 00<br>NE. : -<br>0 : -<br>0 : 01<br>E. + 00  | 3 cir. st. 1 st. NE.* 10 nim. 10 st. 0 10 nim. 9 st. 0   | 00 3 cir. s<br>10 nim.<br>10 st.<br>01 10 nim.<br>00 9 st.  | NE.*.  | 00   | 4 cir. st. 1 st. NE. t<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0   | 00<br>00<br>01<br>00  | 2 cir. st. 4 st. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0  |
| May 11<br>May 12<br>May 13<br>May 14<br>May 15   | 10 st. 8<br>10 nim.<br>10 st.  | 0 00<br>8. † 00<br>0 00<br>7. † 00   | 10 st.<br>10 st.<br>10 nim.<br>10 st.<br>10 st.  | SE.† 00<br>SSW.† 00<br>SW*.01<br>0 00  | 10 st. SE.*<br>9 st. SSW.†<br>10 nim. SW.*<br>10 nim. 0<br>10 st. 0  | 00   10 st.<br>00   9 st.<br>- 10 nim.<br>- 10 st.<br>00   10 st.   | 0<br>W. 1.   | 00   | 10 nim. 0<br>10 st. 0<br>10 nim. 0<br>10 st. W.†<br>10 st. 0   | 00<br>00<br>00  | 10 nim.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>0<br>W.  |
| May 16<br>May 17<br>May 18<br>May 19<br>May 20   | 10 st. SSE<br>10 st. Dense fog.  | 0   00<br>0 00<br>2 1 00<br>0 00   | Dense fog.<br>10 st.<br>10 st.<br>Dense fog.<br>10 nin.  | 0 00<br>0 00<br>0 00<br>0 00   | Dense fog. 0   | - 10 st.  | Dense fog. 0   | 00   | 2 cir. Dense fog. 0<br>10 st. 0<br>10 nim. 0<br>10 st. Dense fog. 0<br>10 st. 0  | 00<br>00<br>00  | 1 cir. Dense fog. 0<br>10 st. 0<br>10 nim. 0<br>10 st. W.<br>10 st. 0   |
| May 21<br>May 22<br>May 23<br>May 24<br>May 25   | 10 st.<br>10 st.<br>1 cir. 1 cir.st. 2 st. E   | 0 .01<br>0 00<br>0 00<br>2.* 00<br>0 00  | 10 st.<br>10 st.<br>10 nim.<br>1 cir. 1 cir. st.<br>10 st.   | 1 st. E. * 00  | 10 st. E.*.  | 00 10 st.<br>00 10 st.<br>01 10 st.<br>00 1 cir. 1<br>00 10 st.   | 8t. W.*  | 00   | 10 st. 0<br>10 st. 0<br>10 st. 0<br>1 cir. 1 st. E. 4<br>10 st. 0  | 00<br>00<br>00<br>00  | 10 st. 0<br>10 st. 0<br>10 st. 9<br>10 st. E.<br>10 st. 0   |
| May 26<br>May 27<br>May 28<br>May 29<br>May 30   | 9 st. E<br>1 cir. st. E  | 0 00<br>0 00<br>0 00<br>0 00   | 10 st.<br>9 st.<br>1 cir. st. 1 st.<br>10:5.<br>10 st.   | 0 00<br>E.* 00<br>E.* 00<br>0 00   | 1 cir. st. 1 st. E.*   | 00 10 st.<br>00 1 cir. s<br>00 1 cir. s<br>00 10 st.<br>00 10 st.   | t. 1 st. E.*<br>t. 1 st. E.*   | 00<br>00<br>00   | 10 at. 0<br>1 at. 0<br>0 0<br>10 st. 0<br>10 at. 0   | 00<br>00<br>00<br>00<br>00  | 10 st. 0<br>0 0<br>1 cir. 1 st. 0<br>10 nim. 0<br>10 st. 0  |
| May 31   |  | 0 -  | 10 nim.  | E  | 10 nim. E.*.   | - 10 st.  | E.*.   | _  | 10 st. E.*   | 00  | 10 st. E  |
| Means.   | 9. 00  |  | 8. 42  | -  | 8. 23  |   | 8.71   |  | 8.71   | 1 1   | 9, 00   |
|  | 1 p. m.  |  | 2 p. n   | il.  | 3 p. m.  |   | 4 p. m.  |  | 5 p. m.  |   | 6 p. m.   |
| 1882.<br>fay 1<br>fay 2<br>fay 3<br>fay 4<br>fay 5   | 4 cir. 3 st. Dense fog.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00   | 10 st.<br>4 cir. 2 st.<br>Dense fog.<br>10 st.<br>4 cir. 2 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>NE.† 00  | 3 cir. Dense fog. 0<br>3 cir. 0  | 00 10 nim.<br>00 D. fog.<br>00 5 cir. 2   | st. 0  | 00   | 10 nim. 0<br>3 cir. st. 2 st. N.*<br>D. haze. D. haze 0<br>10 st. 0  | 00  | 10 nim. 0<br>5 cir. 3 st. N.<br>D. haze. D. haze. 0   |
|  |  |  | 2 0111 8 001   | 24 2311 00   | 3 cir. 0   | 00 3 cir.   | 0 -  |  | 10 st. 0   | 00  | 10 st. 0  |
| lay 7<br>Inv 8<br>Iay 9  | 10 nim.  | 00 .01<br>0 .01<br>0 .00<br>0 00   | 9 st.<br>10 st.<br>10 nim.<br>6 cir. 1 st.<br>10 st.   | SW.† 00<br>0   00<br>0   00<br>E.† 00  | 4 cir. 5 st. SW.1<br>10 st. 0<br>10 nim. 0<br>5 cir. 2 st. 0   |   | st. SW.†   | 00   00   01   00  |  |   |   |
| fay 7<br>fny 8<br>fay 9<br>fay 10<br>fay 11<br>fay 12<br>fay 13<br>fay 14  | 10 st. (10 nim. (10 st | 0 : 01<br>0 : 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00   | 9 st,<br>10 st,<br>10 nim,<br>6 cir, 1 st,   | SW.† 00<br>0   00<br>0   00<br>0   00  | 4 cir. 5 st. SW.† 10 st. 0 10 nim. 0 5 cir. 2 st. 0 4 cir. st. 5 st. E.† 9 st. 0 D. haze. D. haze. 0 10 st. 0 8 st. 0  | 00 3 cir.<br>00 3 cir. 6<br>00 10 nim.<br>10 nim.<br>7 cir. 2   | at. SW.† 0   8t. 0   8t. 0   8t. 0   0   0   0   0   0   0   | 00   00   00   00   00   100   | 0 0 10 st. 0 10 nim. 0 10 nim. 0 10 nim. 0 10 at. 0  | 00 .01 .00  | 1 cir. 0 10 st. 0 10 nim. 0 10 st. 0 10 st. 0   |
| fay 7 fny 8 fay 9 fay 10 fay 11 fay 12 fay 13 fay 14 fay 15 fay 16 fay 16 fay 17 fay 18 fay 19   | 10 st. 10 nim. 10 st. 9 st. 10 st. E 10 st.  | 0 . 01<br>0 . 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0  | 9 st.<br>10 st.<br>10 nim.<br>6 cir. 1 st.<br>10 st.<br>9 st.<br>10 st.<br>10 st.  | SW.† 00<br>0   00<br>0   00<br>E.† 00<br>0   00<br>0   00<br>0   00<br>0   00  | 4 cir. 5 st. SW.† 10 st. 0 5 cir. 2 st. 0 0 t. 2 st. 0 0 b. luize. D. haze. 0 10 st. 0 18 st. 0 18 st. SW.* Druse haze. 0 10 st. 0 10 st. 0 3 st. 0 3 st. 0 3 st. 0 3 st. 0 3 st. 0 4 st. 0 5 st. 0 5 st. 0 6 st. 0 7 st. 0 8  | 00   3 cir.<br>00   3 cir. 6<br>00   10 nim.<br>10 nim.<br>7 cir. 2<br>00   3 cir. 5<br>00   8 st.<br>00   10 st.<br>00   10 st.  | at. SW.t 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00   1 | 0 0 10 st. 0 10 nim. 0 10 nim. 0 10 st. | 00<br>00<br>.01<br>.00<br>00<br>00<br>00<br>00<br>00                            | 1 cir, 0 10 st. 0 10 nm. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 9 st. 0 10 st. 0 9 st. 0 10 st. 0   |
| fay 7 fay 8 fay 9 fay 10 fay 11 fay 12 fay 13 fay 13 fay 15 fay 16 fay 17 fay 18 fay 19 fay 20 fay 21 fay 22 fay 23 fay 23 fay 23 fay 24 fay 23 fay 24 fay 2 | 10 at. (10 at. | 0 . 01<br>0 . 00<br>0 . 00 | 9 st.<br>10 st.<br>10 nim.<br>6 cir. 1 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>2 cir.<br>10 st.<br>2 cir.<br>2 cir.   | SW.f 00<br>0 00<br>0 00<br>E.f 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>8W. 00<br>0 00<br>W.f 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 0 | 4 cir. 5 st. SW.† 10 st. 0 5 cir. 2 st. 0 4 cir. st. 5 st. E.† 0 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. SW.† 10 st. SW.† 10 st. SW.† 10 st. Us.† 10 s | 00   3 cir.<br>00   3 cir. 6<br>00   10 nim.<br>10 nim.<br>00   7 cir. 2<br>3 cir. 5<br>00   10 st.<br>00   10 st. | at. SW.f. 0 0 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 000   100 | 0 0 0 10 st. 0 10 nlm. 0 10 nlm. 0 10 nlm. 0 10 nlm. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 15 | 00<br>00<br>01<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | 1 cir. 0 10 st. 10 nim. 0 10 nim. 0 10 st. 85 cir. 3 st. ESE.  |
| fay 7 fay 9 fay 10 fay 11 fay 12 fay 13 fay 14 fay 14 fay 16 fay 17 fay 18 fay 19 fay 20 fay 21 fay 23 fay 23 fay 24 fay 27 fay 28 fay 27 fay 28 fay 28  | 10 at. 10 nim. (10 ni | 0  | 9 st. 10 st. 10 st. 10 st. 10 st. 9 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 14 st. 15 st. 16 st. 17 st. 18 st. 18 st. 19 st. 19 st. 19 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. | SW.† 00<br>0 00<br>0 00<br>E.† 00<br>0 00<br>E.† 00<br>0 00<br>0 00<br>0 00<br>0 00<br>SW. 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 0 | 4 cir. 5 st. SW.† 10 st. 0 5 cir. 2 st. 0 9 st. 0 10 nim. 0 10 st. 2 st. 0 10 st. 0  | 00   3 cir. 00   3 cir. 6   00   10 nim.  | at. SW.1  at. 0  at. 0  b. 0  c. 1  c. 0 | 00   1   1   1   1   1   1   1   1   1   | 0 0 0 0 10 at. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in. 0 10 in.  | 00<br>00<br>01<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | 1 cir. 0 10 st. |

character

....

10 st. 10 nim. 10 nim.

1 cir. st. 5 st. 10 nim. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st.

10 st. 10 nim. 10 st. 10 nim. 10 st.

10 st. 1 cir. 1 cir. 1st. 10 nim. 10 st. Dense fog.

19 st. 19 st. 19 st. 10 st. 10 st. 10 st. 10 st. 10 st. 2 cir. 6 st. 10 st.

2 cir. 6 at. 10-use fog. 10 at.

character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

table signifies rapid, t signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.   |                            | 5 a. m.  | 1                        | 9 a. m.   |                              | 10 a. m.   |                      | 11 a. m.   |                            | 12 m.   | nrecipi-                   | 4              |
|---|----------------------------|--|--------------------------|---|------------------------------|--|----------------------|--|----------------------------|---|----------------------------|----------------|
| Amount, kind, and direction of clouds.                | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation.           | Amount, kind, and direction of clouds.  | Precipitation.               | Amount, kind, and direction of clouds.   | Precipitation.       | Amount, kind, and direction of clouds.   | Freeigntation              | Amount, kind, and direction of clouds.  | Amount of pro              | Amount of pre- |
| 0) st. 0<br>0 n/m. 0<br>0 n/m. 0<br>0 st. 0           | 00<br>01<br>00<br>00       | 10 st. 0<br>10 nlm. 0<br>10 nlm. 0<br>10 st. 0<br>10 st. 0   | 00                       | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0                       | 00<br>01<br>00<br>00         | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. ENE.†                    | 00<br>00<br>00<br>00 | 10 st. 0 0   | 00                         | 10 st. 0 0 0 0 0 5 ctr. 4 st. NW.† 0 0 0 0 10 st. 0 0 0 0 4 st. NE.† 0            | 1                          | . 0            |
| ctr. st. 5 st. SW. † nim. 0 st. 0 nim. 0 nim. E. †    | 00                         | 9 st. SW.<br>10 nim. 0<br>10 st. Light fog. 0<br>10 nim. 0<br>10 st. E.  | 00                       | 10 st. SW.† 10 nim. 0 10 nim. 0 10 nim. 0 10 nim. 0 10 st. E.!                  | . 01<br>. 02<br>. 01<br>. 00 | 10 st. SW.† 10 nim. 0 10 nim. 0 10 nim. 0 10 st. E.†                             | 03                   | 10 st. SW.† 0<br>10 nim. 0 . 0<br>10 nim. 0 . 0<br>10 nim. 0   -<br>10 st. E.† 0 | 1                          | 10 st. SW. † 0<br>10 nim. 0 . 0<br>10 nim. 0 . 0<br>10 st. 0 . 0<br>10 st. E. † 0 | 1                          |                |
| st. 0<br>st. 0<br>st. 0<br>nim. 0<br>st. 0            | . 01<br>00<br>00<br>       | 10 nim. 0<br>10 at. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0   | 00                       | 10 nim. 0<br>10 at. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0                      | 00                           | 10 st. 0<br>10 nim. 0<br>10 st. W.†<br>10 nim. 0<br>10 st. 0                     | 00                   | 10 nim.<br>10 st. W.† 0<br>10 st. 0  | 00                         | 9 st. 0 0<br>10 nim. 0<br>10 st. 0 0<br>10 st. 0 0<br>10 st. 0 0                  | 0                          | :              |
| cir. Dense fog. 0<br>st. 0<br>wim. 0<br>w. t<br>st. 0 | 00<br>00<br>00<br>00       | 2 cir. Dense fog. 0<br>10 nim. 0<br>10 nim. 0<br>1 cir. st. 7 st. W.<br>10 st. 0   | 00                       | 1 cir. Dense fog. 0<br>10 nim. 0<br>10 nim. 0<br>3 cir. 3 st. 0<br>10 st. 0     | 00<br>01<br>00<br>00         | 5 cir. Dense fog. 0<br>10 st. W. 1<br>10 nim. 0<br>3 cir. 2 st. 0<br>10 nim. 0   | 00                   | 10 st. 0 0   | 00                         | 3 cir. Dense fog. 0 0 10 st. 0 10 st. 0 10 st. 2 cir. 0 0 10 st. 8.† 0            | 10                         |                |
| st. 0 st. 0 st. 0 st. 0 st. 0                         | 00<br>00<br>00<br>00       | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0   | 00                       | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                       | . 00<br>00<br>00<br>00       | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                         | 00<br>00<br>00<br>00 | 10 st. 0 (<br>10 st. 0 (<br>4 cir. 5 st. E.*                                     | 00<br>00<br>00<br>00<br>00 | 10 st. 0 (<br>10 st. 0 (<br>5 cir. 4 st. E.* (                                    | 10                         |                |
| st. 0<br>cir. 0<br>cir. 1st. 0<br>nim. 0<br>st. 0     | 00<br>00<br>00<br>.01      | 10 st. 0<br>1 st. 0<br>2 cir. 1 st. 0<br>10 nim. 0<br>10 st. 0   | 00                       | 10 st. 0<br>1 st. 0<br>10 st. NE.†<br>10 nim. Dense fog. 0<br>Dense fog. 0      | 00 00 00                     | 9 st. ENE.* 1 st. 0 10 st. ENE. † D. fog. 0 10 nim. 0 Dense fog. 0               | 00 00 00             | 10 st. NE.† (  | 00                         | 10 st. NE. † (  | 00                         |                |
| ense fog. 0   | 00                         | 10 st. 0   | 00                       | Dense fog. 0  | 00                           |  | 00                   | 10 st. W.t   | 00                         |   | 00                         |                |
| 8, 81   |                            | 9. 13  |                          | 8, 65   |                              | 9.00   | 1                    | 8.71   |                            | 8. 23   |                            |                |
| 7 p. m.   |                            | 8 p. m.  |                          | 9 p. m.   |                              | 10 p. m.   |                      | 11 p. m.   |                            | 12 p. m.  |                            | Dail<br>nean   |
| st. 0 st. 0 st. 0 eir. 0                              | 00<br>00<br>00<br>00       | 9 st. N. 10 st. 0 10 st. 0 10 st. 0 2 cir. 0   | 00                       | 5 cir. 1 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>1 cir. 2 cir. st. 1 st. 0 | 00<br>00<br>00<br>00<br>00   | 1 cir. 1 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>4 cir. 1 st. 0 | 00<br>00<br>00<br>00 | 10 st. 0<br>10 st. NE.†  | 00<br>00<br>00<br>00       | 10 st. 0  | 00<br>00<br>00             | 7<br>7<br>10   |
| st. 0<br>st. 0<br>st. 0<br>st. 0<br>cir. 3 st. 0      | 00<br>01<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0<br>10 st. 0<br>9 st. 4 cir. 4 st. 0   | 00 00                    | 10 st. 0<br>10 st. 0<br>10 st. 0<br>3 cir. 2 st. 0<br>3 cir. 3 st. 0            | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>10 nim. 0<br>10 st. 0<br>4 cir. 2 st. 0<br>2 cir. st. 4 st. 0        | 00<br>01<br>00<br>00 |  | 00                         | 10 nim. 0 3 cir. 4 st. 0  | 00 -                       | 10<br>10<br>8  |
| cir. 6 st. 0 use fog. 0 st. 0 st. 0 st. 0             | 00<br>00<br>00             | 1 cir. 7 st. 0<br>Dense fog. 0<br>10 st. 0<br>10 st. 0   | 00                       | 9 st. 0<br>9 st. 0<br>10 st. 0<br>10 st. 0                                      | 00<br>00<br>00               | 2 cir. 6 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. SE.1<br>10 st. 0               | 00 00 00             | 3 cir. st. 5 nim. 0 . 10 st. SE.t  | 00<br>:<br>00<br>00        | 9 nim. SW.† . 10 st. 0 10 st. SE.† .  | 00<br>01<br>00<br>00       | 16             |
| st. 0<br>st. 0<br>st. 0<br>vir. 5 st. SE.*<br>st. 0   | 00<br>00<br>00<br>00       | 10 st. 0<br>10 st. 0<br>10 st. W.<br>10 st. 10 nim. 0  | 00 10                    | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. SE.<br>10 nim. 0                     | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                         | 00                   | 10 at. 0   | 00<br>00<br>00             | 10 nim. 0  .  | 00                         | 10             |
| nim. 0 st. 0 cir.1st. E.* st. 0 st. 0                 | 00<br>00<br>00<br>00       | 10 nim. (10 st | 00 (<br>.* 00<br>.00 (   | 10 nim. 0<br>10 st. 0<br>1 cir. 1 st. E.,<br>10 st. 0<br>10 st. 0               | + 00<br>+ 00                 | 10 nim. 0<br>10 st. 0<br>1 cir. 1 st. E.<br>10 st. 0<br>9 st. E.                 | * 00<br>00           | 1 cir. 1 cir. st. 1 st. E.*  | 00<br>00<br>00<br>00       | 10 st. 0<br>1 cir. 1 cir. st. 2 st. E.*<br>10 st. 0                               | 00<br>00<br>00<br>00<br>00 | 1              |
| st. NE.* st. 0  | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00 ; 0<br>00 ; 0<br>00 0 | 1 cir. 1 at. NE. 0 10 at. 0 10 at. 0 10 st. 0                                   | 00<br>00<br>00               | 1 cir. 1 st,   | 00<br>00<br>00       | 1 cir. 0   E.*   | 00<br>00<br>00<br>00       | 1 cir. st. 0<br>10 st. E.   | 00<br>00<br>00             | 10             |
| st. E.f   | 00                         | 10 at E  | . 1 00                   | 10 st. 0  | 00                           | 10 st. 0   | 00                   | 10 st. 0   | 00                         | 10 st. SW.1   | 00                         | 8              |
|   |                            |  |                          |   |                              |  |                      |  |                            | 8. 65   |                            |                |

: Light deposition of fine frozen particles.

and amount and ven in inches. In this

6 a. m. nount, kind, and ection of clouds.

st. 0 n
iim. 0 ...
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nim. st. st. 9.00

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, —5 hours 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.   |                                    | 2 a. m.  |                              | 3 a. m.   |                              | 4 a. m.  |                             | 5 a. m.   |                             | 6 a. m.  |
|---|---|------------------------------------|--|------------------------------|---|------------------------------|--|-----------------------------|---|-----------------------------|--|
| Date.   | Amount, kind, and direction of clouds.  | Precipitation.                     | Amount, kind, and<br>direction of clouds.  | Precipitation.               | Amount, kind, and<br>direction of clouds.   | Precipitation.               | Amount, kind, and<br>direction of clouds.  | Precipitation.              | Amount, kind, and direction of clouds.  | Precipitation.              | Amount, kind, and direction of clouds.   |
| 1882.<br>June 1<br>June 2<br>June 3<br>June 4       | 4 cir. cum. 4 st. E.* Dense fog. 0 10 st. NE.* 10 st. 0                             | 00                                 | 2 cir. 3 st. 0<br>Dense fog. 0<br>10 st. 0<br>10 st. 0                             | 00<br>00<br>00               | 10 st. E.* Dense fog. 0 10 st. 0 10 st. 0   | 00<br>00<br>00<br>00         | Dense fog. 0 Dense fog. 0 10 st. 0 10 st. 0  | 00<br>00<br>00<br>00        | 1 cir. Dense fog. 0<br>Dense fog. 0<br>10 st. 0<br>10 st. 0                           | 00<br>00<br>00<br>.01       | Dense fog. 0 00<br>Dense fog. 0 00<br>10 st. 0 00<br>0 00  |
| June 5<br>June 6<br>June 7<br>June 8<br>June 9      | 10 nim. 0 8 st. SW.1 1 st. SW.1 1 cir. st. 0 1 cir. st. 0                           | . 01<br>00<br>00<br>00<br>00       | 10 nim.<br>8 st.<br>1 st.<br>1 cir. st. 1 st.<br>1 cir. st.                        | . 01<br>00<br>00<br>00<br>00 | 10 st. 0<br>8 st. 8W.†<br>1 st. 5W.†<br>1 cir. cum. 1 st. 0<br>1 cir. 1 st. 0                     | 00<br>00<br>00<br>00         | 10 st,<br>6 st,<br>1 st,<br>Dense fog,<br>1 cir. 1 st.                                       | 00<br>00<br>00<br>00        | 10 st. 0<br>1 st. 0<br>1 st. SW. t<br>Dense fog. 0                                    | 00<br>00<br>00<br>00        | 10 st.<br>1 cum. 1 st.<br>3 st.<br>Dense fog.<br>1 cir.<br>W8W. † 60<br>SE. † 00<br>8W. † 00<br>0 00 |
| June 10<br>June 11<br>June 12<br>June 13<br>June 14 | 10 st. E.* 1 cir. st. 9 st. NE. † 8 st. 0 8 st. E.† Dense fog. 0                    | 00                                 | 10 st. E.* 3 cir. st. 7 st. NE. 1 8 st. S. 1 Dense fog. 0                          | 00                           | 10 st. E.* 1 cir. st. 9 st. NE.† 9 st. SW.† 1 cir. st. 7 st. E.† 10 nim. 0                        | 00<br>00<br>00<br>00<br>00   | 10 st. E.* 10 st. 0 9 st. SSW.† 1 cir. st 6 st. E.† 10 nim. 0                                | 00<br>00<br>00<br>00<br>.01 | 10 st. E.* Light fog.<br>10 st. 0<br>9 st. SSW.†<br>4 cir. st. 5 st. E.†<br>10 nim. 0 | 00<br>00<br>00<br>00<br>.17 | 10 st. Light fog. 0 00<br>10 st. 0 90<br>9 st. SSW + 00<br>5 cir. st. 4 st. NE. + 00<br>10 st. 0     |
| Tune 15<br>Tune 16<br>Tune 17<br>Tune 18<br>Tune 19 | Dense fog.  9 st. NE.† Dense fog. 1 cl. 5s. NE.* Lt. fog. Dense fog. 0 0 st. SW.*   | 00<br>00<br>00<br>00               | 10 nim. 0 Dense fog. 0 1 cl. 4 s. NE.* Lt. fog. Dense fog. 0 1 cir. st. 8 st. SW.* | . 03<br>00<br>00<br>00<br>00 | Dense fog. 0 Dense fog. 0 1 ci. s. 3 s. NE.* L. fog. Dense fog. 0 9 st. SW.*                      | 00<br>00<br>00<br>00         | 10 st. 0 Dense fog. 0 1 cir. st. Lt. fog. 0 Dense fog. 0 10 st. WSW.*                        | 00<br>00<br>00<br>00        | 10 st, 0 Dense fog. 0 6 ci. st. Light log. 0 1 cir. Dense fog. 0 10 nim. 0            | 00<br>00<br>00<br>00        | 10 st, 0 .02 Dense fog, 0 00 Dense tog, 0 00 1 cir. Light fog. 0 00 10 nim. SW.+.                    |
| une 20<br>June 21<br>June 22<br>June 23<br>June 24  | 3 cir. st. 5 st. SW.* Dense fog. 0 0 st. NNW.* 10 st. N.* 1 cl. s. 8 s. NE.* Lt. f. | 00<br>. 01<br>. 00<br>. 00<br>. 00 | 9 st. SW.* Dense fog. 0 9 nim. NNW.* 9 st. NNE.* 3 ci. 2 st. NE.* L. fog.          | 00                           | 2 cir. st. 6 st. SW.* Dense fog. 0 1 cir. st. 9 st. NNW.* 10 st. NNE.* 1 ci. s. 4 s. E.* Lt. fog. | <br>                         | 2 cir. cum. 6 st. SW.* 10 nim, 0 9 st. NNW.* Lt. fog. 10 st. NNE.* 1 ci. s. 1 s. E.† L. fog. | . 00<br>. 01<br>. 00        | 7 st. SW. † 10 nim. 0 3 c. 3 s. NW. † L. fog. 10 st. NNE. † 1 cir. st. 1 st. 0        | 00<br>00<br>00              | Dense fog. 0 00<br>10 nim. 0<br>9 nim. NW.: 0<br>10 st. NXE.+ 00<br>1 cir. cum. 1 st. 0 00           |
| une 25<br>une 26<br>une 27<br>une 28<br>une 29      | 3 cir. st. 0 9 st. NW.† 10 st. 0 10 nim. N.† 6 cir. st. 1 st. NNW.*                 | 00                                 | 3 cir. st. 1st. 0<br>8 st. NW.†<br>10 nim. 0<br>10 st. N.†<br>2 cir. st. D. fog. 0 | 00<br>00<br>                 | 1 ci. st. 1 ci. cu. 1 s. 0 Dense fog. 0 10 nim. 0 10 st. N. † 1 cir. st. D. fog. 0                | 00<br>00<br>. 01<br>00<br>00 | 1 cir. st. 1 st. NE.† 10 st. 0 10 nim. 0 10 st. 0 10 st. N.*                                 | 00<br>00<br>.01             | 2 cir. 1 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>Dense fog. 0                    | 00<br>00<br>00              | 1 cir. st. 1 st. 0 00 10 st. 0 10 nim. 0 .01 10 st. 0 cc. Deuse fog. 0 00                            |
| une 30  | 10 st. 0  | 00                                 | 10 st. 0   | 00                           | 10 at. 0  | 00                           | 1 cir. 9 st. NE.*  | 00                          | 10 st. 0  | 00                          | Dense fog. U 00  |
| Means.  | 6, 46   |                                    | 6, 10  |                              | 6. 00   |                              | 6. 56  |                             | 6. 28   |                             | 5. 60  |
| Date.   | î p. m.   |                                    | 2 p. m.  |                              | 3 p. m.   |                              | 4 p. m.  |                             | 5 p. m.   |                             | 6 p. m.  |
| 1882.<br>une 1<br>une 2<br>une 3<br>une 4           | 1 st. 0<br>4 cir. st. NE.*<br>10 st. 0<br>10 st. E.†                                | 00<br>00<br>01<br>. 01             | 1 cir. st. 1 st. 0<br>2 cir. st. 5 st. NE.*<br>10 st. 0<br>10 st. E. †             | 00<br>00<br>00               | 8 cir. st. 3 st. E. † 2 cir. 4 st. NE.* 10 st. 0 10 st. E. †                                      | 00<br>00<br>00<br>00         | Dense fog. 0<br>3 cir. 3 st. N.*<br>3 cir. st. 4 st. NE.*<br>10 st. 0                        | 00<br>40<br>00<br>00        | Dense fog. 0 2 cir. st. 2 st. N. a 2 cir. 6 st. NE. 1 10 st. 0                        | 00<br>00<br>00<br>00        | Dense fog. 0 3<br>1 cir. st. 3 st. N. 0<br>1 cir. 5 st. NE. 0<br>0 st. 0 0                           |
| une 5<br>une 6<br>une 7<br>une 8<br>une 9           | Dense fog. 0<br>1 cir. 1 cum. 0<br>2 cir. 5 st. SW. t<br>2 st. 0<br>Dense fog. 0    | 00<br>00<br>00<br>00<br>00         | 3 cir. st. 4 st. 0<br>2 st. 0<br>5 st. SW. t<br>5 st. E.*                          | 00<br>00<br>00<br>00<br>00   | 4 cir. st. 4 st. 0 2 cir. 1 st. 0 5 cir. st. 0 3 st. E.* Dense fog. 0                             | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>2 st. 0<br>3 cir. 2 st. 0<br>9 st. E.*<br>Dense fog. 0                           | 00<br>00<br>00<br>00        | 9 st. S. † 2 cir. st. 0 1 cir. 1 st. 0 10 st. ESE.*                                   | 00<br>00<br>00<br>00        | 9 st. S. † 00<br>3 cir. st. 1 st. 0 00<br>0 0 0<br>8 st. ESE.* 00<br>9 st. E.* 00                    |
| une 10<br>une 11<br>une 12<br>une 13<br>une 14      | 9 st.   | 00<br>00<br>00<br>00<br>00         | 10 st. E.* Dense fog. 0 6 st. SW. † Dense fog. 0 Dense fog. 0                      | 00<br>00<br>00<br>00<br>00   | 10 st. E.* Dense fog. 0 2 cir. 1 st. SW. † Dense fog. 0 Dense fog. 0                              | 00<br>00<br>00<br>00         | 8 st. E.* 8 st. E.* 1 st. 0 Dense fog. 0 Dense fog. 0  | 00<br>00<br>00<br>00        | 9 st, E.* 2 st. SW.† 1 cir. 1 st. 0 Dense fog. 0 10 st. 0                             | 00<br>00<br>00<br>00<br>00  | 4 at. E.* 0( 0 0 0 0 2 cir. 2 st. 0 0 Dense fog. 0 00 10 at. 0 00                                    |
| une 15<br>une 16<br>une 17<br>une 18<br>une 19      | Dense fog. 0<br>Dense fog. 0<br>Dense fog 0<br>4 cir. cum. 3 st. 0<br>9 st. SW.     | 00<br>00<br>00<br>00<br>00         | Dense fog. 0 Dense fog. 0 9 at. 0 8 cir. 2 st. 0 9 st. SW. 1                       | 00<br>00<br>00<br>00         | Dense fog. 0<br>Light fog. 0<br>Dense fog. 0<br>6 cir. 2 st. 0<br>10 st. SW. 1                    | 00<br>00<br>00<br>00         | Dense fog. 0 Dense fog. 0 Dense fog. 0 3 cir. 2 st. 0 10 st. SW.†                            | 00<br>00<br>00<br>00        | 1 cir. 7 st. NE.* 4 at. NE.† 9 st. E.* 10 st. W.† 10 st. SW.†                         | 00<br>00<br>00<br>00<br>00  | 1 c. 7 s. NE. Lt. fog. 06 5 st. NE. t 0. 10 st. E. 0 9 st. W. t 0 10 st. SW. t 0                     |
| nne 20<br>ine 21<br>ine 22<br>ine 23<br>ine 24      | 10 nim. 0<br>Dense fog. 0<br>9 nim. NW.†<br>8 st. NW;†<br>5 cir. st. 1 st. 0        | 00                                 | Dense fog. 0 8 st. E.† 9 st. NW.† 8 st. NW.† 3 st. 0                               | . — 1                        | Dense fog. 0<br>10 st. E, †<br>10 st. 0<br>8 st. NW, †<br>1 cir. 1 st. 0                          | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>10 st. NNE, †<br>10 st. 0<br>6 st. NN. †<br>1 cir. 1 st. 9                       |                             | 10 st. W.† 10 st. 0 10 st. 0 4 st. NW.† 1 cir. 0                                      | 00 00 00                    | 10 at. W. t 0<br>10 at. 0 0<br>10 at. 0 0<br>5 at. NW. t 0<br>1 cir, 0 0                             |
| ne 25<br>ine 26<br>ine 27<br>ine 28<br>ine 29       | 4 cir. cum. 1 st. 0<br>10 st. 0<br>8 st. NNW. †<br>10 st. N.*                       | 00<br>00<br>00<br>00<br>00         | 5 oir. 0<br>10 st. 0<br>6 st. NW.*<br>10 st. N.*                                   | 00<br>00<br>00<br>00<br>00   | 4 cir. 0<br>Dense fog. 0<br>10 st. NW.*<br>10 st. N.†<br>10 st. 0                                 | 00<br>00<br>00<br>00         | 3 cir. 0<br>10 st. 0<br>10 st. NW.^1<br>10 st. N.†<br>10 st. N.†                             | 00<br>00<br>00<br>00        | 4 cir, 0<br>10 st. 0<br>10 st. NW.*<br>10 st. 0<br>10 st. 0                           | 00<br>00<br>00<br>00        | 2 cir, 3 cir. st. 1 st. 0 0 0 8 st. 8 st. NW. 0 9 st. W. f 0 Dense fog. 0 0                          |
| ne 80   | Dense fog. 0  | 00                                 | Dense fog. 0   | 00                           | Dense fog. 0  | 00                           | Dense fog. 0   | 00                          | Dense fog. 0  | 00                          | Dense fog.   |
|   | 4.96  |                                    | 5, 16  |                              | 4. 86   |                              | 5, 40  |                             | 6, 60   |                             | 5, 96  |

character

Amount, k

Dense fog. Dense fog. 10 st. 10 st. 1 cir. 1 st. 5 st. Light fog. 1 cir.

5 st. Light fog. 1 cir. 10 st. Light fo 10 st. 8 st. 8 cir. st. 1 st. 10 st.

Dense fog.
Dense fog.
Dense fog.
Leir. Light:

Dense fog. 10 st. 8 st. 8 st. 4 cir. cum. 1 st. 2 cir. st. 1 st. Dense fog. 10 st. 10 st. Dense fog.

10 st. 10 st. Dense fog. Dense fog. 5. 00

Dense fog. 9 st. 9 st. 10 nim. 9 st. 2 cir. st.

2 st. 0 4 cir. 1 at. Dense fog. 10 st. Dense fog. 4 st. 10 st. 10 st. 9 st.

9 st.
10 nim.
10 st.
10 st.
1 cir. 4 st.
1 cir. 3 cir. 3 cir. st

3 cir. 3 cir. st. 2 10 st. 1 cir. 7 st. 9 st. 10 st. 10 st.

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

table signifies rapid, signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.}

| •   |  | 8 a. m.  |   | 9 a. m.   |  | 10 a. m.   |  | 11 a. m.   |   | 12 m.   | precipi       |
|---|--|--|---|---|--|--|--|--|---|---|---------------|
| Amount, kind, and<br>rection of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.  | Amount, kind, and direction of clouds.  | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.  | Amount, kind, and direction of clouds.  | Amount of pre |
| nse fog. 0  nse fog. 0  st. 0  at. 0  | 00<br>00<br>00<br>00   | Dense fog. 0<br>Dense fog. 0<br>10 st. 0<br>10 st. 0   | 00  | Dense fog. 0<br>1 ci. s. 2 s. Lt. fog. 0<br>10 nim. 0<br>Dense fog. 0   | 00   | 1 c. s. 2s. L. fog. 0<br>10 st. NNE.*<br>10 nim. 0<br>10 nim. 0  | 00<br>00<br>00   | 3 cir. st. 1 st 0<br>2 cir. 5 st. NE.*<br>10 nim. 0 .<br>10 nim. 0 .   | _   | 1 cir. at. 1 at. 0 00<br>3 cir. at. 3 at. NE.* 00<br>10 nim. 0  | :             |
| tt. WSW. † cir. 1 st. SE. † st. tt. SW. † cir. 0  | 00   | 8 ci. st. 5 st. WSW. 1 cir. 1 cum. 0 5 st. SW. 1 Light fog. 0 2 cir. 0   | 00  | 1 cir. 5 st. WSW.† 1 cir. 1 cum. 0 6 st. SW.† 4 st. ENE.* Lt. fog. 1 cir. 0   | 00   | 9 st. WSW. t<br>1 cir. 1 cum. 0<br>8 st. SW. t<br>2 st. ENE.* Lt. fog.<br>Dense fog. 0   | 00   | 8 st. WSW.† 1 cir. 1 cum. 0 SW.† 0 ot. 0 Denae fog. 0  | 00  | 4 st. 1 cir. 1 cum. 9 st. 8W.† 00 00 8W.† 00 00 00 00 00 00 00 00 00  |               |
| at. Light fog. 0<br>at. 8SW.†<br>it. 8SW.†<br>it. NE.†  |  | 10 st. 0<br>10 st. 0<br>7 st. SSW.1<br>Dense fog. 0<br>10 nim. 0   | 00<br>00<br>00  | 10 st, 10 st. 0 0 SSW. † Dense fog. 0 Dense fog. 0  | 00<br>00<br>00<br>00<br>.02  | 8 st, E.*  Dense fog. 0 9 st, SSW.†  Dense fog. 0 Dense fog. 0   | 00   | Dense fog. 0 9 st. SSW.t. Dense fog. 0   | 00<br>00<br>00<br>00  | 10 at. E.* 00<br>Dense fog. 0 00<br>9 st. SSW.† C9<br>Dense fog. 0 00<br>Dense fog. 0 00  |               |
| se fog. 0 se fog. 0 se fog. 0 r. Light fog. 0 SW. t   | 00<br>00<br>00<br>00<br>00   | Dense fog. 0 Dense fog. 0 Dense fog. 0 1 cir. Light fog. 0 10 st. SW.  | 00  | 10 st. 0 Dense fog. 0 1 ci. st. Dense fog. 0 1 cir. cum. 1 st. 0 10 st. SW.   | 00   | Dense fog. 0 Dense fog. 0 Dense fog. 0 1 st. 0 10 st. SW.†   | 00<br>00<br>00<br>00   | Dense fog. 0<br>Dense fog. 0   | 00<br>00<br>00<br>00  | Dense fog. 0 00 Dense fog. 0 00 Dense fog. 0 00 1 st. 0 00 10 st. SW.†.—  |               |
| se fog. 0 t. 0 t. NW.† t. NNE.† t. NNE.†  | 00   | Dense fog. 0<br>10 st. 0<br>10 st. NW. 1<br>10 st. NNE. 4 cir. st. 0   | 00<br>00<br>00<br>00  | Dense fog.  Dense fog.  10 nim.  9 st.  5 cir. st.  0   | . —  | Dense fog. 0   | 00   | Dense fog. 0<br>10 st. NW. †<br>9 st. N. †   | 00<br>00<br>00<br>  | 10 st. 0 00<br>Dense fog. 10 nim. NW.†.—<br>9 st. NW.†.—<br>6 cir. st. 0 00   |               |
| ir. st. 1 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00   | 2 cir. st. 1 st. 0<br>10 st. 0<br>10 st. NNW.*<br>10 st. 0<br>Dense fog. 0   | 00<br>00<br>00<br>00  | 1 cir. cu. 2 ci. s. 1 s. 0 Dense fog. 0 10 st. NNW. f 10 st. 0 Dense fog. 0   | 00<br>00<br>00<br>00   | 2 cir. cum. 2 cir. st. 0<br>Dense fog. 0<br>10 st. NNW.*<br>10 st. 0<br>Dense fog. 0   | 00<br>00<br>00<br>00<br>00   |  | 00<br>00<br>00<br>00<br>00  | 3 cir. cum. 2 st. 0 00<br>Dense fog. 0 00<br>2 cir. 5 st. 0 00<br>10 st. N.* 00<br>10 st. 0 00  | ,             |
| se fog. 0   | 00   | Dense fog. 0   | 00  | 10 st. 0  | 00   | 10 st. 0   | 00   | 10 st. 0   | 00  | 10 st. 0 00   |               |
|   |  |  |   |   |  | process on the same of the   | -  |  |   |   |               |
| 5, 00   |  | 5. 10  |   | 4. 73   |  | 4. 70  |  | 4. 66  |   | 5. 00   |               |
| 7 p. m.   |  | 5. 10<br>8 p. m.   |   | 4.73<br>9 p. m.   |  | 4. 70<br>10 p. m.  |  | 4. 66<br>11 p. m.  | . 1   | 5. 00<br>12 p. m.   |               |
|   | 00<br>00<br>00   |  | 00<br>00<br>00<br>. 04  |   | 00<br>00<br>00<br>00   |  | 00<br>00<br>00<br>00<br>. 02   | 11 p. m.  Dense fog. 0 10 st. NE.*   | 00<br>00<br>00<br>00  |   | mea           |
| 7 p. m. se fog. 0 N.* NE.† m. 0 S.† st. 0 BSE.*   | 00<br>00<br>00<br>00<br>00   | 8 p. m.  Dense fog. 0 10 st. N. 1 1 cir. 7 st. NE.   | 00<br>00<br>04<br>00<br>00<br>00  | 9 p. m.  Dense fog. 0 10 st. N.* 1 cir. 6 st. N.E. †  | 00<br>00<br>. 01   | 10 p. m.  Dense fog. 0 10 st. N.* 9 st. N.E. †   | 00   | 11 p.m.  Dense fog. 0 10 st. NE.* 10 st. 0 10 nim. 0 1 st. 0 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 1 st. 0   | 00<br>03<br>00<br>00<br>00<br>00  | 12 p. m.  Dense fog. 0 00 10 st. NE. 00 10 st. 0 06   | meal          |
| 7 p. m.  se fog. 0 N.* NE.† m. 0 S.† ESE.* E.* E.* E.* E.* E.* E.* E.* E.* E.*  | 00<br>00<br>00<br>00<br>00   | 5 p. m.  Dense fog. 0 10 st. N.* 1 cir. 7 st. NE.† 10 nim. 0 5 cir. cum. 3 st. 0 2 cir. 2 cir. st. 0 6 0   | 00<br>00<br>04<br>00<br>00<br>00  | 9 p. m.  Dense fog. 0 10 st. N.* 1 cir. 6 st. NE.† 10 nim. 0  9 st. SSW.† 1 cir. 1 st. 0 0 st. 0  | 00<br>00<br>00<br>00<br>00<br>00   | 10 p. m.  Dense fog. 0 10 st. N.* 9 st. NE.† 10 nim. 0 4 cir. cum. 2 st. 0 1 st. 0 1 cir. st. 1 st. 0  | 00<br>00<br>02<br>00<br>00<br>00<br>00                                     | 11 p. m.  Dense fog. 0 10 st. NE.* 10 st. 0 10 nim. 0 1 st. 0 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 4 st. SSW 1 8 st. 0 1 cir. st. 4 st. SSW 0 1 cir. st. 4 st. SSW 0 1 cir. st. 5 p. fog.   | 00<br>03<br>00<br>00<br>00<br>00  | Dense fog. 0 00 10 st. NE. 0 10 st. 0 01 10 st. 0 01 10 st. 0 01 1 st. 0 01 1 st. 0 01 1 st. 0 00 1 cir. 0 00 1 cir. st. 0 00 1 cir. st. 0 00   | meal          |
| 7 p. m.  pe fog. 0 N.* NE.† m. 0  . 25E.* . E.* . E.* . E.* . E.* . E.* . E.* . S.† . S.† . E.* . S.† . E.* . S.* | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 8 p. m.  Dense fog. 0 10 st. N.* 1 cir. 7 st. NE. t 10 nim. 0 5 cir. cum. 3 st. 0 0 0 10 st. E.\ 9 st. E.\ 9 st. 0 3 cir. 1 st. 0 1 ci. st. Dense fog. 0   | 00<br>00<br>04<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | 9 p. m.  Dense fog. 0 10 st. N.* 1 cir. 6 st. NE.† 10 nim. 0  9 st. SSW.† 1 cir. 1 st. 0 10 st. E.* 10 st. E.† 0 cir. 4 cum. st. 0 Dense fog. 0   | 90<br>90<br>90<br>90<br>90<br>90<br>90<br>90<br>90<br>90<br>90             | 10 p. m.  Dense fog. 0 10 st. N.* 9 st. NE. t 10 nim. 0 4 cir. cum. 2 st. 0 1 st. 1 st. 0 1 cir. st. 1 st. 0 0 c. ** 9 st. 0 1 cir. st. 1 st. 0 0 c. ** 9 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 11 p. m.  Dense fog. 0 10 st. NE.* 10 st. 0 10 nim. 0 1 st. 0 1 st. 0 1 st. 0 1 st. E. 1 10 st. E. 1 10 st. E. 1 1 cir. st. 4 st. SSW. 1 8 st. SSW. 1 8 st. SSW. 1 0 1 cir. 9 st. E.* D. fog. 1 0 st. C. St. SSW. 1 0 cir. st. 4 st. SSW. 1 0 s | 00<br>03<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                        | Dense fog. 0 00 10 st. NE. 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 11 st. 0 00 1 st. 0 00 1 st. 0 00 1 ctr. 0 00 1 ctr. 5 00 1 st. E. 00 9 st. NE. 1 00 1 ctr. 5 E. 0 9 st. E. 0 10 st. E. 0   | meai          |
| 7 p. m.  pe fog. 0 N.* NE.† m. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 8 p. m.  Dense fog. 0 10 st. N.* 1 cir. 7 st. NE. 1 10 nim. 0 5 cir. cum. 3 st. 0 0 cir. 2 cir. st. 0 0 0 st. E.1 0 st. E.2 0 st. L.2 0 cir. 1 st. Dense fog. 0 10 st. E.2 10 st. R.2 10 st. R.3 10 st. R.4 10 st. R.4 11 st. R.5 12 cir. 8 st. R.5 12 cir. 8 st. R.6 13 cir. 1 st. R.7 14 cir. 8 cir. 8 st. R.7 15 cir. 1 st. R.7 16 st. R.8 11 cir. 8 cum. st. SW.7  | 00<br>00<br>04<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | 9 p.m.  Dense fog. 0 10 st. N.* 1 cir.6 st. NE.† 10 nim. 0 9 st. SSW.† 1 cir.1 st. 0 0 1 st. E.* 10 st. E.† 0 1 cir.4 cum. st. 0 Dense fog. 0 Dense fog. 0 Dense fog. 0 Pense fog. 0 Pense fog. 0 Pense fog. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 p. m.  Dense fog. 0 10 st. N.* 9 st. NE.† 10 nim. 0  4 cir. cum. 2 st. 0 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 1 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 0 cir. 4 st. 0 0 cir. 4 st. 0 0 cir. 4 st. 0 0 cir. 4 st. 0 0 cir. 5 cir. 4 st. 0 0 cir. 5 cir. 1 st. 5 cir. 5 cir. 5 cir. 5 cir. 5 cir. 5 cir. 5 cir. 5 cir. 1 st. 5 cir. 5 cir. 1 st. 5 cir. 1 st. 5 cir. 5 cir. 1 st. 1 st. 5 cir. 1 s | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 11 p. m.  Dense fog. 0 10 st. NE.* 10 st. 0 1 st. 0 1 st. 0 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 2 st. 0 1 cir. st. 2 st. 0 1 cir. st. 2 st. 0 1 cir. st. 3 st. 0 1 cir. st. 4 st. SSW. 1 2 st. 0 2 st. 0 2 st. 0 3 st. 0 4 cir. 9 st. E.* D. fog. 1 6 cir. 9 st. E.* D. fog. 1 7 cir. 8 st. 0 7 cir. 9 st. 8 st. 0 7 cir. 8 | 00<br>03<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | Dense fog.   0   00   10 at.   NE.   00   10 at.   0   0   10 at.   0   0   10 at.   0   0   10 at.   0   0   1 at.   0   0   1 cir.   0   0   1 cir.   0   0   1 cir.   0   0   1 cir.   5   0   0   1 cir.   5   0   0   1 cir.   5   0   0   1 cir.   0   0   9 at.   NNE.   0   1 cir.   0   0   0   1 cir.   0   0   1 cir.   0   0   1 cir.   0   0   1 cir.   0   0   0   1 cir.    | mear          |
| 7 p. m.  se fog. 0.  NE.†  m. 0  ESEE.*  E.*  F. 1 st. 0  NE.†  Sw.†  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 8 p. m.  Dense fog. 0 10 st. N.* 1 cir. 7 st. NE. † 10 nim. 0 2 cir. 2 cir. st. 0 0 0 to st. E. † 0 st. E. † 0 st. E. † 0 to t. st. Dense fog. 0 1 cir. 8 cum. st. SW. † 10 st | 00 00 00 00 00 00 00 00 00 00 00 00 00  | 9 p.m.  Dense fog. 0 10 st. N.* 1 cir. 6 st. NE.† 10 nim. 0 9 st. SSW.† 1 cir. 1 st. 0 0 1 st. E.* 10 st. E.† 0 1 cir. 4 cum. st. 0 Dense fog. 0 Dense fog. 0 Dense fog. 0 10 st. SW.† 10 st. SW.† 10 nim. 0 10 st. N.† | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | Dense fog. 0 10 st. N.* 9 st. NE.† 10 nim. 0 1 st. 1 st. 0 1 st. 1 st. 0 1 st. 2 st. 0 1 st. 0 1 st. 0 1 st. 0 1 cir. st. 1 st. 0 1 cir. st. 1 st. 0 0 lo st. E.* 9 st. E.† 0 lo st. 0 Dense fog. 0 Dense fog. 0 Dense fog. 0 10 st. SW.† 10 st. N.* 10 nim. 0 10 st. N.* 9 st. Dense fog. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 11 p. m.    Dense fog.   0   10 st.   NE.*   10 st.   0   10 nim.   0   1 cir. st. 4 st. SSW   1 cir. st. 5 st.   0 lo nim.   0 lo nim.   0 lo st.   0 lo st.   0 st.   0 st.   0 lo st.   0 st.   0 lo st.   0 lo st.   0 st.   0 lo st.   0 l | 00<br>03<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>0 | 12 p. m.  Dense fog. 0 00 10 st. NE. 00 10 st. 0 06 10 nlm. 0 00 1 st. 0 00 1 st. 0 00 1 st. 0 00 1 st. 0 00 1 cir. 0 00 1 cir. 0 00 1 cir. st. 0 00 1 cir. st. E. 0 00 1 cir. st. E. 0 00 1 cir. st. E. 0 00 1 cir. st. E. 0 00 1 cir. st. E. 0 00 1 cir. st. 5 0 00 1 cir. st. 6 0 00 9 st. NNE. 0 0 st. E. 0 0 st. E. 0 0 st. St. St. 0 0 co. 0 0 0 Dense fog. 0 0 8 st. NE. Lt. fog. 0 8 st. St. St. 0 1 cir. st. 8 st. 0 0 10 nim. 0 0 10 st. N. — 10 st. N. |               |

and amount and iven in inches. In this

mount, kind, and section of clouds.

nse fog. 0 nse fog. 0 st. 0

st. W8W.+
cum. 1 st. SE.+
st. SW.+
nase fog. 0
cir. 0
st. Light fog. 0
st. 4

st. 8SW. i cir. st. 4 st. NE. i st. 0 st. 0 sts. 0 nse fog. 0 nse fog. 0 cir. Light fog. 0 nim. SW. i

nse fog.
5. 60
6 p. m.

nae fog. 0
cir. st. 3 st. N.
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st. st.
bir. st. 1 st. 9
st. ESE.
st. E.
st. E.

ir. 2 st. 0 00 ase fog. 0 00 to 00 t

ir. 3 cir. st. 1 st.
NV
se fog.
se fog.

5, 96

Statement showing the amount, kind, and direction of clouds, and amount  $_{\mathit{and}}$ 

[Washington mean time. Correction to reduce to mean local time,—5 hours 17 minutes. Precipitation is given in inches. In this

|  | 1 a. m.  |                                  | 2 a. m.   |                            | 3 a. m.   |                            | 4 a. m.  | ø a. m.  | ва. т.   |
|--|--|----------------------------------|---|----------------------------|---|----------------------------|--|--|--|
| Date.  | Amount, kind, and<br>direction of clouds.  | Precipitation.                   | Amount, kind, and direction of clouds.  | Preipitation.              | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds,   |
| 1882.<br>'ly 1<br>'y 2<br>July 3<br>July 4     | 10 st. 0<br>1 cir. st. 2 st. 0<br>9 nim. 0<br>1 cir. st. 6 st. W.  | 00                               | 2 cir. st. 2 st. 0 0  | 00<br>00<br>01             | 1 cir. cum. 8 at. 0   | 00<br>00<br>01<br>00       | 9 st. 0 00 00 10 nm. 2 st. 0 00 00 00 00 00 00 00 00 00 00 00 00   | 8 st. W. † 00<br>4 st. W. † 00<br>10 st. 0   . —<br>9 st. SW. †  | 8 st. W.+<br>5 st. W.+<br>10 st. 0<br>10 st. 8W.+  |
| fuly 5<br>fuly 6<br>fuly 7<br>fuly 8<br>fuly 9 | 3 cir. cum. 4 st. W.<br>3 cir. 2 cir. st. 1st. 0<br>1 cir. 1 st. 0<br>2 cir. 2 st. 0<br>1 cum. 7 st. NW. | 00<br>00                         | 3 cir. 3 cir. st. 1 st. 0 (<br>1 cir. 1 st. W. f (<br>2 ci. 1 ci. st. 2 cu. st. 0 (           | 00<br>00<br>00<br>00       | 3 cir. 2 cir. st. 2 st. 0<br>1 cir. 1 st. 0<br>4 cir. 3 st. 0   | 00<br>00<br>00<br>00<br>00 | 9 at. W.† 00<br>2 cir. 2 cir. st. 1 at. 0 00<br>1 st. 0 00<br>4 cir. 3 at. W.† 00  | 8 at. W. † 00<br>3 cir. 1 cir. at. 0 00<br>1 at. 0 00<br>4 cir. at. 2st. 0 00<br>Dense fog. 0 00   | 9 st. W.+<br>2 cir. 2 cir. st. 1 st. 0<br>1 cum. 1 st. 0<br>4 cir. st. 1 st. 0<br>Dense fog. 0                 |
| uly 10<br>uly 11<br>uly 12<br>uly 18<br>uly 14 | 1 cum. 7 st. S. SSW. 9 st. SSW. 1 cir. st. 1 st. W. 1 cir. st. 0   | 1 00<br>1 00<br>00<br>1 00<br>00 | 9 st. W. Light fog.   | 00<br>02<br>00<br>00<br>00 | 1 cir. st. 8 nim. W. t.<br>1 cir. st. 7 st. SW.*<br>1 cir. st. 8 st. W. t   | 00<br>05<br>00<br>00<br>00 | 1 cir. st. 2 st. 8W. 1 00<br>1 cir. st. 8 st. 8SW. 1 00<br>8 st. 8W. 1 00<br>1 cir. st. 7 st. W. 1 00<br>1 cir. st. 1st. W. 2 00 | 1 cir. st. 4 st. 8W. † 00<br>1 cir. 3 st. 0 00<br>8 st. 8W*.0 00<br>9 st. W. † 00<br>1 cir. 7 st. W. † 00  | 4 st. 8W.<br>4 st. WSW.<br>8 st. 8W.<br>9 st. W.<br>1 cir. 3 st. W.  |
| uly 15<br>uly 16<br>uly 17<br>uly 18<br>uly 19 | 10 st. 0<br>1 ci. st. 7 st. E. * Lt. f.<br>10 nim. 0<br>10 st. NN, W. † Lt. fog<br>9 nim. 0              | 00<br>00<br>04<br>00<br>02       | 8 st. E. Light fog. 0   | 00                         | 1 ci. st. 8 s. E.* Lt. fog  | 00<br>00<br>01<br>00<br>01 | Dense fog. 0 00<br>9 st. E. * Lt. fog. 00<br>10 nim. 0<br>10 st. 0 00<br>10 st. 8W.*   | Dense fog. 0 00<br>9 at. E. * Light fog. 00<br>10 nim. 0 02<br>10 st. 0 00<br>10 st. SW.† 00   | Dense fog.<br>10 st. E. * Light fog.<br>10 nim. 0<br>10 st. 0<br>10 st. 8W.                                    |
| uly 20<br>uly 21<br>uly 22<br>uly 23<br>uly 24 | 7 st SW. 3 cir. 2 st. 0 SW. 5 st. 8 w. 5 w. 5 w. 5 w. 5 w. 5 w. 5 w. 5 w                                 | 00                               | 1 cir. st. 8 at. SW. † 6<br>1 cir. 5 at. SW. † 6<br>9 st. SW. * 6                             | 00<br>00<br>00<br>00<br>00 | 1 cir. 7 st. 0<br>8 st. SW.*<br>9 st. SW.*  | 00<br>00<br>00<br>00<br>00 | 10 at. 8W." 00 00 90 inim. 8W." 00 00 90 inim. 8W." 00 1 cir. at. 9 at. 8W." 00  | 10 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 9 at. 1 cir. at. 1 cir | 10 st. SW. SW. SW. SW. SW. SW. SW. SW. SW. SW  |
| uly 25<br>uly 27<br>uly 27<br>uly 28<br>uly 29 | 3 ci. cum, 2 st. 8W. 1<br>C st. 88W. 1<br>10 nim. 0<br>10 st. 0<br>9 st. ESE.                            | 00<br>00<br>.02<br>00            | 9 st. 8. † 0<br>10 nim. 0<br>10 st. NE.* 0  | 00                         | 9 st. 0<br>Dense fog. 0<br>10 st. NE. *   | 00<br>00<br>01<br>00<br>00 | 2 cf 1 cf. cu. 3 s. SW. t<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>9 st. SE.*   | 2 cir. 2 st. 0 00<br>10 st. 0 00<br>10 nim. 0 02<br>10 st. NE. 0<br>9 st. SE. 00   | 2 cir. 2 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. NE.*<br>9 st. SE.*   |
| uly 30<br>uly 31                               | 2 cir. 1 st. S. *<br>1 cir. st. 3 st. SW. *  | 00                               | 4 cir. 2 st. SSE 0 6 st. SW.*   | 00                         |   | 00<br>00                   | 4 cl. 4 cl. cu. 1 s. SSE.* 00<br>1 cir. st. 4 st. SW.* 00  | 3 cir. 3 cir. at. 2 st. 0 00<br>1 cir. st. 6 st. SW. † 00  | 2 cir. 3 cir. st. 3 at. 0<br>1 cir. st. 5 st. SW. 1  |
| Means.   | 6, 98  |                                  | 7. 35   |                            | 7. 41   |                            | 7.74   | 7. 38  | 7. 35  |
| Date.  | 1 p. m.  |                                  | 2 p. m.   |                            | 3 p. m.   |                            | 4 p. m.  | 5 p. m.  | 6 р. т.  |
| 1882.<br>uly 1<br>uly 2<br>uly 3<br>uly 4      | 10 st.<br>9 st.<br>Dense fog.<br>8 st. SW.†  |                                  | 10 st. ESE.† 0 st. 5W.† 0 Dense fog. 0 0 0 2 cir. 3 st. SW.† 0                                | 0                          | 9 st. SW.† (<br>Dense fog. 0  | 00<br>00<br>00             | 19 nim. ESE.†.— 7 st. SW.* 00 Dense fog. 0   00 W.* 00   | 10 nim. 0 .— 1 cir. 1 st. 0 00 Dense fog. 0 00 1 cir. 8 st. W. † 00  | 10 nim. 0 . 1 cir.1 at. 0 . Dense fog. 0 . W.  |
| aly 5<br>aly 6<br>aly 7<br>aly 8<br>aly 9      | 10 st. W.i<br>5 cir. 2 st. 0<br>1 cir. 1 st. 0<br>1 cir. 0<br>Dense fog. 0                               | 00<br>00<br>00<br>00             | 10 st. W. † 0<br>5 cir. 2 st. 0 0<br>1 cir. 0 0<br>1 cir. 0 0<br>Dense fog. 0 0               | 10                         | 5 cir. 1 st. 0 (1 cir. 1 cir. 1 st. 0 (1 cir. | 00<br>00<br>00<br>00<br>00 | 4 st. 0 00<br>4 cir. st. 2 st. 0 00<br>1 cir. 1 st. 0 00<br>0 00<br>4 cir. 3 cir. st. 0 00                                       | 4 cir. 0 00<br>2 ci.1 ci.s.1 c.s.1 s.W.† 00<br>1 cir. 0 00<br>0 0 0 00<br>3 cir. cum. 1 st. 0 00   | 3 cir. 1 cum. st. 0<br>1 c. 1 c. s. 2 cu. 2 s.W. 1<br>1 cir. 0<br>1 cir. 1 cum. 0<br>1 cir. 1 cir. cu, 2 st. 0 |
| ly 13  | 3 cir. 3 st. 0<br>2 cir. 1 st. 0<br>10 st. 8.*<br>4 cir. 2 st. 0<br>Dense fog. 0                         | 00<br>00<br>00<br>00             | 8 st. 0 0 0 0 4 cir. 2 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                              | 10                         | 5 cir. 2 st. 0 (0<br>10 st. 0 (0<br>4 cir, 1 st. 0 (0   | 00<br>00<br>00<br>00       | 1 cum. 3 st. 0 00<br>4 cir. cum. 3 st. 8W.* 00<br>10 st. 5 cir. 2 st. 0 00<br>10 nim. 0 0,02                                     | 1 cir. 2 cum. 2st. SW.† 00<br>1c.2c. cu. 2cu.3s. SW† 00<br>Dense fog. 0 00<br>3 cir. 3 cir. st. 1 st. 0 00<br>10 nim. 0 .10  | 2 cir. 2 cum. 2 st, SW.† 2 cir. 0 st. SW.† Dense fog. 0 3 cir. 2 cir. st. 3 st. 0 10 nim. 0                    |
| ily 15<br>ily 16<br>ily 17<br>ily 18<br>ily 19 | 1 cir.st. 5 st.N.*Lt. f. 10 st. 0 10 nim, 0 10 st. SW.† 5 cir. st. 4 st. 0                               | 00<br>00<br>.05<br>00            | 1 ci. st. 3 s. NE.†Lt.f. 0<br>10 st. 0<br>10 nim. 0<br>10 st SW. † 0<br>3 cir. 5 st. W. † 0   | 6                          | 10 st. 0 0<br>10 nim. 0 .0<br>8 st. 0 0   | 00<br>00<br>04<br>00<br>00 | Dense fog. 0 00<br>10 st. 0 00<br>10 nim. 0 02<br>9 st. 0 00<br>4 cum. 4 st. SW. † 00  | *1cir. 9st. NE.* D.fog. 00<br>10 st. 0 00<br>10 st. 0 0<br>5 cir. 1 st. 0 00<br>2c.2c.cu.1cu.1s.SW† 00   | Dense fog. 0<br>10 st. 0<br>10 st. 0<br>2 cir. 2 cir. st. 2 st. 0<br>1 c.2 c.c. 1 cu. 1 s.SW.                  |
| lly 20<br>lly 21<br>lly 22<br>lly 23<br>lly 24 | 4 cir. 5 st. 8W.† 10 st. 0 Dense fog. 0 9 st. 8E.† 3 cir. 1 st. 0  | 00                               | 3 cir. 5 st. SW. † 0<br>10 nim. 0 .0<br>8 st. 0 0<br>6 cir. st. 1 st. 0 0<br>2 cir. 2 st. 0 0 | 0                          | 10 nim. 0 . 0<br>9 st. 0 0<br>5 cir. st. 2 st. 0  | 00<br>07<br>00<br>00<br>00 | 9 st. SW.† 00<br>Dense fog. 0 04<br>8 st. 0 00<br>3 cir. 2 cum. 3 st. S.† 00<br>3 cir. 1 st. 0 00                                | 1 cir. 3 cum. 3 st. SW † 00<br>3 cir. cum. 2 st. 0 00<br>2 c. 2 ci. cu.1 cu.1 st. 0 00<br>1 c. 1 c. s. 3 cu.3 s. SW, † 00<br>1 cir. 1 cir st. 2 st. 0 00   | 2 cir. 2 st. SW.† Dense fog. 0 1 ci. 2 ci. cu. 1 cu. 1 s. 0 1 ci. st. 4 cu. 4 st. SW.† 1 cir. st. 1 st. 0      |
| ly 28  | 4 cir. 3 st. 0<br>7 st. 0<br>Dense fog. 0<br>7 st. NE.*<br>10 st. SE.*                                   | 00<br>00<br>00<br>00<br>00       | 2 st. 0 00<br>9 st. 0 0<br>Dense fog. 0 00<br>8 st. NE.* 0<br>9 st. SE.* 0                    | 0                          | 9 st. 0 0<br>Dense fog. 0 0<br>9 st. NE.* 0   | 00<br>00<br>00<br>00       | 9 st. S.† 00<br>9 st. 0<br>10 st. NE.4<br>9 st. NE.* 00<br>8 st. SE.* 00   | 9 st. 8W.* 00<br>10 st. 0 00<br>9 st. W.† 00<br>9 st. NE.* 00<br>3 cir. 5 st. 8E.* 00  | 10 st. SW.<br>10 st. 0<br>8 st. W.<br>9 st. NE.<br>1 cl. 1 cl. st. 3 st. SE.                                   |
| ly 30<br>ly 31                                 | 3 cir. 1 st. 0<br>3 cir. st. 2 st. 0   | 00<br>00                         | 3 cir. 2 st. 0 00<br>3 cir. st. 2 st. 0 00  |                            |   | 00                         | 5 cir. 1 st. 0 00<br>8 st. 0 00  | 1 cir. 2 cir. st. 1 st. 0 00<br>8 st. SW.*   | 2 cir. 2 cir. st. 1 st. 0<br>4 st. SW.*  |
| iy or  |  |                                  |   |                            |   |                            |  |  |  |

character table signis

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10 st. 1 cir. 3 cir. st. 1 cum. 1 st. 2 cir. 2 st. Dense fog.

3 st. 1 cir. 3 st. 9 st. 8 st. 1 cir. 2 st.

9 st. 1 cir. st. 9 st. 9 st. 6 cir. st. 4 st. 1 cir. 2 st. iest. Ionin. Iost. Ost 1 cir. at. 9 at. 1 cir. 5 at.

7 p. m.

l ci.2c.cu.2cu.1s l ci. st. 2 cu. 2st. i Dense fog. 3 cir. lst. Dense fog. 1c 1 c.s.4s. NE,\* ] 10 st. lost 1 cir. 2 cir. at. 1 at a st.

l cir. 1 st. 1 cir. 4 st. Light fo 2 cir. 1 cum. 1 st. 8 st. 1 cir. st. 1 st.

character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

, and amount and

given in inches. In this 6 a. m.

 $\begin{array}{c} W, \uparrow \ 00 \\ W, \uparrow \ 00 \\ 0 \ 00 \\ 8W, \uparrow \ 00 \\ \end{array}$ 

Light fog. 00 0 .05 0 .05 8W.1 00

SW. † 00 S.† 00 SW. † 00 SW. † 00 SW. † 00

 Dat.
 W.† 00

 2 cir. 2 cir. st. 1 st. 0 \* 00
 0 00

 1 cir. st. 1 st. 0 \* 00
 0 00

 2 cir. st. 1 st. 0 \* 00
 0 00

\$ st. \$ st. 8 st. 9 st. 1 cir.3 st.

Dense fog. 0 st. E. \* 0 nim. 0 st. 0 st.

0 at. 1 cir. st. 9 at. 9 st. 9 at. 4 cir. st. 6 at.

2 cir. 2 st. 10 st. 10 nim. 10 st. 9 st.

0 nim. 1 cir. 1 st. Dense fog. 9 st.

3 cir. 1 cum. st. 0 1 c. 1 c. s. 2 cu. 2 s.W.1 1 cir. 0 1 cir. 1 cum. 0 1 cir. 1 cir. cu. 2 st. 0

2 cir. 2 cum. 2 st, SW.† 00 2 cir. 6 st. SW.† 00 Dense fog. 0 00 3 cir. 2 cir. st. 3 st. 0 00 0 nim. 0 .13

Dense fog. 0 00 0 st. 0 00 2 cir. 2 cir. st. 2 st. 0 00 1 c. 2 c. c. 1 cu. 1 s. SW. t 00

2 cir. 2 st. SW. + 00 Dense fog. 0 : 00 1 ci. 2 ci. cu. 1 cu. 1 s. 0 00 1 ci. st. 4 cu. 4 st. SW. + 00 1 cir. st. 1 st. 0 00

0 st. SW. 0 0 st. 0 00 8 st. W. 0 9 st. NE. 10 1 ci. 1 ci. st. 3 st. SE. 0

2 cir. 2 cir. st. 1 st. 0 00 4 st. SW.\* 00 5.54

2 cir. 3 cir. st. 3 st. 0 00 1 cir. st. 5 st. SW. 1 00 7. 35 table signifies rapid. + signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| I o m  | -  | 8 a. m.  |  | 9 a. m.  |  | 10 a. m.  | -  | 11 a. m.   |  | 12 m.  | 1  | precipi  |
|--|--|--|--|--|--|---|--|--|--|--|--|--|
| Amount, kind, and<br>direction of clouds.  | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds,   | Precipitation.   | Amount, kind, and direction of clouds.  | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and direction of clouds.   | Precipitation.   | Amount of pr   |
| 3 st. W. †<br>7 st. W. †<br>10 st. SW. †   | 00   | 1 cir. cum. 4 st. W, † 6 at. W, † 10 st. 0 8 st. SW. †   | 00<br>00<br>00<br>00   | 9 at. 8W. 1  | 00<br>00<br>00   | 9 st. 0 9 st. 8W.† 10 nim. 0 8W.†   | _  | 2 cir. cum. 6 at. 0<br>10 at. SW. †<br>10 nim. 0<br>3 cir. 2 st. SW. †   | 00 00  | 9 st. 8 st. 8 W. † 10 nim. 9 st. 8 W. *  | 00<br>00<br>00   | . 02<br>. 00<br>. 03   |
| 1 cir. 3 cir. st. 1 st. 0<br>1 cum. 1 st. 0  | 00<br>00<br>00<br>00   | 0 st. W. † 5 cir. st. 1 st. 0 0 1 cir. 1 st. 0 Dense fog. 0  | 00<br>00<br>00<br>00   | 10 at. W.† 1 cir. 3 cir. at. 1st. 0 0 1 cir. 0 Dense fog. 0  | 00<br>00<br>00<br>00   |   | 90<br>00<br>00<br>00   | 10 at. W. † 3 cir. 1 at. 0 1 at. 0 1 cir. 1 at. 0 Dense fog. 0   | 00<br>00<br>00<br>00<br>00   | 10 st. W. 1<br>4 cir. 2 st. 0<br>1 cir. 0<br>1 cir. 0<br>Dense fog. 0  | 00<br>00<br>00<br>00<br>00   | . 00<br>. 00<br>. 00<br>. 00   |
| 5 st.<br>1 cir. 3 st. WSW. 4<br>9 st.<br>8 st.<br>1 cir. 2 st. W. 7  | 00   | 2 at.<br>2 cir. 2 at.<br>10 at.<br>3 cir. 1 at.<br>1 cir. 1 at.<br>W.†   | 00<br>00<br>00<br>00   | 1 cir. 1 st. 0<br>2 cir. 2 st. WSW. t<br>10 st. SW. t<br>3 cir. 1 st. W. t<br>1 cir. 1 st. 0   | 00<br>00<br>00<br>00   | 1 cir. 3 st. 0<br>2 cir. 2 st. 0<br>10 st. SW. †<br>4 cir. 0<br>1 cir. cum. 1 st. 0   | 00<br>00<br>00<br>00<br>00   | 1 cir. 3 st. 0<br>1 cir. 1 st. 0<br>10 st. 8.°<br>5 cir. 3 st. 0<br>1 cir. cum. 5 st. W. 1   | 00<br>00<br>00<br>00   | 3 cir. 2 at. 0<br>3 cir. 1 at. 0<br>10 at. 8.*<br>8 cir. 1 at. 0<br>10 at. W.*   | 00<br>00<br>00<br>00   | . 00<br>. 03<br>. 00<br>. 00<br>. 32   |
| Dense fog. 0   | 00<br>00<br>07<br>00<br>00   | 5 st. N.* Dense fog 0 10 nim. 0 10 st. 0 10 st. 8W.†   | 00<br>00<br>. 06<br>00   | 4 at. W.† Light fog Denne fog. 0 10 nim. 0 10 at. 0 10 at. SW.†  | 00<br>00<br>. 05<br>00<br>00   | 10 mim. 0   | 00<br>00<br>06<br>00   | 1 cir. st. 5 st. N.* 10 st. 0 10 nim. 0 10 st. 0 10 st. SW.†   | 00<br>00<br>00<br>00   | 1 ci. st. 3 st. N. * Lt. f.<br>10 st. 0<br>10 nim. 0<br>10 st. 8, †<br>10 st. 8W. †  | 00<br>00<br>00<br>00   | . 00<br>. 00<br>. 00   |
| 9 st. SW. †  | 00<br>00<br>00<br>00   | 5 at. SW.† 10 at. S.† 9 at. SW.† 9 at. SW.† 2 cir. at. 8 at. SW.†  | 00   | 5 st. SW, † 10 st. 0 10 st. 0 4 cir. 2 st. SW, † 2 cir. st. 7 st. SW, †  | 00<br>00   | 4 cir. 2 st. 0  | 00<br>00<br>00<br>00<br>00   | 4 cir. 4 st. SW. 10 nim. 0 Dense fog. 0 4 cir. 1 st. 0 5 cir. st. 4 st. 0  | 00<br>00<br>00   | 10 st. SW.† 10 st. 0 10 st. 0 3 cir. 3 st. 0 3 cir. 2 st. 0  | 00<br>00<br>00   | .00  |
| 1 cir. 2 st. 0 1 or 1 cir. 2 st. 0 1 or 1 cir. 2 st. 0 1 or 1 cir. 2 st. 0 0 look. NE.   | 00<br>. 00<br>. 02<br>. 00<br>. 00   | 2 cir. 2 st. 0<br>10 st. SW. t<br>10 nim. 0<br>10 st. NE.*<br>10 st. SE.*  | . 03   | 3 cir. 1 st. 0<br>10 st. SW. †<br>10 nm. 0<br>10 st. NE.*<br>9 st. SE.*  |  | 3 cir. 1 st. 0<br>10 st. SW. i<br>Dense fog. 0<br>10 st. NE.*   | 00   |  | 00<br>00<br>00<br>00   | 4 cir. 3 st. 0<br>8 st. 0<br>Dense fog. 0<br>7 st. NE.*<br>10 st. SE.*   | 00<br>00<br>00<br>00   | . 00   |
| 1 cir. st. 9 st. SE *<br>1 cir. 5 st. SW. 1  | 00   | 4 cir. st. 6 st. SE.*<br>2 cir. st. 4 st. SW. †  | 00<br>00   | 10 st. SE.*<br>3 cir. st. 4 st. SW. †  | 00<br>00   | 7 cir. st. 2 st. SE.*<br>5 cir. st. 3 st. SW.†  | 00<br>00   | 7 cir. st. 1 st. 0<br>4 cir. st. 4 st. SW. 1   | 00   | 5 cir. 2 st. 0<br>4 cir. st. 4 st. SW. f   | 00   | . 00   |
| 7. 23  |  | 6. 64  |  | 6.59   |  | 6.00  |  | 6. 67  |  | 0. 87  |  | 1. 46  |
| 7 p. m.  |  | 8 p. m.  |  | 9 p. m.  | -  | 10 p. m.  |  | 11 p. m.   |  | 12 p. m.   | 1  | Daily<br>means.  |
|  |  | - P. III.  |  |  |  |   |  |  |  | The second desired the second desired to the |  |  |
| l cir. 1 st 0 Dense fog. 0   | 00<br>00<br>00   | 10 at.<br>1 cir. 1 ci. cum. 1 s. 0<br>Dense fog. 0<br>1 cir. 8 at. W. t  | 00   | 10 st.<br>1 st.<br>Dense fog. U<br>1 cir. 7 cum. st. 0   | 00<br>00<br>00   | 9 st. SW.†<br>1 cir. 1 st. 0<br>1 cir. 2 st. W.†<br>1 cir. 1 cir. st. 2 s.W.†   | 00<br>00<br>00<br>00   | 9 st.<br>1 cir. st. 9 st. ESE.†<br>1 cir. st. 7 st. SSW.†<br>1 cir. st. 7 st. W.†  | 00<br>00<br>00   | 2 cir. st. 3 st. 0<br>9 st. 8.*<br>1 cir. st. 7 st. W.†<br>1 ci. 2 cl. st. 3 st. W.*   | 00<br>00<br>00<br>00   | 5. 7<br>5. 0   |
| cir. 1 at   0   0   0   0   0   0   0   0   0  | 00   | 10 st. 0<br>1 cir. 1 ci. cum. 1 s. 0<br>Dense fog. 0   | 00<br>00<br>00   | 1 st.<br>Dense fog. u  | 00   | 1 cir. 1 st. 0<br>1 cir. 2 st. W. i   | 00   | 1 cir. st. 9 st. ESE.†<br>1 cir. st. 7 st. SSW.†   | 00<br>00<br>00<br>00<br>00<br>00   | 9 st. 8.* 1 cir. st. 7 st. W.* 1 cir. 2 ci. st. 3 st. W.* 5 cir. 1 st. 0 1 cir. st. 1 st. 0 1 cir. 1 cir. st. 1 st. 0 1 cum. st. 0   | 00<br>00<br>00<br>00   | 5, 70<br>5, 60<br>7, 50<br>7, 60<br>5, 10<br>1, 4<br>2, 4  |
| cir. 1 at 0     Dense fog. 0     Out.     Scir. 1 cam. 0     Leir. 7 at. W. †   Leir. 0     Leir. 1 cam. 0     Leir. 1 cam. 0     Leir. 1 cam. 1 at. 0     Leir. 1 cam. 1 at. 0     Leir. 2 cir. cum. 1 at. 0     Leir. 2 cir. 2 cir. cum. 1 at. 0     Leir. 2 cir. 2 cir. 2 cir. 3 cir. 1 at. 0     Comparison of the cir. 1 at. 2 cir. 1 at. 2 cir. 1 at. 2 cir. 1 at. 2 cir. 3 cir. 1 at. 0     Leir. 1 at. 2 cir. 2 cir. 3 cir. 1 at. 0     Leir. 2 cir. 3 cir. 3 cir. 3 cir. 1 at. 0     Leir. 2 cir. 3 cir. | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 10 st. 0<br>1 cir. 1 ci. cum. 1s. 0<br>Dense fog. 0<br>1 cir. 8st. W.t<br>4 cir. 1 cum. 0<br>3 ci. 1 cu. st. 2 st. W.t<br>1 cir. 1 st. 0<br>1 cir. 1 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                               | 1 st. Dense fog. 1 cir. 7 cum. st.  4 cir. 1 cum. 9 cir. 1 st. 1 cir. 1 st. 1 cum. st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 1 cir. 1 st. 0<br>1 cir. 2 st. W.†<br>1 cir. 1 cir. st. 2 s.W.†<br>5 cir. 1 cum. 0<br>1 cir. 1 cir. st. 0<br>1 st. 0<br>1 cir. 1 cum. st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                         | 1 cir. st. 9 st. ESE.t.<br>1 cir. st. 7 st. SSW. t<br>1 cir. st. 7 st. W. t<br>3 cir. 2 cir. st. 1 st. 0<br>1 cir. 1 st. 0<br>1 cir. 1 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>.03                              | 9 st. 8.* 1 cir. st. 7 st. W.* 1 cir. 2 ci. st. 3 st. W.* 5 cir. 1 st. 0 1 cir. st. 1 st. 0 1 cir. 1 cir. st. 1 st. 0 1 cum. st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>01<br>00<br>00<br>00             | 5, 70<br>5, 00<br>7, 50<br>7, 60<br>5, 10<br>1, 44<br>2, 45<br>3, 5<br>6, 4<br>6, 2<br>5, 2<br>6, 2<br>5, 2  |
| cir. 1 st  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 0 1 cir. 1 ci. cum. 1s. 0 1 cir. 1 ci. cum. 1s. 0 Dense fog. 0 1 cir. 8 st. W.† 4 cir. 1 cum. 0 3 cir. cu. st. 2 st. W.† 1 cir. 1 st. 0 1 cir. 1 cum. 0 3 cir. st, 1 st. 0 1 cl. 1 c. cu. 1 cu. 1 c. 8 W† 2 cir. st. 7 st. 8 W† Dense fog. 0 2 cir. 2 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 st. Dense fog. 1 cir. 7 cum. st. 0 4 cir. 1 cum. 3 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 2 ct. 2 cu. 9.2 s. SW. 1 8 st. Dense fog. 0 1 cir. 1 st. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 1 st. 0<br>1 cir. 2 st. W. †<br>1 cir. 1 cir. st. 2 s.W. †<br>5 cir. 1 cum. 0<br>1 cir. 1 cir. st. 0<br>1 cir. 1 cir. st. 0<br>9 st. 0<br>1 cir. 1 cum. st. 0<br>9 st. 0<br>1 cir. 1 cum. st. 0<br>1 cir. 1 cum. st. 0<br>1 cir. 1 cum. st. 0<br>1 cir. 1 cum. st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | l cir. st. 9 st. ENE. 1 l cir. st. 7 st. SSW. 1 l cir. st. 7 st. SSW. 5 l cir. 2 cir. st. 1 st. 0 l cir. 0 l cir. 1 st. 0 l cir. 1 st. 0 l cir. 1 st. 0 l cir. 1 st. SSW. 5 l cir. st. 7 st. SSW. 5 9 st. SW. 9 st. W. Light fog 1 l cir. st. N. 1 l cir. st. 7 st. SW. 5 l cir. st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW. 5 l cir. st. 7 st. SW.  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 9 at. 8.* 1 cir. 8. t. 1 cir. 8. t. 2 cf. st. 3 st. W.* 5 cir. 1 at. 0 1 cir. 8t. 1 at. 0 1 cir. 8t. 1 at. 0 1 cir. 1 cir. 8t. 1 st. 0 1 cir. 1 cir. 8t. 1 st. 0 9 st. 8t. 9 at. 8t. 9 at. 1 cir. 8t. 1 cir. 7 st. E. * L. fog.  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 8. 33<br>5. 75<br>5. 60<br>7. 55<br>7. 60<br>5. 11<br>1. 4<br>2. 3. 5<br>5<br>6. 4<br>4. 3<br>4. 10<br>7. 60<br>9. 3<br>8. 7<br>8. 7<br>8. 7<br>8. 7<br>8. 7<br>8. 8<br>8. 7<br>8. 8<br>8. 7<br>8. 8<br>8. 8   |
| cir. 1 at  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 1 cl. cum. 1s. 0 1 cir. 1 cl. cum. 1s. 0 Dense fog. 0, 1 cir. 8 st. W. t 4 cir. 1 cum. 0 3 ci. 1 cu. st. 2 st. W. t 1 cir. 1 st. 0 1 cir. st. 1 st. 0 2 cir. st. 7 st. SW. t Dense fog. 0 2 cir. 2 st. 0 Dense fog. 0 1 cir. st. 3 st. NE.* 2 cir. st. 1 st. 0 1 cir. 8 st. W. t 1 cir. 2 st. SW. t 1 cir. 2 st. SW. t 1 cir. 2 st. SW. t 1 cir. 2 st. 3 st. SW. t 1 cir. 2 cir. st. 1 st. 0 1 cir. 2 cir. st. 3 st. W. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 4 st. 0 1 cir. 2 cir. 2 st. 0 8 st. SW. t 1 cir. 2 cir. 2 st. 0 8 st. SW. t 8 st | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 st. Dense fog. 1 cir. 7 cum. st. 0 1 cir. 7 cum. st. 0 cir. 1 cum. 0 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 2 ct. 2 ct. 2 cu. s. 2 s. SW. 1 st. Dense fog. 1 cir. 1 st. 0 bense fog. 1 cir. 1 st. 0 cir. 3 st. 0 cir. 2 st.  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 1 st. 0<br>1 cir. 2 st. 2 s.W. †<br>5 cir. 1 cir. st. 2 s.W. †<br>5 cir. 1 cir. st. 0<br>1 cir. 1 cir. st. 0<br>1 cir. 1 cir. st. 0<br>1 cir. 1 cir. st. 0<br>5 cir. 1 cir. st. 0<br>6 cir. 1 cir. st. 0<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>9 st. SW *<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>1 ci. 1 cis. 2 cu. s. 1 s. SW †<br>2 ci. 2 ci. cu. 4 st. W. †<br>2 ci. 2 ci. cu. 4 st. W. †  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. st. 9 st. ESE. 1 cir. st. 7 st. SSW. 1 cir. st. 7 st. W. 1 cir. st. 7 st. 1 st. 0 icir. 0 cir. 1 cir. st. 0 cir. 1 cir. st. 0 cir. 1 cir. st. 0 cir. 1 cir. st. 0 cir. 1 cir. st. 0 cir. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 2 st. W. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. W. 1 cir. st. 7 st. W. 1 cir. st. 7 st. W. 1 7 st. SW. 1 cir. st. 7 st. W. 1 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. 3 st. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 9 at. 8.* 1 cir. 8.* 1 cir. 2 ci. at. 3 st. W.* 5 cir. 1 at. 0 1 cir. 8t. 1 at. 0 1 cir. 8t. 1 at. 0 9 st. 1 at. 1 st. 0 9 st. 8t. 2 st. 1 9 at. 8S.W.* 1 ci. s. 1 s. W.* Loog. 1 cir. st. 1 0 tot. 1 cir. st. 1 0 tot. 0 cir. st. 0 0 st. 0 cir. st. 1 0 st. 0 cir. st. 1 1 ci. 7 st. E. * L. fog. 0 0 bense fog. 0 0 st. 0 cir. 0 cir. 0 0 st. 0 cir. 0 cir. 0 cir. 0 0 st. 0 cir. 0  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 5.05. 6#445 224243 46374 2372<br>5.123 56654 4.79374 2372  |
| icir. 1 at   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 1 cl. cum. 1s. 0 1 cir. 1 cl. cum. 1s. 0 Dense fog. 0, 1 cir. 8 st. W. t 4 cir. 1 cum. 0 3 ci. 1 cu. st. 2 st. W. t 1 cir. 1 st. 0 1 cir. st. 1 st. 0 2 cir. st. 7 st. SW. t Dense fog. 0 2 cir. 2 st. 0 Dense fog. 0 1 cir. st. 3 st. NE.* 2 cir. st. 1 st. 0 1 cir. 8 st. W. t 1 cir. 2 st. SW. t 1 cir. 2 st. SW. t 1 cir. 2 st. SW. t 1 cir. 2 st. 3 st. SW. t 1 cir. 2 cir. st. 1 st. 0 1 cir. 2 cir. st. 3 st. W. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 2 cir. st. 3 st. SW. t 1 cir. 4 st. 0 1 cir. 2 cir. 2 st. 0 8 st. SW. t 1 cir. 2 cir. 2 st. 0 8 st. SW. t 8 st | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 st. Dense fog. 1 cir. 7 cum. st. 0 4 cir. 1 cum. 3 cir. 1 st. 0 1 cir. 1 st. 1 cir. 1 st. 2 ct. 2 cu. s. 2 s. SW.* 1 sst. Dense fog. 0 1 cir. st. Dense fog. 0 1 cir. st. 0 3 cir. 2 st. 0 3 cir. 2 st. 2 cir. 2 cir. 2 st. 2 cir. 2 cir. 3 st. 2 cir. 2 cir. 3 st. 2 cir. 2 cir. 3 st. 2 cir. 2 cir. 3 st. 2 cir. 2 cir. 3 st. 2 cir. 2 cir. 3 st. 3 cir. 2 st. 2 cir. 2 cir. 3 st. 3 cir. 2 st. 2 cir. 5 st. 0 1 cir. 5 st. 0 2 cir. 6 st. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. 1 st. 0 1 cir. 2 st. 2 s.W. † 5 cir. 1 cim. 0 1 cir. 1 cir. st. 2 s.W. † 5 cir. 1 cim. 0 1 cir. 1 cir. st. 0 1 cir. 1 cir. st. 0 1 cir. 1 cir. st. 0 1 cir. 1 cir. st. 0 1 cir. 1 cir. st. 0 1 cir. 1 cir. st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 4 st. NE † 1 cir. 4 st. NE † 1 ci. 1 cu. st. 2 s. W. † 3 cir. st. 2 st. 0 2 cir. 2 st. 0 3 cir. st. 2 st. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 5 st. 0 s. 0 s. 0 5 st. 0 s. 0 s. 0 5 st. 0 s. 0 s. 0 5 st. 0 s. 0 s. 0 5 st. 0 s. 0 s. 0 s. 0 5 st. 0 s. 0 s. 0 s. 0 s. 0 s. 0 s. 0 s.   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 cir. st. 9 st. ENE. 1 cir. st. 7 st. SSW. 1 cir. st. 7 st. SSW. 1 cir. st. 7 st. 1 st. 0 1 cir. st. 7 st. 1 st. 0 1 cir. st. 7 st. 0 1 cir. st. 1 st. 0 0 1 cir. st. 0 0 0 nim. SSW. 9 st. W. Light fog 1 cir. st. 7 st. SW. 10 st. N. 1 cir. st. 7 st. W. 7 st. SW. 2 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 5 st. SW | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 9 at. S.* 1 cir. 8. 7 at. W. + 1 cir. 2 ci., st. 3 at. W. * 5 cir. 1 at. 0 1 cir. st. 1 at. 0 1 cir. 1 cir. at. 1 at. 0 1 cir. 1 cir. at. 1 at. 0 1 cir. 1 cir. at. 1 at. 0 9 at. S. 4 cir. 1 at. 0 9 at. S. 4 cir. st. 1 cir. 2 cir. st. 1 cir. 2 cir. at. 0 cir. at. 1 cir. 2 cir. at. 2 st. 0 1 ci. 1 cir. 2 cir. at. 2 st. 0 1 ci. 1 ci. 2 cir. 2 st. 8 d. 0 1 ci. 1 ci. 2 cir. 2 st. 8 d. 0 1 ci. 1 ci. 2 cir. 3 st. 0 1 ci. 2 cir. 2 st. 3 cir. cum. 3 st. 0 10 st. 10 st. 10 nim. S. 4 s. S. 4 s. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 4 s. S. 4 s. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 4 s. S. 4 s. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 4 s. S. 4 s. S. 4 s. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 3 cir. cum. 3 st. 0 10 st. 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 st. 0 10 nim. S. 3 cir. cum. 3 | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 5.76<br>7.60<br>7.60<br>5.14<br>2.4<br>3.5<br>6.4<br>6.2<br>4.10<br>7.69<br>8.7<br>9.3   |
| cir. 1 at  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 1 ci. cum. 1s. 0 1 cir. 1 ci. cum. 1s. 0 Dense fog. 0. 1 cir. Sat. W. f. 4 cir. 1 cum. 3 3 ci. 1 cu. st. 2 st. W. f. 1 cir. 1 st. 0 1 cir. 1 cum. 0 3 cir. cum. 1 2 cir. st. 7 st. 5W. f. Dense fog. 0 1 cir. 2 st. 0 Dense fog. 0 1 cir. 8 st. 1 st. 0 1 cir. 8 st. NE.* 3 cir. 2 cir. 2 st. NE.* 1 cir. 2 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 1 cir. 4 st. 0 9 st. SW. f. 1 cir. st. 1 st. 0 9 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f. 10 st. SW. f.   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 st. 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W. 1 cir. st. 7 st. 1 st. 0 icir. 0 cir. 1 cir. st. 2 cir. st. 1 st. 0 icir. 1 cir. st. 2 cir. st. 1 st. 0 icir. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 0 icir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. st. 7 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. 3 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 1 cir. st. 2 st. 0 icir. 6 st. SW. 2 icir. 6 st. SW. 2 icir. 6 st. SW. 2 icir. 6 st. SW. 2 icir. 5 icir. st. 2 st. 0 icir. 6 st. SW. 2 icir. st. 2 st. 0 icir. 6 st. SW. 2 icir. st. 2 st. 0 icir. 6 st. SW. 2 icir. st. 2 st. 0 icir. 6 st. SW. 2 icir. st. 2 st. 0 icir. 6 st. SW. 2 icir. st. 2 st. 0 icir. 6 st. 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E. * L fog. 1 cir. st. 1 cir. 2 cir. st. 0 1 ci. 1 ci. 8 st. 0 1 ci. 1 ci. 2 cir. 2 ci. 3 ci. 2 ci. 2 ci. 3 ci. 2 ci. 2 ci. 3 ci. 2 ci. 3 ci. 2 ci. 3 ci. 2 ci. 3 ci. 2 ci. 3 ci.  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 5.705.<br>7.614.<br>5.144.<br>5.144.<br>6.144.<br>6.144.<br>7.75.<br>6.144.<br>7.77.<br>6.144.<br>7.77.<br>6.144.<br>7.77.<br>6.144.<br>7.77.<br>6.144.<br>6.144.<br>7.77.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.144.<br>6.14 |

# Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time, Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. It was a superior of the contract of th

|   | 1 a. m.   | _   | 2 a. m.   |                            | 3 a. m.   |                                  | 4 a. m.   |                          | 5 a. m.   |                                    | 6 a. m.   |
|---|---|---|---|----------------------------|---|----------------------------------|---|--------------------------|---|------------------------------------|---|
| Date.   | Amount, kind, and direction of clouds                                     | Precipitation.                            | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation                    | Amount, kind, and direction of clouds.                                  | Precipitation.           | Amount, kind, and direction of clouds.  | Precipitation                      | Amount, kind. and direction of clouds.                                  |
| 1882,<br>Aug. 1<br>Aug. 2<br>Aug. 3                 | 9 st. W<br>Deuse fog.<br>1 ci. 1 cl. st. 5 st. 8 V                        | 7.† 00<br>0 00<br>V* 00                   | 10 st. SW.<br>10 st. SW.<br>Dense fog. 0  | 00                         | 10 st. SW.<br>10 st. SW.<br>Dense fog.  | .† 00<br>.† 00<br>0 00           | 10 st. SW. 10 nim. 0<br>Dense fog. 0                                    | 00                       | 10 st. 8W.<br>10 nim. 0<br>Deuse fog. 0   |                                    | 10 st. SW.:<br>10 nim. 0<br>Dense fog. 0                                |
| Aug. 4<br>Aug. 5<br>Aug. 6<br>Aug. 7<br>Aug. 8      | 10 st.<br>10 nim.   | 0 00<br>0 00<br>0 03<br>7 01<br>.* 00     | 1 cir. at. 9 nim. SW.   | 00                         | 1 cir. st. 9 st. NE<br>10 nim. (SW  | 00<br>00<br>00<br>00<br>00<br>00 | 10 st. 0<br>10 st. E.*<br>10 nim. 0<br>10 nim. 0<br>9 st. W.*           | . 09                     | 10 st. E.<br>10 nim. 0  | . 02                               | Dense fog. 0<br>10 st. 0<br>10 nim, 0<br>10 st. W                       |
| Aug. 9<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13  | 10 at. SW<br>10 at. WN W<br>10 at. 8<br>1 cir. st. 4 st. SW<br>10 nim. NW | .* 00<br>.* 00<br>.* 00<br>.† 00          | 10 st. SW. 10 st. WNW. 10 st. S. 3 st. SW. NW.                                      | 00<br>† 00<br>† 00         | 10 st. 8W<br>10 st. W<br>10 nim. 8W<br>5 st. 8W<br>10 st. NW                  | + 00                             | 10 at, W.* 10 at. WNW.* 10 at. SW.* 3 st. SW.* 10 at. NW.*              | 00 00 00                 | 10 st, SW. 10 st. SW. 10 st. SW. 5 st. SW. 10 st, NW.                                 | † 00<br>† 00<br>† 00<br>† 00       | 10 st. 8W .<br>10 st. 8W .<br>10 st. 8W .<br>5 st. 8W .<br>10 st. 8W .  |
| Aug. 14<br>Aug. 15<br>Aug. 16<br>Aug. 17<br>Aug. 18 | 1 cir. 7 st. ESE<br>9 st. ESE<br>1 cir. cum. 9 st. SE                     | .1<br>                                    | 9 st. NE.<br>9 st. E.<br>6 st. SE.<br>1 cir. cum. 8 st. SE.<br>1 cir. st. 9 nim. E. | 00                         | 10 at E   | † 00<br>† 00<br>* 00<br>* 00     | 10 st. NE.: 10 st. E.: 7 st. SE.: 10 st. ESE: 10 st. ESE:               | 00<br>00                 | 10 st. 0<br>10 nim. 0<br>10 st. ESE.<br>10 st. ESE.                                   |                                    | 10 at. 0<br>10 at. 0<br>10 at. E.<br>10 at. ESE.<br>10 nim.             |
| Aug. 10<br>Aug. 20<br>Aug. 21<br>Aug. 22<br>Aug. 23 | 8 st. SW<br>1 cir. st. 9 st. E<br>1 cir. st. 9 st. NE                     | .† 00<br>.† 00<br>.* 00<br>.* 00          | 2 st. E. SW. 3 cir. 4 st. E. 1 cir. st. 7 st. NE. 10 st. 0                          | ' 00                       | 10 at (   | .† 00<br>* 00                    | 1 cir. st. 2 st. E.t SW. t 10 st. 0 NE.* NE.*                           | 00                       | 2 st. E. 10 st. SW. 10 st. 10 st. 10 st. 10 st. 10 st.                                | † 00<br>00                         | 2 st. F.,<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0               |
| Aug. 24<br>Aug. 25<br>Aug. 26<br>Aug. 27<br>Aug. 28 | 10 nim.<br>10 nim.<br>10 st. NE   | .†. 00<br>0 .02<br>.† 00<br>.† 00         | 10 st. NE. 10 nim. 0 10 nim. NE. 10 st. N. 10 nim. E. 10 nim.                       | 00<br>.01<br>00            | 10 nim. (10 nim. NE. 10 nim. NE. NE. NE. NE. NE. NE. NE. NE. NE. NE           | 0 00 01 .01                      | 10 st. 0<br>10 nim. 0<br>10 st. NE.:<br>10 nim. NNE.:<br>10 nim. E.†    |                          | 10 nim. 0<br>10 nim. 0<br>10 st. NE.<br>10 nim. 0<br>10 nim. E.                       | . 01<br>00<br>. 01                 | 10 nim. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. NE.<br>10 nim. E.         |
| Ang. 29<br>Ang. 30<br>Ang. 31                       | 10 st. NE   | t . <del>-</del>                          | 10 st. 0<br>10 st. E.<br>10 st. E.  | 00                         | 10 st. E.   | 00 · 00                          | 10 nim. NE. t   | : -                      | 10 at. 0  | †: <u>-</u>                        | 10 st. E. NE. 10 st. 0  |
| Means   | 8. 73   |   | 8, 22   |                            | 8. 96   | 1                                | 9. 03   |                          | 8. 93   | ,                                  | 8, 93   |
| Date.   | i p. m.   |   | 2 p. m.   |                            | 3 p. m.   |                                  | 4 p. m.   |                          | 5 p. m.   | -                                  | 6 p. m.   |
| 1882.<br>Aug. 1<br>Aug. 2<br>Aug. 3                 | Dense fog.  | .* 00<br>00<br>00<br>00                   | 10 st. 8W.* Dense fog. 0 10 st. 0   | 00<br>00<br>00             | 10 st. SW.<br>Dense fog. C<br>10 st. 6  | * 00<br>0 00<br>0 00             | 10 st. SW.* Dense fog. 0 3 cir. 5 st. NW. †                             | 00                       | 10 nim. (   | * 00<br>. 01<br>. 00               | Dense fog. 0<br>10 nim. 0<br>1 cir. 1 st. SW.                           |
| Ang. 4<br>Ang. 5<br>Ang. 6<br>Ang. 7<br>Ang. 8      | 10 st. E<br>7 st. SSW<br>10 st. W   | 0 00<br>.* 00<br>.† 00<br>.* 00<br>.† 00  | 10 st. N.* 10 st. SE: 8 st. S. 10 st. W.* 9 st. S.                                  | 00<br>00                   | 10 st. N. 10 st. E. 8 st, S. 10 st. SW. 3 cir. 1 st.                          | † 00<br>† 00                     | 10 st. N.* 10 st. SE. † 8 st. S.† 10 st. SW.† 7 cir. 2 st. 0            | 00                       | 10 st. W. 10 st. SE. 8 st. SW. 8 st. W. 1 cir. 8 st. 0                                | † 00<br>† 00<br>* 00               | 10 st. W.<br>10 st. SE.<br>8 st. SW.<br>9 st. W.<br>9 st. SW.           |
| Ang. 9<br>Ang. 10<br>Ang. 11<br>Ang. 12<br>Ang. 13  | 10 st.<br>10 st. S  | t. 03<br>0 00<br>. t 00<br>0 00<br>. t 00 | 10 st. SE. 10 st. S.  | 00<br>00<br>00<br>00<br>00 | 10 st. W.<br>10 st. S.<br>10 st. S.<br>Dense fog. 0<br>9 st. 0                | 1 00<br>1 00<br>0 06             | Dense fog. 0 10 st. S. t 10 st. S. t Dense fog. 0 9 st. 0               | $00 \\ .02 \\ .00 \\ 00$ | 10 st. 00.<br>10 st. SW. 10 nim. 00.<br>10 nim. 00.<br>10 st. 00.                     | † . —<br>. 02                      | 10 st. NW<br>9 st. SW.<br>4 cum. 4 st. 0<br>10 st. NW.<br>8 st. NW.     |
| aug. 14<br>aug. 15<br>aug. 16<br>aug. 17<br>aug. 15 | 10 st. ESE<br>0 st. E<br>10 st. SE  | 0 00<br>.* 00<br>.* 00<br>.* 00           | 10 st. 0<br>9 st. SSE.*<br>8 st. E.<br>10 st. E.<br>10 nim. E.                      | 00<br>00<br>00<br>00       | 10 st. 0<br>9 st. SE.<br>6 st. E.<br>10 st. E.<br>9 st. E.                    | * 00                             | 10 st. 0<br>1 cir. 8 st. ESE.*<br>7 st. E.*<br>10 st. E.*<br>7 st. E. † | 00<br>00<br>00<br>00     | 10 nim. 0<br>1 cir. 8 st. ESE.<br>1 cir. st. 8 st. E.<br>10 st. E.<br>1 cir. 8 st. E. | * 00<br>* 00<br>* 00<br>* 00       | 10 nim. 0<br>1 cir. st. 7 st. ESE.<br>1 cir. cum. 5 st. E.<br>10 st. E. |
| (ng. 45<br>(ng. 20<br>(ng. 21<br>(ng. 22<br>(ng. 23 | 10 st.<br>10 st. NE<br>3 cir. 4 st. NE                                    | 0 00<br>0 00<br>. † 00<br>. * 00<br>0 00  | 3 cir. 2 st. 0<br>10 st. 0<br>10 st. NE.<br>4 cir. 3 st. NE.<br>10 st. NE.          | 00                         | 3 cir. 1 st. 0<br>10 st. 0<br>10 st. NE.<br>5 cir. st. 3 st. W.<br>10 st. NE. | 00<br>+ 00<br>+ 00               | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                    | 00                       | 9 st. SE.<br>10 st. NE.<br>2 ci. st. 1 cum. 2 st. 0                                   | † 00<br>† 00<br>* 00<br>00<br>† 00 | 1 st. E. 9 st. SE. 10 st. NE. 1 cir. 2 cum. 2 st. E.                    |
| .ng. 24<br>.ng. 25<br>.ng. 26<br>.ng. 27            | 10 nim.<br>10 st. NE<br>10 st. N  | 1 00<br>0 .02<br>.1 00<br>.1 .00          | 10 nim. 0<br>10 st. NE.<br>10 nim. N.   | 00 00 00                   | 10 nim. 0<br>10 st. NE.<br>10 nim. N.   | † 00<br>  02<br>  † 00<br>  * —  | 10 st. NNE. † 10 nim. 0 10 dt. NE. † 10 st. N. † 9 st. E. †             | . 03<br>00<br>. 01       | 10 nim. 0<br>10 st. NE.<br>10 st. 0   | † 00<br>* 00<br>* 00<br>† 00       | 10 st.<br>10 nim.<br>9 st.<br>10 st.<br>7 st.<br>0                      |
| ug. 28  |   | 0.0                                       | 10 st. ENE.   | 00                         | 10 st. ENE.   | + 00                             | 10 st. ENE. †   | 00                       | 10 st. ENE.   | t 00                               | 10 st. NE.  |
| ug. 29  |   | 00 00                                     | 10 nim. 0<br>10 st. 0   | . 01                       | 10 st. 0<br>10 st. NE.  | 1 00                             | 10 st. 0<br>10 st. N.   | 00                       | 10 st. 0  | 1 00                               | 10 st.<br>3 cir. 3 st.  |

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character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

| 7 a.m.  |                              |                      | 8 a.  | m.                                    |                            | 9 a.  | m.                           |                            | 10 a. m.  |                                   |                            | 11 n. m.   |  | 12 m.   |                                 |                            | precipi                      |
|---|------------------------------|----------------------|---|---------------------------------------|----------------------------|---|------------------------------|----------------------------|---|-----------------------------------|----------------------------|--|--|---|---------------------------------|----------------------------|------------------------------|
| Amount, kind.   | and<br>ouds.                 | Precipitation.       | Amount, kir<br>direction of                                   | ad, and<br>clouds.                    | Precipitation.             | Amount, kin<br>direction of                                   | d, and<br>clouds.            | Precipitation.             | Amount, kind, a   | and                               | Precipitation.             | Amount, kind, and direction of clouds                            | Precipitation                            | Amount, kind<br>direction of ci                                 | and<br>ouds.                    | Precipitation.             | Amount of pre<br>tation.     |
| 9 st.<br>9 st.  | 8W.†                         | 00                   | 10 st.<br>10 st.<br>Dense fog.                                | 8W.†                                  | 00<br>00<br>00             | 10 at.<br>Danse fog.<br>Dense fog.                            | 8W.†                         | 00                         | 1 cir. at. 6 st. 8<br>Dense fog.<br>Dense fog.                                | 8W.†                              | 00<br>00<br>00             | 10 at. SW<br>Deuse fog.<br>Dense fog.                            | 7.1 00<br>0 00<br>0 00                   | Dense fog.  | 0<br>0                          | 00<br>00<br>00             | 90<br>. 0H<br>90             |
| ense fog-<br>at.<br>nim-<br>et.<br>cir. 1 st.                   | 0<br>0<br>0<br>W.*           | 00<br>00<br>01<br>00 | Dense fog.<br>10 st.<br>10 nim.<br>10 st.<br>1 cir. 1 st.     |                                       | _                          | Denne fog.<br>10 at.<br>8 at.<br>10 at.<br>4 cir. 1 at.       | ENE. t<br>S. t<br>W. °       | 00                         | Dense fog.<br>10 at.<br>8 at.<br>10 at.<br>4 cir.                             | NE. †                             | 00<br>00<br>00<br>00       | Dense fog.<br>10 st.<br>8 st.<br>10 st.<br>5 cir. 2 st.          | 0 : 00<br>5.* 00<br>7. † 00<br>7. * 00   | 10 mt.<br>0 mt.<br>1 4 mt.                                      | 8W.†<br>W.*<br>B.†              | 00<br>00<br>00             | . 3                          |
| pini.   | 8W.†<br>8W.†<br>8W.†<br>NW.† | 00<br>00             | 10 nim.<br>10 st.<br>10 st.<br>5 st.<br>10 nin.               | SW.+<br>SW.+<br>SW.+                  | 00<br>00<br>00             | 10 st.<br>10 st,<br>10 st.<br>10 st.<br>10 nim.               | SW.†<br>8W.†<br>SW.*<br>NW.† | 00<br>00<br>00             | 10 at.<br>10 at.<br>10 at.  | 8W. 1<br>8W. 1<br>8W. 1           | 00                         | 10 st. 8W<br>10 st. 8W<br>10 st. 8W<br>Dense fog. NV             | 7. 1 00                                  | 10 st.<br>10 st.<br>Dense fog.                                  | 8W.†                            | 00<br>00<br>00             | . 1                          |
| oat.  | E.†<br>E.*<br>ESE.*          | 00                   | 10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.                | ESE.*<br>ESE.*<br>ESE.*               | 00<br>00<br>00             | 10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.                | SSE. †<br>ESE. *<br>ESE. *   | 00                         | 10 at.<br>10 at.<br>10 at.<br>10 at.<br>10 at.                                | W. t<br>SE. *<br>E. *             | 00                         | 10 st. ES  | 7. † 06<br>E. * 06<br>E. * 06<br>E. * 06 | 10 st.<br>10 st.  | 8SE.*<br>E.*<br>SE.*            | 00                         | 000                          |
| Ht.  <br>  Ht.  <br>  Ht.  <br>  Ht.  <br>  Ht.                 | 0<br>0<br>0<br>0<br>NE."     | 00<br>00<br>00<br>00 | 1 cir. 3 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st.          | 0<br>0<br>0<br>NE.*                   | 00                         | 3 cir. 1 st.<br>10 st.<br>10 st.<br>2 cir. 4 st.<br>10 st.    | 0<br>0<br>0<br>NE.*          | 00<br>00<br>00<br>00       | 5 cir. 1 st.<br>10 st.<br>10 st.<br>3 cir. 2 st.<br>10 st.                    | 0<br>NE.<br>NE.                   | 00<br>00<br>00<br>00<br>00 | 5 cir. 2 st.<br>10 st.<br>10 st.<br>3 cir. 2 st.<br>10 st.<br>NE | 0 00<br>0 00<br>1.† 00<br>E.* 00         | 10 st.<br>10 st.<br>3 cir. 3 st.                                | 0<br>0<br>NE. 1<br>NE. 2        | 00<br>00<br>00<br>00<br>00 | ()<br>()<br>()               |
| · Lint.<br>o nim.<br>0 st.<br>0 sim.<br>o nim.                  | 0<br>0<br>0<br>NE.*<br>E.†   | . —                  | 10 at.<br>10 nim.<br>10 at.<br>10 at.<br>10 pim.              | 0                                     | 01 00                      | 10 nim,<br>10 nim,<br>10 **t,<br>10 **t,<br>10 **t,           | 0<br>0<br>0<br>NE.*<br>E. †  | 00                         | 10 at.<br>10 nim.<br>10 st.<br>10 nim.<br>10 at.                              | 0<br>0<br>N.*<br>E. t             | . —<br>00<br>00            | 10 at,<br>10 nim,<br>10 st.<br>10 nim,<br>10 st.                 | 0 00<br>0 .00<br>0 00<br>N.*.—           | 10 nim.<br>10 st.<br>10 nim.                                    | 0<br>0<br>0<br>N.*<br>E. t      | 00 00                      | . (                          |
| st.   | E. t                         | 00                   | 10 mt.<br>to st.<br>10 st.                                    | NNE.                                  | 00                         | 10 st.<br>10 st.<br>10 st.                                    | NE.                          | 00                         | 10 st.<br>10 st. E<br>10 st.  | NE.                               | . 00                       | 10 st. EN.<br>10 st. EN.<br>10 st.                               | E.† 0<br>E.†. –                          | 10 at.  | ENE. †                          | . 00                       |                              |
| 9, 00   | -                            | -                    | 8.74  |                                       | . !                        | 8, 48   |                              |                            | 8. 36   |                                   |                            | 8. 26  |  | 8. 12   |                                 |                            | 1. 45                        |
| 7 p. m  |                              | _                    | 8 p.  | m.                                    |                            | 9 p.  | m.                           |                            | 10 p. m.  |                                   | -                          | II p. m.   |  | 12 p.   | n.                              |                            | Daily<br>means               |
| Dense fog.<br>10 st.<br>Dense fog.                              | 0<br>0<br>0                  | 00                   | Dense fog.<br>10 st.<br>10 st. WNW                            | 0<br>0<br>*. D. fog.                  | 00<br>00<br>00             | Dense fog.<br>10 nim.<br>Dense fog.                           | 0 0                          | .00<br>.01<br>.00          | Dense fog.<br>8 st.<br>10 st.   | sw.                               | . —                        | Dense fog.<br>1 cir. cum. 8 st. SS<br>10 st.                     | 0 0<br>W.* 0<br>W.† 0                    | Dense fog.<br>1 ci. s. 3 cu. 3 c<br>0 9 st.                     | s. 8W.*<br>W.†                  | 00                         | 6.<br>6.<br>4.               |
| lust.<br>luniu.<br>* st.<br>* st.                               | NW.*<br>SW.+<br>W.*<br>SW.+  | 00                   | 1 cir. 3 st.<br>10 nim.<br>4 cum. 4 st.<br>9 st.<br>10 nim.   | NW.*<br>8W. †<br>W.*                  | 00<br>00<br>00<br>00       | 1 ci. 2 ci. st. 10 nim.<br>4 cum. 5 st.<br>9 st.<br>10 nim.   | 8W.                          | 00<br>05<br>00<br>00<br>00 | 1 ci. 1 ci. st. 6 st.<br>10 nim.<br>9 st.<br>1 cir. 8 st.<br>10 nim.          | SW. 1                             | 00                         | 10 nim.<br>9 nim.  | N.* 0<br>0 .0<br>V.*<br>V.* 0<br>W.*.0   | 9   10 nim.<br>  9 nim.<br>0   10 nt.                           | N.†<br>0<br>W.*<br>W.*<br>SSW.* | 0.8                        | 5, :<br>9, :<br>8, :<br>9, : |
| 10 st.<br>1 cir. 8 st.<br>8 st.<br>10 st.<br>9 st               | NW.* SW.+ SW.+ NW.*          | 00                   | 10 st.<br>9 st.<br>1 cir. 4 st.<br>10 st.<br>9 st.            | 8W.†<br>8W.*<br>NW.*<br>NW.†          | 00                         | 10 st.<br>10 st.<br>1 cir. 5 st.<br>10 st.<br>1 cir. 8 st.    | NW.                          | 00                         | 9 st.<br>7 st.<br>10 st.  | NW.*<br>SW.1<br>SW.1<br>O<br>NW.1 | . 01                       | 1 cir. cum. 9 st.<br>1 ci. s. 2 cu. 2 s. S <sup>3</sup>          | W.* 0<br>S.* 0<br>W. † 0<br>W. * 0       | 0 9 st.<br>0 1 cir. st. 7 st.<br>0 8 st.                        | NNW.*<br>SW.†<br>NW.*<br>NNE.†  | 00                         | 9.<br>9.<br>9.<br>5.         |
| 10 st.<br>  8 st.<br>  3 cir. cum. 3 st<br>  10 st.<br>  10 st. | ESE,*<br>E.*<br>E.*<br>E.*   | 00                   | 10 st,<br>8 st,<br>2 cir. cum. 4<br>9 st,<br>9 st.            | E.†<br>ESE.*<br>est. E.*<br>E.*       | 00<br>00<br>00<br>00       | 10 st.<br>9 st.<br>2 cir, cum. 5<br>10 st.<br>10 st.          | ESE.<br>at. E.<br>E.         | * 00<br>* 00<br>* 00       | 9 st.<br>2 cir. st. 7 st.<br>2 cir. cum. 6 st.<br>1 cir. cum. 8 st.<br>10 st. | E.*                               | 00                         | 10 st. S<br>1 cir. st. 9 st. ES                                  | E.*. 0<br>E.*. 0<br>E.*. 0<br>E.*. 0     | 0   10 st.<br>0   1 cir. st. 8 st.<br>0   10 st.                | ESE.                            | 00 00 00 00                | 9,<br>9,<br>8,<br>9,         |
| 1 st.<br>9 st<br>1 'st.<br>4 cr. 5 st.<br>1 st.                 | E.†<br>SE.†<br>NE.*<br>0     | 00                   | 1 cir. 1 st.<br>9 st.<br>9 st.<br>1 cir. cum. 7               | 0<br>SE.†<br>NE.*<br>st. N.†          | 00<br>00<br>00<br>00<br>00 | 4 cir. 1 st.<br>10 st.<br>10 st.<br>1 cir. st. 8 st<br>10 st. | SE.:<br>0<br>NE.:<br>N.:     | 0.0                        | 2 ci. 2ci. cu. 2 st<br>1 cir. st. 8 st.<br>10 st.<br>9 st.<br>10 st.          | t. SE. 1<br>0<br>0<br>0           | 00<br>00                   | 1 cir. 7 st.<br>10 st.<br>10 st.                                 |  | 0 loir 8 at   | NE.4                            | 00<br>00<br>00<br>00       | 3.<br>9.<br>9.<br>7.<br>10.  |
| 9 5.<br>10 nim.<br>1 cir. 7 st.<br>10 st.<br>8 st.              | NE. *                        | 00<br>00             | 1 cir. 9 st.<br>10 nim.<br>1 ci. 1 ci. st.<br>10 st.<br>9 st. | NE. †<br>0<br>6 st. NE.*<br>0<br>NE † | 00                         | 9 st.<br>10 nim.<br>1 ci. s. 3 ou.<br>9 st.<br>1 cir. 7 st.   | 4 s. NE.                     | † 00                       | 10 st,<br>10 nim.<br>9 st,<br>10 st,<br>10 st.                                | NE.<br>NE.                        | t. —                       | 9 st. N  | E."  , (<br>E. † (                       | 0 9 nim.<br>4 10 nim.<br>0 1 ci. cu.4 cu.5<br>- 10 st.<br>8 st. | 8.<br>0<br>8. NE.<br>NE.<br>NE. | t . —                      | 9,<br>10,<br>9,<br>9,        |
| 10 st.<br>10 st.<br>4 st.                                       | NE. †                        | 00<br>00<br>00       | 8 st.<br>10 st.<br>1 cir. st. 1 st                            | NE. 1<br>0<br>t. N.*                  | 00                         | 8 st.<br>10 st.<br>1 st.                                      | 0                            | † 00<br>† 00<br>† 00       | 4 cum. 5 st.<br>10 st.<br>1 cir. 1 cir. st. 2                                 | NE.<br>0<br>et. 0                 | + 00                       | 10 st.   | 0 6                                      | 0 10 st.<br>0 10 st.<br>0 1 cir. 2 cir. st.                     | NE. 0                           | 00<br>00<br>00             | 8,<br>10,<br>8,              |
| 8.09  |                              | -                    | 8. 09   | )                                     | -                          | 8. 12   |                              |                            | 8, 67   |                                   | -                          | 9. 06  |  | 8, 88   | _                               |                            | 8.                           |

and amount and given in inches. In this

Amount, kind. and freetion of clouds.

8. 93 6 p. m.

1 st. E. 1 st. SE 1 s.

10 st. NE.+ (0 10 st. 0 (0 3 cir. 3 st. N.+ (6 8. 19

# Statement shoring the amount, kind, and direction of clouds, and amount $a_{RR}$

|  | 1 a. m.  | 2 a.  | 300.  | 8 a. m.  |                            | 4 m. 201.   |                         | å n. m.   |                      | 6 a. m  |  |
|--|--|---|---|--|----------------------------|---|-------------------------|---|----------------------|---|--|
| Date.  | Amount, kind, and direction of clouds.   | Amount, kin   | ol, and clouds.                                 | Amount, kind, and direction of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation           | Amount, kind, and direction of clouds.  | Preripitalma         | Amount, kind<br>direction of ch                           | and a                                    |
| 1882.<br>Bept. 1<br>Sept. 2                              | 7 st. 0  | 00 × st.<br>— 10 st.  | 0 00<br>0 00                                    | lo at. NNW. *  | 00                         | 10 mt. NNW. †   |                         | 10 mt. 0  | (H)                  | i<br>10 it,   | 0 to                                     |
| Sept. 3<br>Sept. 4<br>Sept. 5<br>Sept. 6<br>Sept. 7      | 0 at. NW.+ 10 at. 0 1 cir. at. 1 at. 0 Denae fog. 0 10 at. ENE.*   | 00 D st.<br>00 D st.<br>00 I st.<br>00 Dense fog.<br>10 nim.              | NW.† 00<br>0 00<br>0 00<br>0 00<br>ENE.*.       | 5 cir. at. 3 at. 0<br>4 cir. at. 3 at. 0<br>1 at. 0<br>Dense fog. 0<br>10 nim. 0 | 00<br>00<br>00<br>00       | 4 st. 0<br>2 cir. st. 2 st. 0<br>1 st. 0<br>Dense fog. 0<br>9 nim. ENE.       | 00<br>00<br>00<br>00    | 3 at. 0<br>Light base. 4 st. 0<br>U Light fog. 0<br>10 nim. 0                             | 1943                 | 3 st.<br>Light haze. 8;<br>1 st.<br>Light fog.<br>10 niu. | 0 0<br>0 0<br>0 0                        |
| Sept. 8<br>Sept. 9<br>Sept. 10<br>Sept. 11<br>Sept. 12   | 10 st. 0<br>10 nim. E. *.  | 00 10 mm.   | NE. † 00<br>0 .01<br>0<br>0<br>NE. † 00         | 10 nt. 0<br>10 nim. 0<br>10 nt. 0<br>10 nt. 0<br>10 nim. 0                       | 00                         | 10 st. 0<br>10 nim. 0<br>10 nim. 0<br>5 nim. 0<br>6 st. NE.                   | : =<br>: =<br>: =       | 10 st, 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>8 st. 0                                | (H)                  | 10 st.<br>10 st.<br>10 nin.<br>10 nin.<br>9 nin.          | 0.0                                      |
| Sept. 13<br>Sept. 14<br>Sept. 15<br>Sept. 16<br>Sept. 17 | 1 cl. st. 9 st. E. * d. hu.  | - 10 nim.<br>- 10 nim.<br>- 10 nim.<br>- 1 nt.<br>- Dense fog.<br>- 0 nt. | NW.*.01<br>0<br>0 00<br>0 00<br>0 00<br>0 00    |  | 91<br>00<br>00             | 10 nim. 0<br>10 nim. 0<br>Light haze. 2 at. 0<br>10 st. 0<br>9 nim. NE.       | 00 00                   | 10 nim. 0<br>10 nim. 0<br>10 wt. 0<br>10 wt. 0<br>10 wt. 0                                | ; —;<br>(10)<br>(01) | 10 nim.<br>10 nim.<br>\$ nt.<br>10 nt.<br>10 nim.         | 0 10                                     |
| Sept. 18<br>Sept. 19<br>Sept. 29<br>Sept. 21<br>Sept. 22 | 1 cir. st. 9 st. NW. †<br>10 nim. NW. † .<br>9 st. NW. †   | 00 10 st.<br>00 8 st.<br>- 10 nim.<br>0 light haze. 7                     | 8W. * 00<br>NW. † 00<br>8t. 0 00<br>0 00        | **************************************   | 00 00                      | 6 at. 0 6 at. NW.† 10 at. NW.† 10 at. 0 0                                     | 00<br>60<br>            | 10 st. 0 9 st. NW.110 st. 0 0 ot. 10 st. 0 0 ot. 0  | 00<br>00<br>00       | 10 st.<br>10 st.<br>10 st.<br>10 niu.<br>10 st.           | NW. 00                                   |
| Sept. 23<br>Sept. 24<br>Sept. 25<br>Sept. 26<br>Sept. 27 | 10 st. 0<br>10 st. N. * (<br>1 cir. st. 9 st. SW. † .  | 0 7 st.<br>0 to st.<br>0 1 cir. st. 9 st.<br>4 0 st.<br>0 10 st.          | E. * 00<br>0 00<br>N. * 00<br>SW. f 00<br>0 00  | 10 st. 0<br>9 st. N. 1<br>7 st. 0  | 00<br>00<br>00<br>00       | Dense haze, 9 st. E. * 10 st. 0 1 etr. st. 4 st. N. * 4 st. 8W. t 10 st. W. * | 00<br>00<br>00<br>00    | 10 nt. 0 10 at. 0 9 cum. st. N. 5 nt. W. 1 10 nt. W. 1                                    | 00<br>00<br>00<br>00 | 10 st,<br>10 st,<br>10 st,<br>2 cum, 3 st,<br>10 st,      | 0 to 0 to W ! O! W. ! O!                 |
| Sept. 28<br>Sept. 29<br>Sept. 30                         | 10 st. 0 6<br>10 st. 0 6<br>9 st. 0 .6   | ) 10 nim.   | S.† 00<br>0 .03<br>S.† 00                       | 10 nim. 0 .  | 09 .<br>01<br>00           | 10 nim. 0<br>10 nim. 0<br>Dense haze. 2 st. 0                                 | . 02<br>. 01<br>. 00    | 10 at. 88W. †<br>10 nim. 0<br>Dense haze. 8 at. 0   | 00                   | 10 cum. st. 8<br>10 nim.<br>2 cir. 3 st.                  | 8W. 0                                    |
| Means.   | 8. 23  | 8. 16   |   | 7. 96  |                            | 7. 40   |                         | 8, 36   |                      | 8, 43   |  |
| Date.  | 1 p. m.  | 2 p. m  | 1   | 3 p. m.  |                            | 4 p. m.   |                         | 5 p. m.   |                      | 6 p. m.   |  |
| 1882.<br>Sept. 1<br>Sept. 2                              | 10 st. N. † 0<br>10 st. 0  |   | N.† 00  |  | 00                         | 10 st. N. †<br>10 st. 0   | 00<br>00                | 10 st. N. 1<br>10 st. 0   | 00                   | 10 at.<br>10 at.  | 0 m                                      |
| Sept. 3<br>Sept. 4<br>Sept. 5<br>Sept. 6<br>Sept. 7      | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 1 cir. 1 st.<br>1 st.<br>2 cir. 3 cir. cu.                                | 0 00<br>0 00<br>0 00<br>3 st. 0 00<br>NE.* 00   | 1 cir. 1 st. 0<br>1 st. 0<br>4 cir. cum. 5 st. NE. 1                             | 00<br>00<br>00<br>00<br>00 | 3 cir. 3 st. 0<br>1 st. 0<br>1 st. 0<br>Dense haze. 0<br>10 st. NE.           | 00<br>00<br>00<br>00    | 6 st. 0<br>1 st. 0<br>1 st. 0<br>10 st. NE. 1<br>10 st. NE.                               | 00<br>00<br>00<br>00 | 6 st.<br>1 st.<br>1 st.<br>10 st.<br>10 st.               | 0 to<br>0 to<br>NE.† or<br>NE.† or       |
| Sept. 8<br>Sept. 9<br>Sept. 10<br>Sept. 11<br>Sept. 12   | 10 st. NE.† 10 st. 0 { 10 st. E.* 10 st. E.†. 9 st. NW.†.  | ) 10 st.<br>- 10 st.<br>) 10 st.  | NE.   00<br>0 00<br>E.* -<br>0 00<br>0 00       | 10 st. 0<br>10 nim. 0 .<br>8 st. NE. †   | 00<br>00<br>01<br>00<br>00 | 10 st. 0<br>10 st. 0<br>10 st. E.*<br>8 st. NE.†<br>8 st. NV.†                | . —                     | 10 st. 0<br>10 st. 0<br>10 st. E.:<br>8 st. NE.:<br>8 st. NV.:                            | 00                   | 10 st.<br>10 st.<br>10 st.<br>7 st.<br>10 st.             | E.* 10<br>NE. 1 20<br>NW. 1 100          |
| Sept. 13<br>Sept. 14<br>Sept. 15<br>Sept. 16<br>Sept. 17 | 10 st. N.† ( 10 st. E.†. 4 st. 0 ( 2 cir. 2 st. 0 ( 10 st. 0 (   | - 10 st.<br>0 9 st.<br>0 1 cir. 1st.                                      | N.† 00<br>SE.† 00<br>SE.† 00<br>0 00<br>NE.* 00 | 1 cir. 7 st. 0<br>1 cir. 8 st. SE. †<br>1 cir. 1 cir. st. 2 st. 0                | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>Dense fog. 0<br>8 st. 8E.†<br>1 cir. st. 1 st. E.*<br>0           | 00<br>00<br>00<br>00    | 10 st. 0<br>Dense fog. 0<br>2 cir. 4 st. SE. i<br>4 st. 0<br>10 st. 0                     | 00 00 00 00          | 10 st.<br>Dense fog.<br>2 cir. 2 st.<br>7 st.<br>10 st.   | () () () () () () () () () () () () () ( |
| Sept. 18<br>Sept. 19<br>Sept. 20<br>Sept. 21<br>Sept. 22 | 10 st. NE  |   | W. † 00<br>0 00<br>NE. † 00<br>E. † 00          | 10 st. W. †<br>2 cir, cum. 6 st. 0<br>10 st. NE. †                               | 00                         | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                          | 00                      | Dense fog. 0<br>10 st. SW. 1<br>3 cir. cum, 5 st. 0<br>10 st. E. 1<br>2 cir. 7 st. E.     | 00                   | Dense fog.<br>10 st.<br>3 cir. 6 st.<br>10 st.<br>9 st.   | W. · · · · · · · · · · · · · · · · · · · |
| Sept. 23<br>Sept. 24<br>Sept. 25<br>Sept. 26<br>Sept. 27 | 1 cir. 4 st.   | 0 10 st.<br>0 10 st.<br>t   10 nin.                                       | E. † 00<br>0 00<br>0 . —<br>0 . —               | 10 st. NW, † 10 nim. 0 .   | 00                         | 10 st. NNE. t   | 00<br>00<br>. 01<br>. — | 3 cir. 2 cir. st. 1 st. 0<br>10 st. N. †<br>4 cum. 4 st. 0<br>9 st. SW. †<br>Dense fog. 0 |                      | 3 cir. 2 st.<br>10 st.<br>9 st.<br>10 st.<br>Dense fog.   | SW 1 of 0 or                             |
| Sept. 28<br>Sept. 29<br>Sept. 30                         | Dense fog. 0 (10 nim. 0 1, 0 cir. 2 cir. 2 cir. st. 2 st. 0 (10 cir. st. | 10 nim.   | ${0\atop 0}$ $00\atop {\bf E}^*$ $00$           | 3 cir. Dense fog. 0<br>10 nim. 0<br>10 st. E.*                                   |                            | 10 nim. 0   | 00<br>. 01<br>00        | 10 st. 8W.* 0 10 st. E.*  | . 00                 | 10 st.<br>Dense fog.<br>10 st.                            | SW. ·                                    |
| Means.   | 7. 73  | 8.50  |   | 8, 20  |                            | 7. 33   | -                       | 7.46  |                      | 7. 26   |  |

character

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## character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

initian rapid. ) signifies slow. Daily means of amount of clouds on the right below: amount of precipitation on the right above.

| 7 a. m.   |                | % a. m.   |                            | 9 a. m.   |                            | 10 a. m.  |                            | H a. m.  |                      | 12 m.  |                              | precipa                          |
|---|----------------|---|----------------------------|---|----------------------------|---|----------------------------|--|----------------------|--|------------------------------|----------------------------------|
| Amount, kind, and direction of clouds.          | Precipitation  | Amount, kind, and direction of clouds.                              | Procipitation.             | Amount, kind, and direction of clouds.                                  | Precipitation              | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and<br>direction of clouds.  | Precipitation        | Amount, kind, and direction of clouds.                                       | Precipitation                | Amount of pre                    |
| st. Light fog. 0                                | 00             | 10 nim. 0   | _                          | 10 at. NNW.*<br>10 at. 0  |                            | 10 nim. 0<br>10 st. 0   | 1000                       |  | 01                   |  | _                            | .0                               |
| ot. 0<br>cir. 2 st. 0<br>st. 0<br>st. ENE.      | 00<br>00       | 2 cir. cum. 8 st. 0<br>2 cir. 3 st. 0<br>1 st. 0<br>10 st. ENE.     | 00<br>00<br>00<br>00<br>00 | # cir. 1 st. 0 ( i cir. cum. 0 ( i st. cum. 0 (                         | 00 i<br>00<br>00<br>00     | 6 cir. 2 at. 0<br>1 cir. cum. 0<br>5 cir. cum. 1 at. 0                          | 00<br>00<br>00<br>00<br>00 | 3 cir. 5 st. 0<br>6 cir. 0<br>1 cir. cum. 0<br>4 cir. cum. 1 st. 0<br>10 st. NE. | 00<br>00<br>00<br>00 | f cir. cum. 0  | 00<br>00<br>00<br>00<br>00   | . (                              |
| ot. E. 0  | 00             | 10 at. EBE. 1   | . 01                       | 10 st. NE.† 10 nim. 0 . 10 st. 0 . 10 nim. E.† 10 nim. 0 .              | _                          | 10 st. ESE. † .   | 00                         | 10 at, NE,† 10 at, 0 10 at, E,* 10 at, E,† 10 at, WNW,†                          | 00                   | 10 st. NE.  <br>10 st. 0<br>10 nim. E.  <br>10 st. E.  <br>1 cir. 8 st. WNW. | 00                           | :                                |
| ht hase. 0                                      | 00<br>00       | 10 st. 0<br>10 nim. 0<br>0 0<br>10 st. 0<br>10 nim. 0               | 00                         | 10 nim. 0 ; s<br>Light base. 1 st. 0 ; s<br>10 st. 0 ;                  | 00<br>00                   | 10 nim. 0<br>2 st. 0<br>10 st. Light fog. 0                                     | 00<br>01<br>00<br>00<br>00 | 10 st. N. 1<br>10 nim. ENE. 7<br>1 st. 0<br>10 st. Light fog. 0<br>10 st. 0      | 00 00 00 00          | 10 st. N.† 10 nim. ENE.† 3 st. 0 10 st. E.* 10 st. NE.*                      | -                            |                                  |
| t. 0<br>nim. 0<br>t. 0<br>nim. 0                | 00             | 10 st. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0        | 00                         | 10 st. Light fog. 0<br>10 st. W.†.<br>10 st. 0<br>10 nim. 0<br>10 st. 0 | 00                         | 10 st. W. †<br>10 st. 0<br>10 nim. 0  | 00 00 00                   |  | 00                   |  | 00<br>00<br>00<br>00<br>01   |                                  |
| t. N. N.  | 1 00           | 10 nim. 0<br>10 st. 0<br>10 nim. N. 5<br>10 st. W. †<br>10 st. W. † | 00                         | 10 st. N. 1. 10 st. 0   | 00                         | 10 st.<br>10 st.<br>10 st.<br>10 at.<br>0                                       | 00<br>00<br>00<br>00       | 10 at. NW. †   | 00                   | 2 ci. cum. 5 st. ENE. † 10 st. 0 10 st. NW.† 10 nim. 0 Dense fog. 0          | 00<br>00<br>00               |                                  |
| a. 3cu. 4cu. s. SW.:                            | 00<br>01<br>00 | f.t. haz, 8 cu. st. 8W.*<br>10 nim. 0<br>2 cir. 1 st. 0             | $\frac{00}{00}$            | 10 st. SW.* Light fog.<br>10 nim. 0 .<br>2 cir. 1 st. 0                 | 00<br>03<br>00             | 10 st. SW.* Light fog.<br>10 nim. 0 .<br>2 cir 6 st. 0                          | 00<br>01<br>00             | 10 nim. SW.* Lt. fog.<br>10 nim. 0<br>3 cir. 5 st. 0                             | . 05                 | Dense fog. 0<br>10 nim. 0<br>3 cir. cum. 6 st. 0                             | . 04<br>00                   |                                  |
| 8. 13   |                | 8,43  |                            | 8. 78   |                            | 9, 00   | -                          | 8. 83  |                      | 8. 23  |                              | 1                                |
| 7 p. m.   |                | 8 p. m.   | *                          | 9 p. m.   | -                          | 10 p. m.  |                            | II p. m.   |                      | 12 p. m.   |                              | Dail                             |
| t. 0<br>ir. at. 3. st. S.:                      |                | Dense fog. 0<br>7 cir. st. 3 st. 0                                  | 00<br>00                   |   | 00<br>00                   | 10 st. Light fog. 0<br>10 st. SE. †   | 00                         | 10 nim. 0<br>10 at. SE. t  | 00                   | 10 nim. 0<br>3 cir. st. 5 st. SE. †  |                              | 9                                |
| 0<br>0<br>0<br>NE.<br>NE.                       | 00             | 2 cir. st. 5 st. 0<br>0 0 0<br>10 st. NE. 1<br>10 st. NE.           | 00                         | 1 cir. 1 st. 0 0 10 st. NE. †   | 00<br>00<br>00<br>00<br>00 | 1 st. 0<br>1 st. 0<br>10 st. NE.  | 00<br>00<br>00<br>00<br>00 | 1 cir. 7 st. 9 1 cir. 1 st. 0 1 st. 0 10 nim. NE. 1 10 st. NE.                   | 00                   | 8 st, 0<br>2 sc, 0<br>1 st, 0<br>10 nim. NE. †<br>10 st. NE. †               | 00 00 00                     | 6<br>3<br>6<br>2<br>9            |
| e haze, 0 t. 0 t. E. mm. st. NE. NW.            | 00             | 10 st. 0<br>10 st. 9<br>8 st. NE.*<br>3 cum. 0<br>9 st. NW.         | 00                         |   | 00<br>00<br>00<br>00       | 10 at, 0  | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0<br>10 nim. E. 1<br>4 cum. N.*<br>10 st. NW. t               | 00<br>00<br>00       | 10 st, 0<br>10 st, E.†<br>10 nim, E.†<br>9 st, N.†<br>10 st. NW.†            | 00                           | 10<br>10<br>10<br>10<br>10<br>10 |
| t. 0<br>ser fog. 0<br>ir. 1 st. 0<br>t. E.      | 00             | 10 st. 0<br>Dense fog. 0<br>1 cir. 1 cum. st. 0<br>9 st. E.*        | 00                         | 3 cir. Dense fog. 0<br>1 cir. 2 st. 0<br>10 st. E. †                    |                            | 10 st. 0<br>1 cir. st. 9 st. E. †<br>1 cir. 2 st. 0<br>10 st. NE. †<br>10 st. 0 | 00                         | 10 nim. 0 E.† 1 cir. 2 st. 7 st. 0 10 st. NE.† 10 st. 0                          | 00                   | 10 st. NE. †   | 00 .                         | 10<br>7<br>3<br>7                |
| se fog. NW. r. 8 st. 0 E. E.                    | 00 00          | Dense fog. 0 0 0 10 st. 10 st. 0 10 st. E.† 8 st. E.*               | 00                         | 10 st.  | 00                         | 10 at. 0 ,  | 00<br>00<br>00<br>00<br>00 | 10 st. 0<br>10 st. 0<br>9 st. SE. t<br>10 st. NE. t<br>1 cir. 2 st. 0            | 00                   | 2 cir. 4 at. SE. 10 at. NE. 1  | 00                           | 1                                |
| ir. 4 st. 0<br>i. N.:<br>i. 0<br>ii. 0<br>mm. 0 | 00<br>00<br>00 | 2 cir. 2 st. 0<br>10 st. N.*<br>8 st. 0<br>10 st. 0<br>10 nim. 0    | 00 00 00                   | 10 at. NE.†. 10 at. N.* 9 st. 0 1 cir. 7 st. NW.† 10 at. 0              | 00<br>00<br>00             | 10 at. NE. i<br>10 at. N. i<br>9 at. W. i<br>5 at. NW. i<br>9 at. S. i          | 00<br>00                   | 10 st. 0<br>10 st. N.†<br>9 st. W.†<br>9 st. NW.†<br>10 st. S.†                  | . 00                 | 10 st. 0<br>10 nim. 0<br>10 st. NW.  | 00<br>00<br>. 01<br>00<br>00 | 16                               |
| t. SW.:   | 00             | 10 st. BW.*<br>Dense fog. 0<br>10 nim. 0                            | 00<br>00<br>. 01           | 9 st. SW.*<br>Dense fog. 0<br>10 nim. 0                                 | 00<br>00<br>15             | 10 st. SW. † Dense fog. 0 10 nim. E.*   | 00<br>00<br>. 12           | 10 st. SW. 10 st. 0 E.*  | 00                   | 10 nim. 0  | 00                           | 877                              |
| 7.06  |                | 6.90  |                            | 8,13  | _                          | 8.26  |                            | 8.23   | 1                    | 8.53   |                              | 1                                |

10 st. 10 st. 10 st. 10 st. 7 st. 10 st.

s, and amount and

given in inches. In the

6 a. m.

Amount, kind, and direction of clouds.

3 st. 0 00 Light hace. 5 st. 0 00 1 st. 0 00 Light fog. 0 0s 0 nim. 0 ,01

0 14.

to st. to st. to nim. to nim. 9 nim.

10 nim. 10 nim. 4 st. 10 st. 10 nim.

10 st. 10 st. 10 st. 10 nim. 10 st.

10 st. 10 st. 10 st. 3 cum. 3 st. 10 st.

10 cum. st. 10 nim. 2 cir. 3 st.

10 st. 10 st. 8. 43 6 p. m.

88W. (4) 0 .01 0 00

> 0 to 0 to 0 to NE. † (6) NE. † (6)

10 st. NW.

10 st. Dense fog. 2 cir. 2 st. 7 st. 10 st.

Dense fog. 10 st. W. 3 cir. 6 st. 10 st. 9 st.

3 cir. 2 st. 0 si 10 st. 2 SV 1 si 10 st. SV 1 si Dense fog. 0 si Dense fog. 0 si Dense fog. 0 si E. 2

## Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

|  | 1 a. m.  | 2 a. m.  | 3 a. m.   | 4 a. m.   | 5 a. m.   | 6 a. m.  |
|--|--|--|---|---|---|--|
| Date.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds  |
| 1882.<br>Oct. 1<br>Oct. 2  | 10 nim. 0 . 10 p st. 0   | 10 nim. 0 . 07<br>10 at. 0 . 00  | 10 nim. 0 . 04<br>10 st. 0 . 00   | 10 nim. 0 .06<br>10 nim. SSW. 01  | 10 nim. 0   .05   | 10 nim. 0 .00<br>10 nim. 0 .00   |
| Det. 3<br>Oct. 4<br>Oct. 5<br>Oct. 6<br>Oct. 7   | 10 nim. 0   .05<br>10 nim. 0   .01<br>10 st. ENE. 0   00<br>10 st. 0   00<br>10 st. 0   00   | 10 nim. 001  | 10 nim. 0 .— 10 nim. 0 .01 10 st. 0 00 10 st. 0 00 10 st. 0 00                                    | 10 nim. 0 .— 10 nim. 0 .01 10 st. 0 00 10 st. 0 00 10 st. 0 00                              | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 10 nim.<br>10 nim.<br>10 st,<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>10 st. |
| Oct. 8<br>Oct. 9<br>Oct. 10<br>Oct. 11<br>Oct. 12  | 3 st. NE. † 00<br>Light haze. 8 st. 0 00<br>Dense haze. 7 st. 0 00<br>10 nim. 0 .—<br>Dense haze. 0 00   | 5 st. NE. † 00 Dense haze. 5 st. 0   00 t0 nm. 0   10 nim. 0   Lt. haze. D. haze. 0   00 | Lt, haze. 6 st. NE, † 00 D. haze. 6 st. 0 00 10 nim. 0 . — 10 nim. 0 . — Lt, haze. D. haze. 0 .00 | 9 st. 0 00<br>Lt. haze. 8 st. 0 00<br>Lt. haze. 5 nim. 0 .01<br>4 st. 0<br>Dense haze. 0 00 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 3 st. 0 (10 st. 0 (Lt. haze, 6 nim. 0 (Light haze, 0 (                         |
| Det. 13<br>Det. 14<br>Det. 15<br>Det. 16<br>Det. 17  | D, haze, D, haze, 0   00   1 st, 0   00   00   00   00   00   00   00  | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                    | D. haze, D. haze, 0 00<br>0 0 0 0 0<br>0 Lt. haze, D. haze, 0 00<br>1 st, 0 00                    | D. haze. D. haze. 0 00 00 00 0 00 00 00 00 00 00 00 00 0                                    | $\begin{array}{cccccc} Lt.\ haze. & D.\ haze. & 0 \mid 00 \\ 0 & 0 & 0 \\ 0 & 0 \mid 00 \\ 10\ st. & 0 & 00 \\ 2\ st. & 0 & 00 \end{array}$ | Lt. haze. D. haze. 0 (0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                      |
| Det. 18<br>Det. 19<br>Det. 20<br>Det. 21<br>Det. 22  | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 nim. 0 .—<br>10 st. 0 00   | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 nim. 0 00<br>10 nim. 0 00                | 10 st. 0 0. — 10 st. 0 00 10 st. 0 00 10 mim. 0 — 10 mim. 0 —                                     | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 nim. 0 .01<br>10 nim. 0 .—   | 10 st.     0   00       10 st.     0 00       10 st.     0 00       10 nim.     0   0       10 nim.     0   0                               | 10 st. 0 t<br>10 st. 0 t<br>10 st. 0 t<br>10 st. 0 t<br>10 nm. 0 -             |
| Det. 23<br>Det. 24<br>Det. 25<br>Det. 26<br>Det. 27  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 1 st. 0 0 0<br>10 nim. 0   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 1 st. 0 0 0<br>10 nm. 0 10 st. 0 8 st. N.* 00 9 st. NW.† 00                                 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 3 st. 0 . 10 st. 0 . 10 st. 10 st. 4 cum. 2 st. NNW. 1 5 cum, 4 st. 0 . 1      |
| Oct. 28<br>Oct. 29<br>Oct. 30<br>Oct. 31   | Dense haze. 3 st. 0 00 8 t. 8 t 00 10 nim. 0 - 10 st. 0 00   | 8 st. 0 00<br>0 st. S. † 00<br>10 nim. 0<br>10 st. S. † 00                               | 9 st. W. ( 00<br>8 st. SE.* (0<br>10 nim. SSE.*) —<br>9 st. SSW. (100                             | 10 st. W. † 00<br>8 st. SE. * D. haze. 00<br>10 st. SSE. * 01<br>10 st. SSW. † 00           | 10 st. W. † 00<br>5 cir. cum. 3 st. SE. † 00<br>10 st. SSE. * 00<br>10 st. SSW. † 00  | 10 nim. 0 2 st. 0 10 st. SSE + 1 10 st. SSW. 1                                 |
| Moans .  | 6.96   | 7. 25  | 7. 19   | 7. 16   | 7. 67   | 7.48   |
| Date.  | 1 p. m.  | 2 p. m.  | 3 p. m.   | 4 p. m.   | 5 p. m.   | 6 p. m.  |
| 1882.<br>Oct. 1<br>Oct. 2  | 2 cir. cum. 6st. SW. † 00<br>1 cir. 9 st. SW. † 00   | 9 st. 0   00<br>1 cit. 7 st. SW. † 00  | 9 st. SW. † 00<br>10 st. • 0 00   | 1 cir. cum. 7 st. S. † 00<br>Dense fog. 0 00  | 2 cir. cum. 4 st. SW. † 00<br>Dens. fog. 0 00   | 2 cir. cum. 1 at 0 (5 cir. 2 st. 0 (   |
| 0et. 3<br>0et. 4<br>0et. 5<br>0et. 6   | 10 nim. 0 .01 10 nim. 0 10 st. NE.* 00 10 st. ENE.* 00 10 st. 0 00   | 10 nim. 0 .01<br>10 nim. 0 .01<br>10 st. 0   00<br>10 st. ENE.* 00<br>10 st. 0 00        | 10 nim. 0 .— 10 nim. 0 .— 10 st. 0 00 10 st. ENE.* 00 10 st. 0 00                                 | 10 nim. 0 0 01 10 st. E.*. — 01 00 10 st. ENE.* 0 00 10 st. 0 00                            | 10 uim. 0 .— 10 st. E.* 00 10 st. 0 00 10 st. NE.* 00 10 st. 0 00   | 10 nim. 0 10 st. E.' = 10 st. 0 (10 st. 0 st. 0 st. 0 st. 0 st.                |
| et. 8<br>et. 9<br>et. 10<br>et. 11<br>et. 12   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 1 cir. 1 st. NE.* 00 8 st. NE.† 00 8 st. NE.† 00 10 nim. 0 1 st. NE.† 00                 | 1 cir. 1 st. NE.* 00<br>9 st. NE.† 00<br>8 st. NE.† 00<br>10 nim. 0 .—<br>1 st. Dense haze. 0 00  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 1 cir. 1 st. NE. 00<br>10 st. 0 00<br>5 st. 0 00<br>10 nim. 0 .—<br>Dense haze. 0 00  | 2 st. NE. 10 st. 0 . 8 nim. 0 . 10 nim. 0 . 0                                  |
| et. 13<br>et. 14<br>et. 15<br>et. 16<br>et. 17   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 1 st. 0 ! 00<br>10 st. E. † 00<br>1 st. 0 ! 00<br>1 cir. 3 st. E. † 00<br>5 st. E. † 00  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. E.                               |
|  | 10 st. 0 00<br>10 st. 0 00   | 10 at. 0 100 t 10 at. 0 100 t 10 at. 0 00  | 10 st. 0 00<br>10 st. 0 00<br>10 st 0 00<br>10 st. 0 00   | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00                                    | 10 st. 0 00<br>19 st. 0 00<br>10 st. 0 00<br>10 st. 0 00  | 10 st. 0 10 st. 0 10 st. 0 10 st.  |
| et. 19<br>et. 20<br>et. 21   | 10 st. 0 : 00<br>10 st. 0 : 00<br>10 st. 0 : 00  | 10 st. 0 00<br>10 st. 0 00   | 10 87. 0 00<br>9 st. 0 00   | 8 st. 0 00  | 8 at. 0 00  | 8 at. 0  |
| et. 21<br>et. 22<br>et. 23<br>et. 24<br>et. 25   | 10 st. 0 : 00<br>10 st. 0 : 00   | 10 st. 0 00  | 10 st. 0 00 1 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 7 cir. cum. 1 st. 0 00                 |   |   |  |
| et. 19<br>et. 20<br>et. 21<br>et. 22<br>et. 23<br>et. 24<br>et. 25<br>et. 26<br>et. 27<br>et. 28<br>et. 28 | 10 st. 0 - 00 10 | 10 st. 0 00 00 10 st. 0 00 00 00 00 00 00 00 00 00 00 00 00                              | 9 st. 0 00<br>1 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>9 st. 0 00                              | 8 st. 0 00  1 st. 0 00  10 st. 0 00  9 st. 0 00   | 8 st. 0 00<br>4 cir. 2 st. 0 00<br>10 st. 0 00<br>10 st. 0 00   | 8 at.   0     2 at.   1   1   1   1   1   1   1   1   1                        |

character o

Amount, kin

10 mm. 10 mm. 10 mm. 10 mm. 10 mm. 10 st. 10 st. 10 st.

1st. 1. haze. 8 ni 1. haze. 1. haze. t. haze. D. h

| st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st. | st.

8 cum. 2 st. 9 nim. 1 st. 1 st. 1 st. 7. 2:

3 cir cum. 2 st. Deuse fog.

10 nim.
10 st.
10 st.
10 st.
10 st.
10 st.
10 st.
10 st.
10 st.
2 st.
10 st
10 nim.
30 nim.
6

2 st. 10 st. 1 st.

st in. cum. 2 st. st st st character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

table signifies rapid, taignifies slow.] Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  |  | 8 a. m.  |   | 9 a. m.  |                              | 10 a. m.   | 11 a. m.  |                              | 12 m.  | precipi-                      |
|--|--|--|---|--|------------------------------|--|---|------------------------------|--|-------------------------------|
| Amount, kind, at<br>direction of cloud           | Precipitation.                                 | Amount, kind,<br>direction of clo                              | spin pur                                      | Amount, kind, and<br>direction of clouds,                                    | Precipitation.               | Amount, kind, and direction of clouds.   | Amount, kind, and<br>direction of clouds.         | Precipitation.               | Amount, kind, and direction of clouds.   | Amount of pre-<br>tation.     |
| n nim.<br>1 pin.                                 | 0 .05<br>0 .—                                  | 10 nim.<br>10 st.  | 0 .05<br>SW.f.01                              | 10 nint. 0<br>10 st. SW.   | . 04                         | 10 nim. 0 .02<br>10 st. SW.† 00  | 1 cir. 8 st. 0<br>5 cir. cum. 4 st. SW.           | . 01                         | 8 st. 8.† 00<br>10 st. 8W.† 00   | . 5                           |
| nim.<br>nim.<br>st. EN                           | 0   01<br>0   —<br>(E.* 00<br>0   00<br>0   00 | 10 nim.<br>10 nim.<br>Lt. haze. 9 st. 1<br>10 st.<br>10 st.    | 0 1. —<br>0 .01<br>ENE.† 00<br>0 00<br>0 .00  | 10 nim. 0<br>10 nim 0<br>13 cir. 7 st. ENE.10 nim. 0<br>10 st. 0             | . 01<br>00<br>. 01<br>00     | 10 nim. 0  | 10 nim. 0   | . 01                         | 10 nim. 0 .02<br>10 nim. 0 .—<br>10 st. NE.* 01<br>10 st. NE.* 00<br>10 st. 0 00                                 | . (                           |
| st.<br>st.<br>haze. 8 nim.<br>nim.<br>haze.      | 0 00<br>0 00<br>0 01<br>0                      | 2 st.<br>10 st.<br>14 st.<br>10 pm.<br>0                       | 0 · 00<br>0 · 00<br>0 · —<br>0 · 01<br>0 · 00 | 1 st. 0<br>- 10 st. 0<br>- Lt. baze. 8 st. 0<br>- 10 nim. 0<br>- Lt. haze. 0 | 00 . —                       | 1 st. 0 00<br>10 st. 0 60<br>10 nim. 0 .01<br>10 st. 0<br>Lt. baze. 0 00                                 | 10 st. NE.†                                       | 00                           | 2 st. NE.* 00<br>10 st. ENE.t' 00<br>8 st. NE.t 00<br>10 st. 0   00<br>Lt. haze, 1 st. 0   00                    | :                             |
| st.  | 0   00<br>0   00<br>0   00<br>0   00<br>0   00 | D. huze. D. haze<br>0<br>10 st.<br>Lt. haze. 2 st.             | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | D. haze. D. haze. 0<br>0 0 0<br>10 st. 0<br>Lt. haze. 2 st. 0                | 00<br>00<br>00<br>00         | T.t. haze, D. haze, 0 00<br>Lt. haze, 0 00<br>0 00<br>Lt. haze, 10 st, 0 00<br>Lt. haze, 3 st, 0 00      | Lt. haze. 0<br>0 0<br>9 st. 0                     | 00<br>00<br>00<br>00         | Lt. haze, 1 st. 0   00<br>3 cir. 2 st. 0   00<br>1 st. 0   00<br>10 st E.† 00<br>Lt haze, 0   00                 |                               |
| st.<br>st.<br>st.<br>haze. 3 st.<br>nim.         | 0 00<br>0 00<br>0 00<br>0 . —                  | 10 st.<br>10 st.<br>10 st.<br>Lt. baze. 2 st.<br>10 nim.       | 0 00<br>0 00<br>0 00<br>0 00<br>0             | 10 st. 0<br>10 st. 0<br>10 st. 0<br>Lt. haze. 0<br>10 nim. 0                 | 00<br>00<br>00<br>00         | 10 st. 0 00<br>Lt. hnze. 9 st. 0 00<br>10 st. 0 00<br>Lt. hnze. D. hnze. 0 00<br>10 st. 0 0              | 10 st. 0<br>10 st. 0<br>10 st. 0                  | 00<br>00<br>00<br>00<br>00   | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00  |                               |
| st.<br>st.<br>st.<br>cum. 3 st. NN<br>cum. 2 st. | E.† 00<br>0 00<br>0 00<br>W.† 00<br>0 00       | 2 st.<br>10 st.<br>10 st.<br>4 ci. cu. 2 st. N<br>7 cum. 3 st. | 0 00<br>0 00<br>0 00<br>NW.† 00<br>0 00       | 10 st. 0<br>10 st. 0<br>6 ci. cu. 3 st, NNW.                                 | 00<br>00<br>00<br>00         | Lt. haze. 0 00<br>10 st. 0 00<br>10 nim. 0 .—<br>7 ct. cu. 2 st. NNW. to<br>8 cir. cum. 2 st. 0 00       | 0 10 st. 0<br>- 10 st. 0<br>4 ci 3 ci.cu.2s.NNW.1 | 00                           | Lt. haze. 1 st. 0   00<br>10 st. 0   00<br>10 st. 0   00<br>5 ci. cu. 5 st. NNW.1 00<br>7 cir. cum. 3 st. 0   00 |                               |
| nim  | 0 . —<br>0 00<br>SE.† 00<br>0 00               | 10 nim.<br>1 st.<br>10 st.                                     | 0 . —<br>0 00<br>SSE.t 00<br>0 . 00           | 3 st. 0  | 00<br>00<br>00<br>00         | 10 st. SW. f   | 3 st. 0   | 00                           | 10 st. WSW.†   |                               |
| 7. 22  |  | 7. 12  |   | 6. 67.   |                              | 6, 90.   | 7. 32   |                              | 7. 58.   | 1.                            |
| 7 p. m.  |  | 8 p. m.  |   | 9 p. m.  |                              | 10 p. m.   | 11 p. m.  |                              | 12 p. m.   | Daily<br>mer as               |
| cir cum. 2 st.                                   | 0 00<br>0 00                                   | 3 cir. 1 st.<br>10 st.   | 0 - 00  | 2 cir. cum. 6 st. 0<br>Dense fog. 0  | 00                           | 9 st. 0 00<br>10 nm, 0 .—  |   |                              | 9 nim.<br>10 nim. 0 .—<br>0 .01  | 8.<br>7.                      |
| nim.<br>st.<br>st.<br>st.<br>st.                 | 0 .01<br>E.* 00<br>0 00<br>0 00<br>0 00        | 10 nim.<br>10 st.<br>10 st,<br>10 st.<br>10 st.                | 0 .01<br>E.* 00<br>0 :00<br>0 00              | 10 st. E<br>10 st. 0<br>10 st. 0   | . 01<br>00<br>00<br>00<br>00 | 10 nim. 0 . 0:<br>10 st. E. † 0:<br>10 st. 0 0:<br>10 st. 10 st. 0 0:<br>1 cir. 7 st. 0 0:               | 0 10 st. E. 0 10 st. 0 10 st. 0                   | 00<br>00<br>00               | 10 nim. 0 , 01<br>10 st. E. † 00<br>10 st. 0 00<br>10 st. 0 00<br>9 st. 0 00                                     | 10,<br>10,<br>9,<br>10,<br>9, |
| st. P<br>st.<br>nim.<br>nim.                     | E.* 00<br>0 00<br>0<br>0<br>0 00               | 2 st.<br>10 st.<br>10 st.<br>10 nim.<br>0                      | NE.* 00<br>0 00<br>0<br>0 .01<br>0 00         | 10 st. 0<br>10 nim. 0<br>10 nim. 0   | 00<br>00<br>.01<br>. —       | 8 st. NE.* 00 10 st. 0 + 00 10 nim. 0 + - 10 nim. 0 10 nim. Dense haze. 0 + 00                           | 0 10 st. 0<br>- 10 st. 0<br>- 10 st. 0            | . —                          | 5 st. NE.† 00<br>10 st. 0 00<br>10 st. 0 00<br>6 st. 0 00<br>2 st. Light fog. 0 00                               | 3.<br>9.<br>8.<br>9.          |
| st. E.N<br>st. E.N<br>st. st.                    | 0 : 00<br>E.† 00<br>0 : 00<br>0 : 00<br>E.* 00 | 4 st.<br>10 st.<br>1 st.<br>8 st.<br>10 st.                    | 0 00<br>E, t 00<br>0 00<br>0 00<br>E,* 00     | 10 st. E.<br>1 st. 0   | 00<br>1 00                   | 2 st. 0 0 0 10 st. 10 st. 0 1 0 st. 10 st. ESE † 0 10 st. 10 st. E † 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 10 st. ENE.<br>9 4 st. NE<br>9 10 st. E.          | 1 ()()                       | 1 st. 0 00<br>2 st. 0 00<br>2 st. 0 00<br>4 st. 0 00<br>10 st. 0 00  | 1.<br>4.<br>1. 6.<br>1. 4.    |
| st.<br>st.<br>st.<br>st.                         | 0 00<br>0 : 00<br>0 : 00<br>0   00<br>0   00   | 10 st.<br>10 st.<br>10 nim.<br>10 st.<br>9 st.                 | 0 00<br>0 00<br>0 - 00<br>0 00                | 10 st. 0<br>10 nm. 0<br>10 st. 0   | 00                           | 10 st, 0   00   10 st, 0   10 st, 0   10 st, 10 nim, 0   | 0 10 st. 0<br>- 10 nim. 0<br>0 10 st. 0           | 00                           | 10 st. 0 00<br>10 st. 0 00<br>10 nm. 0 .—<br>10 nm. 0 .—<br>2 st. 0 00   | 10.<br>9.<br>10.<br>8.<br>8.  |
| st.<br>st.<br>st.<br>st.<br>st.                  | 0 ; 00<br>0 ! 00<br>0 ! 00<br>0 ! 00<br>0 ! 00 | 10 st.<br>10 st.<br>10 st.<br>10 st.<br>3 cir. cum. 2 st.      | 0 00<br>0 00<br>0 00<br>0 00                  | 10 st. 0<br>10 st. 0<br>10 st. 0   | 00                           | 10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>4 st. 0 00                                   | 0 10 st. 0<br>9 10 st. 0<br>0 10 st. 0            | (10)<br>(10)<br>(10)<br>(10) | 10 st. 0 00<br>10 st. 0 .00<br>10 st. 0 .00<br>10 st. 0 .00<br>5 st. 0 00  | 3.<br>10.<br>10.<br>9<br>6    |
| wf.  | 0 00<br>SE, † 00<br>S, † 01<br>W, † 00         | 10 st.<br>10 st.<br>9 st.<br>1 cir. st. 9 st.                  | 0 00<br>SE.† 00<br>S.† 00<br>W.† 00           | 10 st. S.W. SSW.   | 00<br>† 00<br>† 00<br>† 00   | 9 st. 0 0<br>10 st. SE. † 0<br>6 st. SSW. † 0<br>10 st. 0 0  | 0 10 st. 0<br>0 10 st. 0                          | 00<br>00<br>00               | 5 st. 0 00<br>10 st. 0 03<br>9 st. SW ± 01<br>10 nim. 0 . —  | 9.<br>5<br>8<br>9.            |
|  |  | 8, 45  |   | 8.51   |                              | 8.54   | 8. 70   |                              | 7. 77  | 7.                            |

im.

2 st. 10 st. 10 st. 10 st. 4 cir, cum. 2 st.

, and amount and

given in inches. In this

mount, kind, and rection of clouds

> ENE : (0) (0 - (0) (0 - (0) (0 - (0)

nim.

nim. nim. st. st.

l st. 0 st. t. haze. 6 nim. 0 nim. ight haze.

7. 48 6 p. m.

2 cir. cum. 1 st 5 cir. 2 st.

10 nim. 10 st. 10 st. 10 st. 10 st.

2 st. 10 st. 8 nim. 10 nim. 0 SSE + 101 SSW. + 141

> 0 .-E.\* (n n od u iki

NE. (0)

10 nim. 2 st. 10 st. 10 st.

1, 01

SE

Statement showing the amount, kind, and direction of clouds, and amount  $\alpha_{\text{nd}}$ 

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In the contraction of the c

|   | 1 a. m.  |                               | 2 a. m.  | 1                          | 3 a. m.  | 4 a. m.   | •                          | 5 a. m.   |                            | 6 a. m.   |
|---|--|-------------------------------|--|----------------------------|--|---|----------------------------|---|----------------------------|---|
| Date.   | Amount, kind, and direction of clouds.   | Precipitation.                | Amount, kind, and direction of clouds.                                 | Precipitation.             | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.                      | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.  |
| 1882.<br>Nov. 1                                     | 5 st. 0  |                               | 3 cir. eum. 3 st. 0  | 00                         | 0 st. 0   00   | 10 nim. 0 .   | 01                         | 10 st. 0  | . —                        | 10 nim. 0   |
| Nov. 2<br>Nov. 3<br>Nov. 4<br>Nov. 5<br>Nov. 6      | 1 st. 0<br>0 0<br>10 st. 0<br>2 st. 0<br>10 st. 0  | 00 1                          | 0 0<br>9 st. 0<br>Light haze. 2 st. 0                                  | 00<br>00<br>00<br>00       | 1 st. 0 00<br>Dense haze, 1 st. 0 00<br>10 st. 0 00<br>Dense haze, 4 st. 0 00<br>10 st. Dense haze, 0 00 | 1 st. 0 (<br>Dense haze, 9 st. 0 (<br>Dense haze, 5 st. 0 ( | 00<br>00<br>00<br>00       | Light haze. 4 st. 0<br>Light haze. 3 st. 0<br>10 st. 0<br>Dense haze. 6 nim. 0<br>Dense haze. 4 st. 6 | 00 00 00                   | Light haze. 5 st. 0<br>2 st. 0<br>10 st. 0<br>Light haze. 4 nim. 0<br>D. haze. D. haze. 0 |
| Nov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11    | 10 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0<br>10 st. 0   | 00 I<br>00 I                  | 0 st. 0<br>0 st. 0<br>1, haz, 4 s. NE.* D.haz.<br>0 nim. 0<br>0 nim. 0 | 01                         | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 10 st. 0  | 00  <br>00  <br>00  <br>00 | 10 st, 0<br>Dense haze. 8 st. 0<br>0 0<br>10 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00       | 10 st, 0<br>10 st, 0<br>2 st, 0<br>10 nim, 0<br>10 st, 0                                  |
| Nov. 12<br>Nov. 13<br>Nov. 14<br>Nov. 15<br>Nov. 16 | 10 st. 0 0 1 st. 0 0 1 st. 0 0 1 st. 0 0   | 00 4                          | 1 st. 0<br>1 st. 0   | 00<br>00<br>00<br>00<br>00 | 8 st. 0 00<br>1 st. 0 00<br>1 st. 0 00<br>0 0 00<br>1 st. 0 00   | 1 mt. 0 (   | 00<br>00<br>00<br>00<br>00 | 2 st. 0<br>1 st. 0<br>1 st. 0<br>2 st. 0  | 00<br>00<br>00<br>00<br>00 | 3 st. 0<br>1 st. 0<br>1 st. 0<br>0 0<br>3 st. 0   |
| Šov. 17<br>Šov. 18<br>Šov. 19<br>Šov. 20<br>Šov. 21 | 2 st. 0<br>10 st. 0<br>10 st. Dense haze. 0<br>Dense haze. 1 st. 0<br>9 st. ENE.*  | 00 1<br>00 1                  |  | 40                         | 2 st. 0 00<br>10 st, 0 00<br>10 st. Dense haze. 0 00<br>1 cir. st. 1 st. 0 00<br>9 st. ENE.* 00          | 10 st. 0 0 0  | 00<br>00<br>00<br>00<br>00 | 3 st, 0<br>10 st. 0<br>Light haze. 8 st. 0<br>1 st, 0<br>3 st, 0                                      | 00<br>00<br>00<br>00       | 2 st. n<br>10 st. 0<br>10 st. 0<br>Light haze. 2 st. u<br>2 st. 0                         |
| Vov. 22<br>Vov. 23<br>Vov. 24<br>Vov. 25<br>Vov. 26 | 10 st. W.† 10 st. WNW.* 9 st. WNW.* 1 cir. st. WNW.*   | 00 1<br>00<br>00              | 0 nim.<br>0 st.<br>0 st.<br>1 cir. st.<br>1 cir. st.<br>2 st. W.*      | 00                         | 10 nim. W.†, 02<br>10 st. 0 00<br>10 st. W.† 00<br>1 st. 0 00<br>1 cir. st. 0 00                         | 10 st. W. f (   | 01<br>00<br>00<br>00       | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 00 00 00                   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                      |
| Vov. 27<br>Vov. 28<br>Vov. 29<br>Vov. 30            | 9 st. 0 0 1 st. 0 0 1 st. 0 0 0 1  | 00                            | 1 cir. st. 2 st. 0<br>1 st. 0  | 00<br>00<br>00<br>00       | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 2 cir. 2 cir. st. 2 st. 0                                   | 00<br>00<br>00<br>00       | 2 cir. 3 st. 0<br>1 cir. st. 2 st. 0<br>0 0<br>2 st. 0  | 00<br>00<br>00<br>00       | 3 st. 0 0 0 1 st. 0   |
| Means.  | 5. 46  | 1                             | 5, 50  |                            | 5. 28  | 4. 93   |                            | 5. 10   |                            | 4. 93   |
| Date.   | 1 p. m.  |                               | 2 p. m.  | _                          | 3 p. m.  | 4 p. m.   |                            | 5 p. m.   |                            | 6 p. m.   |
| 1882.<br>Tov. 1                                     | 2 st. 0  | 00                            | 2 st. 0  | 00                         | 2 st. 0 00   | 2 st. 0   | 00                         | 1 st. 0   | : 00                       | 2 st.   |
| Tov. 2<br>Tov. 3<br>Tov. 4<br>Tov. 5                | 8 st. NW.* 10 st. 0 6 cir. 2 st. 0 Light haze, 6 st. 0 2 cir. cum. 5 st. 0   | 00<br>00                      | 8 st. NW.* 6 st. NW.† 2 cir. 7 st. 0 3 cir. cum. 5 st. 0 0 st.         | 60<br>00<br>00<br>00<br>00 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 5 st. NW.†<br>1 cir. 4 st. 0                                | 00<br>00<br>00<br>00<br>00 | 9 st. NV.* 4 st. NV.* 3 cir. 4 st. 0 10 st. 0 E.*   | 00                         | 10 st, NW.<br>6 st, 0<br>Lt. haze, D. haze, 10 st, 0<br>10 st, E.                         |
| iov. 7<br>Nov. 8<br>Nov. 9<br>Nov. 10<br>Nov. 11    | 2 cir. 3 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0  | $\frac{00}{00}$ $\frac{1}{1}$ | 9 st. E.†<br>0 nim. 0 .<br>0 st. 0                                     | 00<br>00<br>01<br>00<br>00 | 1 cir. 3 st. 0 · 00<br>1 cir. 8 st. E.† 00<br>10 nim. 0 · 01<br>10 st. 0 · 00<br>10 st. 0 · 00           | 7 st. E.† 10 nim. 0   | 00 1                       | 4 cir. 3 st. 0<br>10 st. 0<br>8 nim. 0<br>10 st. 0<br>10 st. 0  | 00<br>00<br>00<br>00       | 3 cir. 3 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0                                       |
| Vov. 12<br>Vov. 13<br>Vov. 14<br>Vov. 15<br>Vov. 16 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 00<br>00                      | 1 st. 0<br>1 st. 0<br>2 st. 0  | 00<br>00<br>00<br>00<br>00 | 4 st. NE.* 00<br>1 st. 0 00<br>1 st. 0 00<br>2 st. 0 00<br>1 cir. 1 st. 0 00                             | 1 cir. 1 st 0<br>1 st. ESE.†<br>1 cir. cum. 2 st. 0         | 00<br>00<br>00<br>00<br>00 | 1 cir. 4 st. 1 cir. 1 st. 0 l st. 0 l cir. 1 st. 0 l cir. 1 st. 0 l cir. 1 st. 0                      | 00<br>00<br>00<br>00       | 3 st. 0<br>0 0<br>1 st. 6<br>1 st. 1 cir. 3 st.   |
| lov. 17<br>lov. 18<br>lov. 19<br>lov. 20<br>lov. 21 | 5 st. 0<br>Light haze, 5 st. 0<br>9 st. 0<br>10 st. 0<br>Dense haze, 5 st. 0   | 00 ·<br>00 ·<br>00 · 1        | 6 st. 0<br>1 cir. cum. 5 st. 0<br>0 st. 0                              | 00<br>00<br>00<br>00<br>00 | 3 cir. cum. 3 st. 0 00<br>1 cir. 5 st. 0 00<br>1 cir. 4 st. 0 00<br>9 st. E.† 00<br>NE.† 00              | 1 cir. 4 st. 0  | 00<br>00<br>00<br>00<br>00 | 1 cir. 4 st. 0 3 cir. st. 4 st. 0 1 cir. 2 st. 0 9 st. E.; 2 cir. 2 cir. st. 5 st. 0                  | 00<br>00<br>00<br>00<br>00 | 1 cir. 3 st. 9 st. 1 cir. 2 st. 6 st. E 9 st.   |
| čov, 22<br>čov, 23<br>čov, 24<br>čov, 25<br>čov, 26 | $\begin{array}{c} 6 \text{ st.} \\ \text{L. haz. 4 cum. 4 st. } \begin{matrix} 0 \\ \text{W. } \dagger \\ 5 \text{ st.} \end{matrix} \\ \begin{matrix} 0 \\ 5 \text{ cir. 1 st.} \end{matrix}$ | 00<br>00<br>00                |  | 00                         | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 2 st. W.† 1 st. 0 1 st. 0                                   | 00<br>00<br>00<br>00<br>01 | 9 st. W.* Light haze. 8 st. W.* 1 st. 0 1 st. 0 7 st. 0   | 00<br>00<br>00<br>00       | 9 st. W<br>8 st. 1<br>1 st. 1<br>1 cir. 4 st.   |
|   | 4 cir. 2 st. 0   |                               | 5 cir. L. haze. 3 st. 0  | 00                         | 2 cir. 3 st. 0 00<br>1 st. 0 00  |   | 00                         | 1 cir. 4 st. 0<br>1 st. 0   | 00                         | 2 cir. 4 st.  |
| ov. 27<br>ov. 28<br>ov. 29<br>ov. 30                | 0 0  | 00                            | 1 at. 0  | 00                         | 0 0 00<br>1 cir. 1 st. 0 00  | 0   | 00                         | 0 0<br>1 st. 0  | 00<br>00                   | 1 st.<br>1 st.  |

character table signif

Light haze. 6 3 st. 10 st. Light haze. 5 D. haze. D. ha

Dense haze. 5 78t. 198t. 18t. 18t. D.haze. D.haz lenim. test. lest. 28t. cm. 28t.

1 cir. 2 st. 2 cir. 2 st. 5. 13 7 p. i

. (at. 5 st. b. st. 1 b.m. 1 st. 1 st.

1 1. lst. 2st our dist.

## character of precipitation, at Ugluamie, from October, 1881, to August, 1883-Continued.

, and amount and

Amount, kind, and irection of clouds.

ight haze. 5 st. 2 st. 3 st. dight haze. 4 nim. 5 haze. D. haze.

0 nim. 0 st. 0 st. 1 st. 5 cir. cum. 2 st.

3 st. 3 st. 0 1 st. 4.93

2 st.

10 st. NW 6 st. Lt. haze. D. haze. 10 st.

3 cir. 3 st. 0 st. 0 nim. 0 st. 10 st. 1 st. 1 cir. 3 st.

1 cir. 3 st. 9 st. 1 cir. 2 st. 9 st. 9 st.

9 st. 8 st. 1 st. 1 st. 1 cir. 4 st.

2 cir. 4 st. 1 st. 1 st. 1 st. 5,33

nim.

rable signifies rapid, t signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  |  |                   | 8 a. m.   |                      | 9 a. m.  |                            | 10 a. m.   |                          | 11 a. m.   |                            | 12 m.   |                        |                              | eipi.                            |
|--|--|-------------------|---|----------------------|--|----------------------------|--|--------------------------|--|----------------------------|---|------------------------|------------------------------|----------------------------------|
| Amount, kind, a  | Precipitation.                               | -   (             | Amount, kind, and lirection of clouds.  | Precipitation.       | Amount, kind, and direction of clouds,   | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation.           | Amount, kind, and direction of clouds.                                       | Precipitatior.             | Amount, kind, and direction of cloud  | 1                      | Precipitation.               | Amount of precipi-<br>tation.    |
| eim.   | 0 -  | - 1               | 0 st. 0   | -                    | 10 st. 0   | 00                         | 8 st, 0  | 00                       | 6 st. 0  | 00                         | 4 st.   | 0                      | 00                           | . 0                              |
| ght haze. 6 st.<br>st.<br>st.<br>ght haze. 5 st.<br>haze. D. haze. | 0 : 00<br>0 : 00<br>0 : 00<br>0 : 00         | )<br>} !          | 0. haze, D. haze,<br>1 st. 0<br>.ight haze, 6 st. 0<br>.ight haze, 6 st. 0<br>0. haze, D. haze, 0 | 00                   | Lt. haze. D. haze. 0<br>Lt. haze. 4 st. NW.t<br>3 st. 0. Lt. haze.<br>Light haze. 6 st. 0<br>10 nim. 0 | 00<br>00<br>00<br>00       | $\begin{array}{ccccccc} D, haze, & D, haze, & 0\\ Light haze, & 2 st, & 0\\ 2 st, & & 0\\ Light haze, & 6 st, & 0\\ Light haze, & 8 st, & 0 \end{array}$ | 00<br>00<br>00<br>00     | 10 nim. WNW.* Light haze. 0 Light haze. 1 st. 0 Light haze. 7 st. 0 10 st. 0 | 00<br>00<br>00<br>00<br>00 | 3 c.L.hz.5 st. NNV<br>Light haze.<br>4 cir. 2 st.<br>Light haze. 7 st.<br>3 cir. cum. 4 st. | 0                      | 00<br>00<br>00<br>00         |                                  |
| t.<br>t.<br>t.<br>t.   | 0 00<br>0 00<br>0 00<br>0                    | ) I               | 0 st. 0 bense haze. 8 st. 0 light haze. 3 st. 0 light haze. 5 st. 0 0 st. 0                       | 00                   | 10 st.   | 00<br>00<br>00<br>00       | Light haze. 6 st. 0<br>L. haze. 2 st. L. haze. 6<br>10 st. 0<br>10 st. 0<br>10 st. 9   | 00<br>00<br>00<br>00     | 5 st. 0<br>Lt. haze. Lt. haze. 0<br>10 st. 0<br>10 nim. 0                    | 00<br>00<br>00<br>00       | Dense haze. 4 st.<br>Dense haze. 8 st.<br>10 nim.<br>10 st.<br>10 st.                       | 0<br>0<br>0            | 00<br>00<br>01<br>00<br>01   |                                  |
| at.<br>st.<br>st.  | 0 00<br>0 00<br>0 00<br>0 00                 | )<br>)            | 2 st. 0<br>2 st. 0<br>2 st. 0<br>1 st. 0  | 00                   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 00<br>00<br>00<br>00       | 2 st. 0<br>1 st. 0<br>Light haze. 0<br>0 0   | 00<br>00<br>00<br>00     | Dense haze.  | 00<br>00<br>00<br>00       | 1 st.<br>1 st. Light haze.<br>Light haze.<br>1 st.<br>1 st.                                 | 0 0                    | 00<br>00<br>00<br>00<br>00   |                                  |
| t.<br>d.<br>d.<br>d.<br>d.<br>d.<br>d.<br>d.                       | 0 00<br>0 00<br>0 00<br>0 00                 | ) I               | 0 st. 0<br>4 st. 0<br>Dense haze. 6 st. 0<br>3 st. 0<br>Dense haze. 8 st. 0                       | 00<br>00<br>00       | 8 st. 0 Light haze, 5 st. 0 Dense haze, 5 st. 0 2 st. 0 Dense haze, 9 st. 0                            | 00<br>00<br>00<br>00<br>00 | 3 st. 0<br>L,haze, 1 st. D.haze, 0<br>10 st. 0<br>2 st. 0<br>Dense haze, 9 st. 0   | 00                       | 9 st. ESE.*  | 00<br>00<br>00<br>00       | 2 st.<br>L.haze, 3 st. L.haze<br>10 st.<br>10 st.<br>Dense haze, 4 st.                      | 0                      | 00<br>00<br>00<br>00         |                                  |
| nim-<br>st.<br>st.<br>st.<br>or. 2 st.                             | 0 1 00<br>W,† 00<br>0 00<br>0 1 00<br>0   00 | ) 1               | 3 cir. cum. 5 st. 0<br>0 st. WNW.<br>0 st. 0<br>1 st. 0<br>5 cir. st. 3 st. 0                     | 00<br>00<br>00       | 10 st. 0<br>8 cum. WNW.t<br>10 st. 0<br>1 st. 0<br>5 cir.3 cir.cum.2 st. 0                             | 00<br>00<br>00<br>00<br>00 | Dense haze. 7 st. 0<br>8 cum. WNW.<br>10 st. 0<br>1 st. 0<br>5 cir. cum. 5 st. 0   | 00<br>00<br>00<br>00     | 10 st. 0<br>9 cum. WNW.†<br>10 st. 0<br>6 cir.2cir.cum.2st.0                 | 00<br>00<br>00<br>00<br>00 | 10 st.<br>Light haze. 8 cum<br>1 st.<br>0<br>5 cir.   | 8.0                    | 00<br>00<br>00<br>00         |                                  |
| cir. 2 st.<br>cir. 2 st.<br>ct.                                    | 0 00<br>0 00<br>0 00                         | )                 | 2 cir, 1 st. 0<br>2 st. 0<br>1 st. 0<br>3 st. 0   | 00                   | 3 cir.4 cir.cum.1 st. 0<br>1 cir. 1 st. 0<br>0 0<br>1 cir. 0   | 00<br>00<br>00             | 4 cir. L. haze. 1st. 0<br>1 cir. 0<br>0 0<br>Light haze. 0   | 00                       | 3 ci.L.hz.1 st.L.hz. 0<br>1 cir. 0<br>0 Light haze. 0                        | 00<br>00<br>00             | 3ci. L.hz. 1st. L.h<br>0<br>0<br>Light haze.  | 0                      | 00<br>00<br>00<br>00         |                                  |
| 5. 13  |  |                   | 4.76  |                      | 5, 20  |                            | 4. 13  |                          | 5. 03  |                            | 4.50  |                        | . 1                          |                                  |
| 7 p. m.  |  |                   | 8 p. m.   |                      | 9 p. m.  |                            | 10 p. m.   |                          | 11 p. m.   |                            | 12 p. m.  |                        |                              | Dail                             |
| est.  St. X  St. St. St. St. St. St. St. St. St. St.               | 0 00<br>0 00<br>0 00<br>0 00<br>E.† 0        | 0 1<br>0 1        | Oense haze. 3 st. 0  0 st. NW. 0 st. 0  5 cir. 4 st. 0  0 st. E                                   | * 00<br>0 00<br>0 00 | Dense haze. 3 st. 0  10 st. NW.1 10 st. 0 10 st. E.4 10 st. 0 10 st. E.5                               | 00                         | 1 cir. 3 st. 0 8 st. NW. 10 st. 0 7 st. 0 9 st. E. 10 st. 0  | † 00<br>00<br>00<br>* 00 | 2 st. 0 4 st. 0 4 st. 0 4 st. 0 4 st. 0 10 st. 0 10 st. 0                    | 00<br>00<br>00<br>00<br>00 | 1 st.<br>1 st.<br>10 st.<br>2 st.<br>10 st.<br>10 st.                                       | 0 0 0 0 0 0 0          | 00<br>00<br>00<br>00<br>00   | 5.<br>5.<br>4.<br>6.<br>6.<br>7. |
| cir. 5 st.   | 0   0   0   0   0   0   0   0   0   0        | 0 1<br>3 1<br>0 1 | 3 cir. 5 st. 6<br>0 st. 6<br>0 nim. 6<br>0 st. 6<br>0 st. 6                                       | 00 00 00             | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0  | 00<br>00<br>03<br>00<br>00 | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>7 st. E.<br>10 st. 0  | 00<br>1.02<br>1.00       | 10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0                    | 00<br>00<br>02<br>00<br>00 | 10 st.<br>5 st.<br>10 nim.<br>9 st.<br>10 st.   | 0<br>0<br>0<br>E.f     | 00<br>00<br>02<br>00<br>00   | 8<br>7<br>9                      |
| st.<br>et.<br>er 3 st.   | 0   0  | 0 0               | 1 cir. 2 st. 0<br>0 1 st. 0<br>2 st. 0<br>9 st. 6   | 00 00 00 00 00       | 4 st. NE.* 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0   | 00<br>00<br>00<br>00<br>00 | 2 st. 0<br>1 st. 0<br>1 st. 0<br>2 st. 0<br>4 st. 0  | 00                       | 2 st. 0<br>1 st. 0<br>0 0<br>2 st. 0<br>3 st. 0                              | 00<br>00<br>00<br>00       | 1 at.<br>1 at.<br>1 at.<br>1 at.<br>2 at.<br>9 at.  | 0 0                    | 00<br>00<br>00<br>00<br>00   | 3<br>1<br>1<br>2                 |
| eir. 4 st.   | 0 0<br>0 0<br>0 0<br>E.† 0<br>0 0            | 0 1<br>0<br>0     | 1 cir. 4 st. 0 st. 0 st. 0 st. 0 st. E 9 st.  | 00<br>0 00<br>1 00   | 5 st. 0<br>9 st. 0<br>4 cir. cum. 5 st. 0<br>8 st. E.:<br>6 st. 0                                      | 00<br>00<br>00<br>00<br>00 | 3 st. 0<br>4 st. 0<br>9 st. E.<br>8 st. E.   | 00<br>† 00<br>† 00       | 8 at. NE.: 4 st. 0 9 st. E.: 3 st. 0 10 st. 0                                | 0.0                        |   | E.3<br>E.3<br>E.3<br>0 | (11)                         | 4<br>6<br>7<br>5                 |
| st.<br>1st.<br>1st.<br>1st. 1st.                                   | W,† 0<br>0   0<br>0   0<br>0   0<br>0   0    | 0 0               | 0 st. W<br>7 st. 0<br>1 st. 0<br>1 st. 0<br>3 st. 0   | 00<br>0 00<br>0 00   | 10 st. 0<br>2 cir. 2 st. 0<br>1 cir. 1 st. 0<br>1 st. 0  | 00<br>00<br>00<br>00       | 10 st. 0<br>1 cir. 2 st. 0<br>10 st. 0<br>1 st. 0<br>3 st. 0   | 00                       | 10 st. 0<br>5 st. 0<br>10 st. NW.1<br>1 st. 0<br>5 st. 0                     | 00<br>00<br>00<br>00       | 10 st.<br>10 st.<br>1 st.<br>1 cir. 5 st.   | 0                      | 00 00                        | 9<br>7<br>6                      |
| cir. 4 st.<br>st.<br>l st.<br>l st.                                | 0   0<br>0   0<br>0   0<br>0   0             | 0                 |   | 00 00                | 1 cir. st. 3 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0  | 00<br>00<br>00             | 3 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0   | 00                       | 2 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0                                     | 00<br>00<br>00             | 1 cir. st. 2 st.<br>1 st.<br>1 st.<br>1 st.   | 0 .                    | ()()<br>()()<br>()()<br>()() | 5,<br>1,                         |
|  |  |                   |   |                      |  | ***                        | 5, 73  | -                        |  |                            |   |                        |                              | - 5                              |

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce mean local time, -5 hours 17 minutes. Precipitation is given in inches. In the

|   | 1 a. m.  |                                  |                            | 2 a. m.   |                            | 3 a. m.  |                | d a. m.  |                            | 5 a. m.   |                            | 6 а. ш   |
|---|--|----------------------------------|----------------------------|---|----------------------------|--|----------------|--|----------------------------|---|----------------------------|--|
| Date.   | Amount, kind, an   | d<br>la.                         | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation. | Amount, kind, and direction of clouds.   | Precipitation.             | Amount, kind, and<br>direction of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.   |
| 1882.<br>Dec. 1                                     | 0  | 0 (                              | 00                         | 0 0   | 00                         | Light haze. 0  | 00             | Light haze. 0  | 00                         | Lt. haze. Lt. haze. 0   | 00                         | Lt. haze. Lt. haze. 0  |
| Dec. 2<br>Dec. 3<br>Dec. 4<br>Dec. 5<br>Dec. 6      | 1 st.<br>Dense fog.<br>1 st.<br>1 st.<br>1 st.                         | 0 0                              | 00  <br>00  <br>00  <br>00 | 1 st. 0 Dense fog. 0 1 st. 0 1 st. 0 3 st. 0  | 00<br>00<br>00<br>00<br>00 | 1 st. 0 Dense fog. 0 1 st. 0 1 st. 0 3 st. 0   | 00             | 1 at. 0 Dense fog. 0 1 st. 0 1 st. 0 2 st. 0   | 00<br>00<br>00<br>00       | 2 st. 0<br>1.t. haze. Lt. fog. 0<br>1 st. 0<br>1 st. 0<br>3 st. 0                               | 00<br>00<br>00<br>00<br>00 | 3 st.<br>Lt. haze. Lt. fog. 0<br>1 st. 0<br>2 st. 0<br>2 st. 0   |
| Dec. 7<br>Dec. 8<br>Dec. 9<br>Dec. 10<br>Dec. 11    | 10 st.<br>1 st.<br>1 st.<br>1 st.<br>1 st.<br>10 st.                   | 0 (                              | 10<br>10<br>10<br>10       | 10 at. 0<br>1 at. 0<br>1 at. 0<br>1 at. 0<br>1 at. 0                                  | 00<br>00<br>00<br>00       | 5 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0                                      | 00             | 9 st. 0<br>1 st. 0<br>1 st. 0<br>0 0<br>9 st. 0  | 00<br>00<br>00<br>00       | Light hase, 5 st. 0<br>1 st. 0<br>1 st. 0<br>0 0<br>10 st. 0                                    | 00<br>00<br>00<br>00<br>00 | Light haze. 9 st. 0<br>0 0<br>2 st. 0<br>0 0<br>10 at. 0   |
| Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15<br>Dec. 16 | 0<br>9 st.<br>Light huze. 4 st.<br>1 st.<br>1 st.                      | 0 0                              | 10<br>10<br>10<br>10<br>10 | 0 0 0 10 st. 0 5 st. 0 0 0 1 st.  | 00<br>00<br>00<br>00       | 0 0 0 0 10 st. 0 4 st. 0 1 st. 0 1 st. 0 0   | 00             | 0 0 0 9 st. 0 1 st. 0 1 st. 0 1 st. 0  | 00<br>00<br>00<br>00       | 0 Light haze. 9 st. 0 3 st. 0 Dense haze. 9 st. 0 0   | 00<br>00<br>00<br>00       | $\begin{array}{c} 0\\ \text{Light haze. 3 st.} & 0\\ 0\\ \text{Dense haze. 8 st.} & 0\\ 0\\ \end{array}$ |
| Dec. 17<br>Dec. 18<br>Dec. 15<br>Dec. 20<br>Dec. 21 | 1 cir. 1 st.<br>2 cir. st. 1 st.<br>2 cir. st. 1 st.<br>1 st.<br>4 st. |                                  | 0                          | 1 st. 0<br>1 cir. st. 1 st. 0<br>3 cir. st. 1 st. 0<br>1 st. 0<br>Light haze, 3 st. 0 | 00<br>00<br>00<br>00<br>00 | 1 st. 0<br>1 cir. st. 1 st. 0<br>5 cir. st. 2 st. 0<br>3 st. WNW.<br>Dense haze. 5st. W. | 00             | 1 st. 0<br>1 cir. st. 1 st. 0<br>4 cir. st. 3 st. 0<br>Light haze. 2 st. 0<br>Dense haze. 8 nim. 0 | 00<br>00<br>00<br>00       | 0 1 st. 0 1 cir. 2 st. 0 Light haze. 1 st. 0 3 st.  | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25<br>Dec. 26 | 0<br>1 st.<br>0<br>3 cir. st. 4 st.<br>10 nim.                         | 0 0<br>0 0<br>0 0<br>0 0         | 0                          | 0 0<br>1 st. 0<br>0 0<br>8 nim. 0<br>10 nim. 0  | 00 00 00                   | 0<br>2 st. 0   | 00<br>00<br>00 | 9 pim. N.  | 00                         | I.t. haze. Lt. fog. 0<br>1 st. 0<br>0 0<br>Denze haze. 8 nim. 0<br>10 nim. 0                    | 00<br>00<br>00             | Light haze. 1 st. 0<br>1 st. 0<br>0<br>Dense haze. 9 st. 0<br>10 nim. 0                                  |
| Dec. 27<br>Dec. 28<br>Dec. 29<br>Dec. 30<br>Dec. 31 | 0<br>Lt. haz. Dense haz.<br>10 st.<br>0<br>3 st.                       | 0 0<br>0 0<br>0 0<br>0 0         | 0 :<br>0 :<br>0            | 1 cir. st. 1 st. 0<br>0 0<br>5 st. 0<br>0 3 st. 0                                     | 00<br>00<br>00<br>00<br>00 | 1 cir. cum. 1 st. 0<br>0 0<br>1 cum. st. 7 st. 0<br>0 0<br>2 st. 0                       | 00             | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 00<br>00<br>00<br>00<br>00 | 0 0 0<br>Dense haze. 8 st. 0<br>0 Light haze. 1 st. 0   | 00<br>00<br>00<br>00<br>00 | 0 0<br>0 0<br>10 st. 0<br>0<br>Light haze, 2 st. 0   |
| Means .   | 2.77   |                                  |                            | 2.74  |                            | 2. 93  |                | 2, 83  |                            | 2.61  | _                          | 2. 70  |
| Date.   | 1 p. m.  |                                  |                            | 2 p. m.   |                            | 3 p. m.  |                | 4 p. m.  |                            | 5 p. m.   |                            | 6 p. m.  |
| 1882.<br>bec. 1                                     | Light haze. 1 st.  | 0 0                              | 0                          | 1 cir. 1 st. 0  | 00                         | 1 cir. 1 st. 0   | . 00           | 1 cir. st. 1 st. 0   | 00                         | 1 cir. 1 cir. at. 2 at. 0   | 00                         | 2 cir. st. 3 st. 0   |
| Dec. 2<br>Dec. 3 :<br>Dec. 4 :<br>Dec. 5            | 1 st.<br>1 st.<br>2 st.<br>Light haze.<br>10 st.                       | 0 0<br>0 0<br>0 0<br>0 0         | 0<br>0<br>0                | 1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0                                   | 00<br>00<br>00<br>00       | 4 st. 0<br>0 0<br>1 st. 0<br>1 st. 0<br>1 st. 0  | 00             | 5 st. 0<br>0 0<br>1 st. 0<br>1 st. 0<br>9 st. 0  | 00<br>00<br>00<br>00       | 6 st. 0<br>0 0<br>1 st. 0<br>1 st. 0<br>9 st. 0   | 00<br>00<br>00<br>00<br>00 | 5 st. 0 0 0 1 st. 0 1 st. 0 1 st. 0  |
| 90c, 7<br>9cc, 8<br>9cc, 9<br>9cc, 10<br>9cc, 11    | Light haze.<br>1 st.<br>Light haze. 4 st.<br>0<br>2 st.                | 0 0<br>0 0<br>0 0<br>0 0<br>0 0  | 0 ,                        | Light haze, 0<br>1 st. 0<br>Light haze, 5 st. 0<br>1 st. 0<br>1 st. 0                 | 00<br>00<br>00<br>00       | 1 st. 0<br>2 st. 0<br>1 cir. 1 st. 0<br>1 st. 0  | 00<br>00       | 1 st. 0<br>1 cir. st. 1 st. 0<br>1 st. 0<br>2 cir. cum. 3 st. 0<br>1 st. 0                         | 00<br>00<br>00<br>00       | 1 st. 0<br>2 st. 0<br>1 st. 0<br>3 cir. 4 st. 0   | 00<br>00<br>00<br>00<br>00 | 1 st. 0<br>2 st. W.f.<br>1 st. 0<br>3 cir. 5 st. 0<br>1 st. 0  |
| Dec. 12<br>Dec. 13<br>Dec. 14<br>Dec. 15<br>Dec. 16 | Light haze. 1 st.<br>Light haze. 9 st.<br>0<br>1 st.<br>1 st.          | 0 0<br>0 0<br>0 0<br>0 0         | 0                          | 2 st. 0<br>1 cir. 8 st. 0<br>0 0 0<br>2 st. 0<br>2 st. 0                              | 00<br>00<br>00<br>00       | 1 st, 0<br>1 cir. st. 8 st, 0<br>0 0<br>2 st. 0<br>2 st. 0                               | 00<br>00       | 1 st. 0<br>1 cir. st. 9 st. 0<br>1 st. 0<br>1 st. 3<br>1 st. 3                                     | 00<br>00<br>00<br>00<br>00 | 2 st. 0<br>1 cir. st. 8 st. 0<br>1 st. 0<br>1 st. 0<br>2 st. 0                                  | 00<br>00<br>00<br>00       | 3 st. 0<br>8 st. 0<br>1 st. 0<br>1 st. 0<br>2 st. 0  |
| Dec. 17<br>Dec. 18<br>Dec. 19<br>Dec. 20<br>Dec. 21 | 1 st.<br>1 st.<br>1 cir. st. 1 st.<br>4 st.<br>2 st.                   | 0 : 0<br>0 : 0<br>0 : 0<br>0 : 0 | 0                          | 1 cir. 1 st. 0<br>1 st. 0<br>1 cir. st. 1 st. 0<br>5 st. 0<br>1 st. 0                 | 00<br>00<br>00<br>00<br>00 | 1 cir. 1 st. 0<br>1 st. 0<br>1 cir. st. 1 st. 0<br>5 st. SW.<br>Light haze. 2 st. 0      | 00             | 1 cir. st. 1 st. 0   | 00<br>00<br>00<br>00       | 1 at. 0<br>1 cir. st. 1 st. 0<br>1 cir. st. 1 st. 0<br>1 cir. 4 st. W.†<br>Dense haze. 0 nin. 0 | 00<br>00<br>00<br>00       | 8 st. 0<br>1 st. 0<br>4 cir. st. 1 st. 0<br>2 cir. 4 st. W.†<br>Dense haze. 6 nim.0                      |
| Dec. 22<br>Dec. 23<br>Dec. 24<br>Dec. 25<br>Dec. 26 | Lt. haz. Dens. haz.<br>1 cir. Lt. haz. 1 st.<br>0<br>10 st.<br>10 nim. | 0 0<br>0 0<br>0 0<br>0 0         | 0 :                        | Lt. haz. 2 st. D. haz. 0<br>Light haze. 1 st. 0<br>0 0<br>10 nim. 0<br>10 nim. 0      | 00<br>00<br>00             | Lt. haz. Dens. haz. 0<br>Light haze. 1 st. 0<br>0 0 0<br>10 nim. 0<br>1 cir. 5 st. 0     | 00             | 1 4 st. Dense haze. 0<br>1 cir. Lt. haz. 1 st. 0<br>0 0 0<br>1 10 nim. 0<br>1 cir. 4 st. 0         | 00<br>00<br>00<br>. —      | Dense haze. 0 Light haze. 1 st. 0 1 st. 0 10 st. 0 1 cir. 4 st. 0                               | 00 00                      | 1 st. 0<br>Light haze, 1 st. 0<br>0 0 0<br>10 st. 0<br>Dense fog. 3 st. 0                                |
|   | 0  | 0 0                              |                            | 8 st. SW.i  | 00                         | 10 st. 0<br>1 cir. st. 5 st. 0   |                | 10 st, 0<br>2 cir. st. 6 st. 0   | 00<br>00                   | 3 cir. st. 6 st. 0  | 00                         | 4 st. 0<br>10 st. 0  |
| lec, 27<br>lec, 28<br>lec, 29<br>lec, 30 c          | 1 cir.<br>0<br>0<br>2 cir. st. 2 st.                                   | 0 0 0                            | 0 .                        | 1 cir. 1 st. 0<br>1 cir. 0<br>1 cir. st. 3 st. 0                                      | 00                         | 0 0 0 1 cir. 1 cir. st. 1 st. 0  | 00             | 1 cir. st. 1 st. 0   | 00<br>00<br>00             | 0 0<br>3 cir. 1 st. 0<br>1 cir. st. 1 st. 0   | 00<br>00<br>00             | 1 st. 0<br>1 cir. 2 st. 0<br>1 st. 0   |

characte

Amount.

2 at. Light haze. 2 at 1 at 1 at

0 Light haze. 1 st. Dense haze. 1 st. 1 st. Light haze. 2 cir. st. Li

> ) ) st ) nun. ense haze. ight haze.

st. nse fog. st. st.

l st. l cir. 2 st. l st. Light haze. 3 l st. 4 st. 2 cir. st. 5 st. l st. l st. 2 st.

4 cir. st. 4 st. 1 st. 4 cir. st. 2 st. 8 st. 2 st 1 st. Light baze. 1 s 1 st. 10 st. 10 st. 3 st 10 st. 3 st

1 cir. 1 at.

# character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

the signifies rapid, | signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  |  | 8 a. m.  |  | 9 a. m.   |   | 10 a. m.   |                          |                                  | 11 a. m.   |                            | 12 m.  |                              | cipi:                    |
|--|--|--|--|---|---|--|--------------------------|----------------------------------|--|----------------------------|--|------------------------------|--------------------------|
| Amount, kind, an<br>neotion of cloud                           | Precipitation.                           | Amount, kind, and direction of clouds.                                     | Precipitation.                         | Amount, kind, and direction of clouds.                                  | Precipitation.                                | Amount, kind, and direction of clouds.                                 | Previnitation            | 1 realphration.                  | Amount, kind, and direction of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation.               | Amount of precipi-       |
| haze. Lt. haze.  |  | Light haze. 2 st. (  |  | Light haze. 2 st.   |   | Light haze. 2 st.  |                          |                                  | Light haze. 1 st. 0  | 00                         | Light haze. 1 st. 0  | 1                            | , 0                      |
| at<br>tht haze. 1 st.<br>at<br>at                              | 0 00<br>0 00<br>0 00<br>0 00             | 2 st.<br>1 st.<br>1 st.<br>1 st.<br>0 D, haze. D, haze.                    | 00 00<br>0 00                          | 0<br>1 st.<br>0   | 0 00<br>0 00<br>0 00<br>0 00                  | 0<br>0<br>2 st.  | 0 0<br>0 0<br>0 0<br>0 0 | )()<br>)()                       | Light haze, 0 0 1 st. 0 Light haze, 0 U st. 0  | 00<br>00<br>00<br>00<br>00 | Light haze. 0<br>2 st. 0<br>Light haze. 6<br>10 st. 0                            | 00                           | , 6<br>, 6<br>, 6<br>, 6 |
| t.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | 1 st. 6<br>1 st. 6<br>Dense haze. 9 st. 6                                  | 0 00                                   | Dense haze.<br>Light haze.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | Dense haze.<br>Light haze. 3 st.                                       | 0 0<br>0 0<br>0 0<br>0 0 | 10<br>10<br>10                   | Light haze. 8<br>1 st Light haze. 0<br>Light haze. 3 st. 2<br>0<br>L. haz. 4 st. D. haz. 0     | 00<br>00<br>00<br>00<br>00 | Light haze.<br>Light haze.<br>L. haz. 3 st. D. haz. 0<br>L. haz. 4 st. D. haz. 0 | - 00                         | . 6                      |
| ht haze. 2 st.<br>t.<br>ise haze. 6 st.                        | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | 1 st. Dense haze. 8 st. 2 st. 10 st. 0                                     | 0 00                                   | 0<br>10 at.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | 0<br>2 st.   | 0 0<br>0 0<br>0 t        | 10<br>10<br>10<br>0<br>0         | L. haz. 1 st. L. hn/ 0<br>Light haze. 0 st. 0<br>0 J<br>4 st. 0<br>0                           | 00<br>00<br>00<br>00<br>00 | Lt. haze. Lt. haze. t<br>10 st. c<br>0 1<br>1 st. c<br>1 st. c                   | 00<br>00                     | . (<br>. (<br>. (<br>. ( |
| et<br>ght haze,<br>ir st. Lt. haze,<br>eum.<br>ht haze. 3 cum. | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | 2 st.<br>0<br>Light haze. 1 st.<br>2 cir cum. 2 cum.<br>Light haze. 2 cum. | 0 00                                   | Light haze.<br>Lt. haze. Lt. haze.<br>4 cum.                            | 0 (10<br>0 00<br>0 00<br>0 00<br>0 00         |  | 0 0                      | 00<br>00<br>00<br>00             | Light haze. 3 st. 0<br>0 t.t haze. Lt. haze. 0<br>Deuse haze. 6 st. 0<br>Lt. haze. Lt. haze. 0 | 00<br>00<br>00<br>00<br>00 | 1 st. Light haze. Lt. haze. Lt. haze. C Denso haze. 5 st. Lt. haze. Lt. haze. C  | 00                           | . (                      |
| ht haze. 2 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | Lt. haze. 1 cum. st. (   | 0 00<br>0 00<br>0 00<br>0 00           | Lt. haze. 1 cum.<br>1 cir. 1 st.<br>0<br>10 st.                         | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | L. haz. 1 cu. L. haz.<br>1 cir. 1 st.<br>0<br>10 st.                   | 0 0                      | 00<br>00<br>00                   | Lt. haze. Lt. haze. 0<br>1 cir. 1 st. 0<br>0 0<br>10 st. 0<br>10 nim. 0                        | 00<br>00<br>00<br>00       | Lt. haze. Lt. haze. (1 cir. Lt. haz. 1 st. (0 10 st, 10 nim.                     | 00                           | . (                      |
| nse haze. 5 st.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | Light haze. 1 st.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00   | 1 cir.<br>Light haze. 1 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | Lt. haze. Lt. haze.  | 0 0                      | 00<br>20<br>20<br>20<br>20<br>20 | 0 0 0 0 1 cir. 0 0 1 cir. 0 0 1 cir. 0 0 2 cir. 0  | 00<br>00<br>00<br>00       | 0<br>1 cir.<br>0<br>0<br>2 cir.  | 00                           |                          |
| 2. 25  |  | 2.38   | 1                                      | 2. 19   |   | 2. 12  |                          |                                  | 2. 22  |                            | 2. 03  |                              |                          |
| 7 p. m.  |  | 8 p. m.  | ==                                     | 9 p. m.   |   | 10 p. m.   |                          |                                  | 11 p. m.   |                            | 12 p. m.   |                              | Daily                    |
|  |  |  |  |   |   | -  |                          |                                  |  |                            | * ***  |                              | mans                     |
| st.<br>nse fog.<br>et  | 0 00<br>0 00<br>0 00<br>0 00             | Dense fog.   | 0 00<br>0 00<br>0 00<br>0 00           | Dense fog.<br>1 st.<br>1 st.  | 0 00<br>0 00<br>0 00<br>0 00                  | 2 st.<br>1 st. Light fog.<br>1 st.<br>1 st.                            | 0 0                      | 00<br>00<br>00                   | 1 st. 0 3 st. 0 1 st. 0 1 st. 0  | 00<br>00<br>00             | 3 st.<br>4 st.<br>1 st.<br>1 st.   | 00 (00                       | 1.                       |
| t.<br>4.   | 0 00                                     | 10 st.   | 0 00                                   | 1 st.<br>2 cir. cum, 3 st.  | 0 00  | 1 st.<br>4 st.   | 0 (                      | (11)<br>()(1                     | 1 st. 0<br>6 st. 0   | 00                         | 1 st<br>10 st.   | 00                           | 6.                       |
| et.<br>eir. 2 st. V<br>et.<br>et. 3 st.<br>et.                 | 0 00<br>V, † 00<br>0 00<br>0 00          | 5 cir. 3 st. W<br>1 st.<br>2 st.   | 0 00<br>C 1 00<br>O 00<br>O 00<br>O 00 | 1 st.<br>4 st.<br>1 st.<br>2 st.<br>1 st.                               | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | 1 st.<br>1 st.<br>1 st.<br>2 st.<br>1 st.                              | 0 (                      | 00<br>60<br>00<br>00<br>00       | 1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0                                 | 00<br>00<br>00<br>00<br>00 | 1 st.<br>1 st.<br>10 st.   | 0 00<br>0 00<br>0 00<br>0 00 | 1.<br>1.<br>1.           |
| st<br>cir. st, 5 st,<br>st<br>st.<br>st.                       | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | 9 st.<br>1 cir. st. 1 st. NE<br>1 st.                                      | 0 00<br>0 00<br>0 00<br>0 00<br>0 00   | 4 st.   | 0 00<br>0 (1)<br>2, i 00<br>0 00<br>0 00      | 3 st 3 st. 1 st. 0 1 st.   | 0 0                      | 08<br>00<br>60<br>60             | 3 st. 0<br>3 st. 0<br>2 st. 0<br>0 0<br>1 st. 0  | 00<br>00<br>00<br>00<br>00 | Light haze. 4 st.<br>1 cir. st. 2 st.<br>0                                       | 0 00<br>0 00<br>0 00<br>0 00 | 7.<br>1.<br>2.           |
| rin st. 4 st.<br>st.<br>cin st. 2 st.<br>st. V                 | 0 00<br>0 00<br>0 00<br>V. † 00<br>0 . — | 1 at.<br>4 cir. at. 2 at.<br>Light haze. 7 at. W                           | 0 00<br>0 00<br>0 00<br>1 00<br>0 00   | 4 cir. st. 3 st.<br>1 cir. st. 3 st.<br>3 cir. st. 2 st.<br>9 nim.<br>0 | 0 00<br>0 00<br>0 00<br>0 00<br>0 .01<br>0 00 | 4 cir. st. 3 st.<br>1 cir. st. 2 st.<br>1 cir. st. 2 st.<br>9 st.<br>0 | 0 (                      | 00                               | 3 cir. st. 3 st. 0<br>2 cir. st. 2 st. 0<br>2 st. 0<br>8 st. SW.<br>1 st. 0                    | 00<br>00<br>00<br>00       | 1 cir. st. 2 st.<br>1 cir. st. 2 st.<br>5 st. SW                                 | 0 00<br>0 00<br>0 00<br>0 00 | 1.<br>2.<br>4.           |
| st,<br>glit haze. 1 st.<br>st.<br>st.                          | 0 00<br>0 00<br>0 00<br>0 00<br>0 00     | 1 st.<br>1 st.<br>10 st.   | 0 00<br>0 00<br>0 00<br>0 00           | Light haze. 1 st.<br>1 st.<br>1 st.<br>10 st.<br>2 st.                  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | Light haze. 1 st.<br>1 st.<br>1 st.<br>10 st.<br>Light haze. 3 st.     | 0 1                      | 00<br>00<br>00<br>00             | Light haze. 1 st. 0<br>1 st. 0<br>1 st. 0<br>10 n/m. 0<br>2 st. 0                              | 00 00 00                   | 1 st.<br>2 st.<br>10 nim.  | 0 00<br>0 00<br>0 00<br>0 00 | 1.                       |
| •t<br>nim  | S.* 00<br>0 . —<br>0 00                  | 3 st.<br>10 nim.<br>0  | 0 00<br>0<br>0 00<br>0 00              | 3 st.<br>10 nim.<br>1 st.<br>1 cir, st. 2 st.                           | 0 00<br>0 .10<br>0 00<br>0 00                 | 2 st.<br>10 nim.<br>1 st.<br>3 st.                                     | 0 0                      | 00<br>03<br>00<br>00             | 3 at. 0<br>10 nim. 0<br>1 st. 0<br>2 st. 0   | . 02<br>. 00<br>. 00       | 10 st.<br>1 st.  | 0 00<br>0 02<br>9 00<br>0 00 | 4. 2.                    |
| cit: 1 st.<br>st.  | 0 00                                     | 1 cir. 2 at.<br>1 at.  | 0 00                                   | 1 at.   | 0 00  | 1 st.  |                          | 00                               | 1 st. 0  |                            | 1 st.  | 00                           | 2.                       |

and amount and given in inches. In this

mount, kind, and section of clouds.

t. haze. Lt. haze. 0 00 st. haze. Lt. fog. 0 00 st. 0 00 st. 0 00 st. 0 00 st. 0 00

0 2 st. 2 cir. st. 1 st. 4 cum. 2 st. Light haze. 1 st. 1 st.

6 p. m. 2 cir. st. 3 st. 5 st.

5 st. 0 iol 0 1 st. 1 st. 10 iol 1 st. 1 st. 10 iol 1 st. 1 st. 10 iol 1 st. 1 st. 10 iol 1 st.

Dense haze. 6 nin

1 st.
Light haze. 1 st.
0
10 st.
Dense fog. 3 st.

4 st. 10 st. 1 st. 1 cir. 2 st. 1 st.

Statement showing the amount, kind, and direction of clouds, and amount  $a_{\rm nd}$ 

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In that

|   | 1 a. m.  |                                 | 2 a. m.  |                   | 3 a. m.   |                            | 4 a. m.  |                                  | 5 a. m.   |                            | 6 a. m.  |
|---|--|---------------------------------|--|-------------------|---|----------------------------|--|----------------------------------|---|----------------------------|--|
| Date.   | Amount, kind, and direction of clouds.   | Precipitation.                  | Amount, kind, and direction of clouds.   | A<br>dir          | mount, kind, and<br>ection of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.           | Precipitation.                   | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.   |
| 1883.<br>Jan. 1<br>Jan. 2<br>Jan. 3<br>Jan. 4<br>Jan. 5 | 0 6<br>1 at. 6<br>Light haze. 5 st. 0<br>1 st. 0<br>Dense haze. 3 nim. 0                       | 00<br>00<br>00<br>00            | 0 0 00<br>1 st. 0 00<br>1 cir. st. 4 st. 0 00<br>2 st. 0 00<br>3 nim. 0 .—                   | Lig<br>4 i<br>2 i | ht haze, 3 st. 0 ot. 0 t. 0 ht haze, 4 nim. 0   | 00 00 00                   | Light haze, 3 st. 0 (                            | 00 ±                             | 0<br>Light haze. 3 st. 0<br>3 st. 0<br>2 st. 0<br>Light haze. 5 nim. 0                      | 00 :                       | 1 st.<br>Light haze, 3 st. 0<br>Light haze, 3 st. 0<br>1 st. 0<br>Light haze, 4 nim, 0     |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10         | Dense haze, 7 nim, 0<br>2 cir, cum, 6 st, 0<br>1 cir, st, 1 st, 0<br>0 0<br>1 cir, st, 1 st, 0 | (H)<br>(H)<br>(H)<br>(H)<br>(H) | Dense haze, 8 nim, 0 , 3 cir. st. 4 st. 0 0 0 1 cir. st. 0 0 0 0 0 0 1 st. 0 0 0 0           | ) 1 c<br>) 1 c    | nse haze. 8 nim. 0<br>cir, st. 1 st. 0<br>cir, st. 2 st. 0<br>nse haze. 8 st. 0<br>t. 0 | 00<br>00<br>00<br>00       | Light haze, 7 st. 0 (                            | 00<br>00<br>00<br>00             | Dense haze. 9 nim. 0<br>1 st. 0<br>Light haze. 7 st. 0<br>10 st. 0<br>Light haze. 8 st. 0   | 00 00 00 00                | 10 nim.<br>Light haze. 2 st. 0<br>Dense haze. 8 st. 0<br>7 st. 0<br>3 st. 0                |
| Jan. 11<br>Jan. 12<br>Jan. 13<br>Jan. 14<br>Jan. 15     | 1 st. 0<br>1 st. 0<br>0 0<br>0 0<br>0 0  | 00<br>00<br>00<br>00            | 1 st, 0 00 00 00 00 00 00 00 00 00 00 00 00  | Lt.               | haz. 3 st. D. haz. 0<br>0<br>0  | 00<br>60<br>60<br>00<br>1  | Lt. haz. 3st. D. haz. 0 (                        | 00<br>00<br>00<br>00<br>00       | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                       | 00<br>00<br>00<br>00<br>00 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0   |
| Jan. 16<br>Jan. 17<br>Jan. 18<br>Jan. 19<br>Jan. 20     | 1 cir. st. 1 st. 0<br>10 st. 0<br>0 0<br>0 0<br>0 0  | 00<br>00<br>00<br>00<br>00      | 1 cir. st. 1 st. 0 00 00 00 00 00 00 00 00 00 00 00 00                                       | 10 9              | ir. st. 1 st. 0   | 00<br>00<br>00<br>00       | 10 st. SE. t 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00<br>00<br>00<br>00<br>1        | Light haze. 0<br>10 nim. 0<br>0 0<br>2 cir. st. 0<br>1 cir. cum, 1 st. 0                    | 00 00 00                   | Light haze, 0 10 nim. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                |
| Jan. 21<br>Jan. 22<br>Jan. 23<br>Jan. 24<br>Jan. 25     | 0<br>1 st.<br>1 cir. st. 6 st.<br>9 nim.<br>2 cir. st. 1 st.                                   | 00<br>00<br>00<br>00            | 0<br>1 st.<br>3 cir, st. 4 st.<br>10 nim.<br>1 cir, st. 1 st.<br>0 00<br>E.† e0              | 101               | ort. 0<br>orr. st. 3 st. E.<br>orr. st. 1 st. 0   | 00<br>00<br>00<br>1.01     | 9 st. SSW.† 6                                    | 00 '<br>00 '<br>00 .<br>—        | 0 0 0 0 3 cir. cum. 6 st. 0   | 00                         | 0 0 0<br>10 st. 0<br>9 cum. 0<br>1 st. 0   |
| Jan. 26<br>Jan. 27<br>Jan. 28<br>Jan. 29<br>Jan. 30     | 1 cir. st. 0<br>1 st. 0<br>0 1 st. 0<br>1 st. 0  | 00<br>00<br>00<br>00            | 3 cir. st. 1 st. 0 00<br>0 0 00<br>1 st. 0 00<br>0 0 00                                      | 0 0               | ir. st. 1 st. 0<br>0<br>0<br>0<br>0   | 00<br>00<br>00<br>00       | 0 0 0  | 00<br>00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Jan. 31   | Lt. haze. : st. 0  | 00                              | 1 st. 0 00   | 0                 |   | 00                         |  | 00                               | 0   | 00                         | 0 (1   |
| Means.  | 2. 11  |                                 | 2.22   |                   | 2. 64   |                            | 2. 83  |                                  | 2.72  |                            | 2.45   |
| Date.   | 1 p. m.  |                                 | 2 p. m.  | 1                 | 8 p. m.   |                            | 4 p. m.  |                                  | 5 p. m.   |                            | 6 p. m.  |
| 1883.<br>Jan. 1<br>Jan. 2<br>Jan. 3<br>Jan. 4<br>Jan. 5 | 0<br>Light haze, 5 st, SE, †<br>1 st, 0<br>Light haze, 2 st, 0<br>Light haze, 5 st, 0          | 00<br>00<br>(0)<br>(n)          | 0 0 00<br>9 st, SE.1 00<br>4 st. 0 00<br>Light haze, 4 st. 0 00<br>Dense haze, 8 nim. 0 '.—  | 9 8               | t. SE.<br>t. 0<br>t. 0  | 00 00 00                   | 1 cir. 5 st. 0 . 6                               | 00                               | 1 st. 0<br>1 cir. st. 7 st. SE.!<br>9 st. 0<br>3 cir. 5 st. 0<br>10 nim. 0                  | 1, 00                      | 1 st.<br>2 cir. cum. 7 st.<br>9 st.<br>8 st.<br>10 nim.                                    |
| Jan. 6<br>Jan. 7<br>Jan. 8<br>Jan. 9<br>Jan. 10         | Light haze, 1 st. 0<br>10 st. 0<br>10 nim. 0<br>1 st. 0<br>2 st. 0                             | 00 00 00                        | Light haze, 1 st. 0 00<br>10 st. 0 00<br>10 nim. 0 -<br>1 st. 0 00<br>1 st. 0 00             | 10 s<br>10 s      | im. 0   | 00 00 00                   | 10 nim. 0 9 st. 0 1 st. 0                        | 06<br><br>00<br>00               | Light haze. 4 st. 0<br>10 st. 0<br>10 st. 0<br>1 st. 0<br>1 st. 0<br>1 cir. 1 st. 0         | 00 00 00                   | 1 cir. Lt. haze. 4 st.<br>10 st.<br>10 st.<br>1 st.<br>1 cir. 1 st.                        |
| fan. 11<br>fan. 12<br>fan. 13<br>fan. 14<br>fan. 15     | 0 0 0 0 0 0 0  | (0)<br>(0)<br>(0)<br>(0)<br>(0) | 0 0 00<br>1 st, 0 00<br>1 st, 0 00<br>1 st, 0 00<br>1 st, 0 00                               | 18                | t. 0<br>t. 0<br>t. 0  | 00<br>00<br>00<br>00<br>00 | 1 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      | 00<br>00<br>00<br>00<br>00       | 1 st. 0<br>1 st. 0<br>0 0<br>1 st. 0<br>1 st. 0   | 00<br>00<br>00<br>00       | 1 st. 1 st. 0 0 0 0 0 1 st.  |
| fan. 16<br>Ian. 17<br>Ian. 18<br>Ian. 19<br>Ian. 20     | 10 st. 6 st. 8W. 0 0 0 0 1 cir. st. 1 st. 0  | 00<br>00<br>00<br>00<br>00      | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 4 s<br>1 s        | t. SW.  | 00<br>00<br>00<br>00       | 8 st. SW.* (                                     | 00<br>00                         | S st. SW.   | 00<br>00<br>00<br>00<br>00 | 10 st. SW<br>9 st. SW<br>Light haze, 1 st. 4<br>1 st. 6                                    |
| Fan. 21<br>Fan. 22<br>Fan. 23<br>Fan. 24<br>Fan. 25     | 0 0<br>0 0<br>10 st, 0<br>3 ci.3 ci.st, 2 st, N W.†<br>Light haze, 1 st, 0                     | 00<br>00<br>00<br>00            | 0 0 00<br>1 st. 0 00<br>10 st. 0 00<br>2 ci. 3 ci. s. 4 st. NW.† 00<br>Light haze, 1st. 0 00 | 1 s<br>9 s<br>2 c |   |                            | 1 st. 0 0<br>10 nim. 0                           | 00                               | Light haze. 1 st. 0<br>1 st. 0<br>10 nim. 0<br>1 cir. st. 7 st. NNW.f<br>1 cir. st. 1 st. 0 | 00                         | Light haze, 1 st.<br>Light haze, 1 st.<br>10 nim.<br>2 cir. st. 6 st.<br>Light haze, 2 st. |
| an. 26<br>an. 27<br>an. 28<br>an. 29<br>an. 30          | 1 st. 0<br>1 st. 0<br>1 st. 0<br>0 0   | 00<br>00<br>00<br>00<br>00      | 1 st. 0 00<br>1 st. 0 00<br>1 st. 0 00<br>1 st. 0 00<br>1 cir. 0 00                          | 1 e<br>2 s        | t. 0<br>t. 0  | 00<br>00<br>00<br>00<br>00 | 1 st. 0 0 1 st. 1 st. 0 0 0                      | 00<br>00<br>00<br>00<br>00       | 1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0<br>1 st. 0   | 00                         | 1 st.<br>1 st.<br>1 st.<br>1 st.<br>1 st.  |
| Jan. 31   | Den. haz. Den. haz. 0  | 00                              | Den. haz. Den. haz. 0 00   | 10 6              | t. 0  | 00                         | 9 st. 0 (  | 00                               |   | 00                         | 10 st.   |
| Means.  | 2, 51  |                                 | 3.12   |                   | 3.78  | 1                          | 3, 96  |                                  | 4. 25   |                            | 4.38   |

charact

Amount, direction

2 st. Light haze. Light haze. 2 st. Dense haze. to nim. le st. Light haze. bense haze. Light haze.

t. haze. Lt.

ľ.

2. 87 -7 p

in.com. 6 s t. t. in. in.enm. 2 st r.com. 3 st

th thaze. 1 st ht haze. 1 st t. ht haze. 1 st ht haze. 1 st ht haze. 1 st ht haze. 2 st.

1 st. 1 st. 0 nim. 4. 25

# character of precipitation, at Uylaamie, from October, 1881, to August, 1883—Continued.

s, and amount and

given in inches. In this 6 s. m.

Amount, kind, and direction of clouds.

1 st. 0 Light haze, 3 st. 0 Light haze, 3 st. 0 1 st. 0 Light haze, 4 nim, 0

10 nim. Light haze, 2 st. Dense haze, 8 st. 7 st. 3 st.

Light haze. 10 nim. 0 2 cir. st. 2 st.

0 10 st. 9 cum. 1 st.

> > 2, 45 6 p. m.

1 st. 2 cir. cum. 7 st. 9 st. 8 st. 10 nim.

1 cir. Lt. haze. 4 st. 10 st. 10 st. 10 st. 1 st. 1 cir. 1 st. (6

10 st. 9 st. Light haze, 1 st. 1 st. 10 st.

Light haze, 1 st. Light haze, 1 st. 10 nim. 2 cir. st. 6 st. Light haze, 2 st.

4,38

10 st.

pible signifies rapid, † signifies slove. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  |  | * a. m.  |  | \$ a. m.  |                                       |  | 10 a. m.   |   |  | 11 a. m.  |   |  | f2 m.   |   |  | presipt                                 |
|--|--|--|--|---|---------------------------------------|--|--|---|--|---|---|--|---|---|--|---|
| Amount, kind, one direction of clouds  | I've initation.  | Amount, kind, and<br>direction of clouds   | Precipitation.                           | Amount, kind, a<br>direction of clot  | Precipitation.                        | Air dir  | nount, kind,<br>ection of ele  | and<br>ouds.  | Precipitation.   | Amount, kind, an<br>direction of cloud  | d<br>ls.                                  | Precipitation.   | Amount, kind, and<br>direction of clouds  |   | Precipitation.   | Amount of pre-                          |
| 2 st.<br>Light haze, 8 st.<br>Light haze, 5 st.<br>1 st.<br>Lense haze, 7 nim.   | 0 (H)<br>0 (0)<br>0 (H)<br>0 (H)<br>0 (H)                      | Dense haze, 8 st.<br>Light haze, 8 st.   | 0 00<br>0 00<br>0 00<br>0 0              | Dense haze. 4 st.<br>Light haze. 8 st.<br>3 st.   | 0 00                                  | 5 :<br>3 :<br>Lt.  | ir. 3 st.<br>haz. 3 st. Lt.!   | 0<br>haz. 0 :   | 00<br>00<br>00   | 0<br>8 st. 8<br>2 st.<br>Lt.haz. 2 st. Lt.haz<br>10 nim.  | 8E.†                                      | 00   | Lt. haz, 1 st. Lt.haz.  | 0                                       | 00<br>00<br>00<br>00   | .0                                      |
| jo nim.<br>lo st.<br>Li_ht haze. 7 st.<br>hense haze. 9 st.<br>Light haze. 3 st.   | 0 . —<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00                  | 10 st.<br>5 st.  | 0<br>0 00<br>0 00<br>0 00                | 10 st.<br>3 st.   | 0 00                                  | ) Lig<br>) 10:<br>) 1:   | it.  | t. 0 1 0 0 0 0  | 00<br>00<br>00<br>00<br>00   | Dense haze, 3 st.<br>Light haze, 3 st.<br>10 st.<br>1 st.<br>10 st.   | 0   | 00   | Light haze. 5 st.<br>10 st.<br>1 st.  | 0                                       | 00<br>00<br>00<br>00<br>00   | . (                                     |
| t t  | 0 00<br>0 00<br>0 00<br>0 00                                   | Light haze, 1 st.  | 0 0<br>0 0<br>0 0<br>0 0                 | Light haze.   | 0   00<br>0   00<br>0   00<br>0   00  | ) Lis  | nse haze. 8 s<br>tht haze.   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00   | Dense haze. 6 st.<br>Light haze.<br>0<br>0  | 0 0                                       | 00<br>00<br>00<br>00   | Light haze.   | 0 0                                     | 00<br>00<br>00<br>00<br>00   |   |
| Lt. haze. Lt. haze.  | 0 00<br>0 . —<br>0 00<br>0 00<br>0 00                          | 0  | 0 0<br>0<br>0 0<br>0 0                   | 3 st. W:<br>Light hazo.   | 8W.* 00<br>0 00<br>0 00<br>0 00       | 0 3<br>0 Li:<br>0 6  | nse haze. 7 s<br>st. V<br>ght haze.<br>st.                                 | VSW.*   | 00<br>00<br>00<br>00<br>00   | 10 at.<br>4 st. S<br>0<br>0<br>Light haze.  | W.*                                       | 00<br>00<br>00<br>00<br>00   |   | V                                       | 00 ±<br>00<br>00<br>00<br>00   |   |
| e<br>past.<br>Jeum. 3 cum. st. V<br>Light haze. Lt. fog.   | 0 00<br>0 00<br>0 00<br><b>V</b> ,† 00<br>0 00                 | 0<br>10 st.  | 0 0<br>0 0<br>0 0<br>0 0                 | 0   0   10 st. 1 cum.   | 0   00<br>0   00<br>0   00<br>0   00  | 0 0<br>0 10<br>0 1   | st,<br>cir. 9 cum. st<br>cir. Lt. haze.                                    | 0<br>0<br>0<br>0<br>. NW.†  | 00<br>00<br>00<br>00<br>00   | 0<br>0<br>2 cum. st. 8 st.<br>1 cir. 5 cum. st. N<br>Dense baze. 6 st.  | 0<br>0<br>0<br>W.t                        | 00<br>00<br>00<br>00<br>00   | 0<br>0<br>10 st.<br>1 ctr. 6 cum. st. NV<br>Light haze, 1 st.   | 0<br>0<br>0<br>V                        | 00<br>00<br>00<br>00<br>60   |   |
| to the state of th | 0 00<br>0 00<br>0 00<br>0 00                                   | 1 st.  | 0 0<br>0 0<br>0 0<br>0 0                 | 0 0   | 0 0<br>0 0<br>0 0<br>0 0              | 0 0  |  | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00   | 0<br>0<br>0<br>0  | 0<br>0<br>0<br>0                          | 00<br>00<br>00<br>00   | 0<br>0<br>0<br>0<br>0   | 0 0 0                                   | 00<br>00<br>00<br>00   |   |
| p  | 0 00   | 0  | 0 0                                      | Light haze.   | 0 , 0                                 | 0 1  | st.  | 0   | 00   | Der 'aze 1st.   | 0   | 00   | Dense haze. 3 st.   | 0                                       | 00   |   |
| 2.87   |  | 3, 19  |  | 2. 80   | -                                     |  | 3. 29  |   |  | 2. 93   | -   |  | 2. 29   |   |  |   |
| 7 p. m.  |  | 8 p. m.  |  | 9 p. m.   |                                       | _  | 10 p. n  | n.  |  | 11 p. m.  |   |  | 1 p.m.  |   |  | Dail<br>mear                            |
| 1st.<br>or.cum. 6 st.<br>sst.<br>1 min.  | 0 00<br>0 00<br>E.i 00<br>0 00<br>0 .—                         | 4 cir. 4 st.   | 0 . 0<br>0 .0<br>E.† 0<br>0              | 9 2 cir. st. 2 st.<br>9 1 cir. st. 3 st.  | 0 0 0 0 E.t 0 0 N.t.                  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | st.<br>st.<br>st.<br>st.<br>st.  | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00<br>00   | 1 st.<br>Dense haze. 3 st.<br>3 st.<br>8 st.<br>6 st.   | 0<br>0<br>0<br>0<br>N.i                   | 00<br>00<br>00<br>00<br>00   | 1 st.<br>Dense haze. 3 st.<br>2 st.<br>Dense haze. 2 st.<br>Light haze. 2 st.   | 0<br>0<br>0<br>0                        | 00<br>00<br>00<br>00   | 5<br>4<br>4                             |
| teir.cum. 2 st.<br>eir.cum. 3 st.<br>4 st.<br>1 st   | 0 00<br>0 60<br>0 00<br>0 00<br>0 00                           | 3 cir. cum. 5 st.<br>9 st.<br>4 st.<br>1 st.<br>4 cir. 1 st.   | 0 0<br>0 0<br>0 0<br>0 0<br>0 0          | 0 10 st.<br>0 1 st.<br>0 1 st.  | 0 0                                   | 0 6<br>0 6<br>0 1  | st.<br>st.<br>st.  | NW.   | 00   | 8 st.<br>1 st.<br>1 st.<br>1 st.  | 0<br>0<br>0<br>0                          | 00<br>00<br>00<br>00<br>00   | 10 st.<br>1 st.<br>1 st.<br>1 st.<br>1 st.  | 0<br>0<br>0<br>0                        | 00<br>00<br>00<br>00<br>00   | f (                                     |
|  |  |  |  |   | 0 1                                   | 107  | cir. 2 st.   | 0   | 00   | 1 st.   |   |  |   |   | 00   | 1                                       |
| Leir, 1 st.<br>1 st.<br>1 st.  | 0 : 00<br>0 : 00<br>0 : 00<br>0 : 00<br>0 : 00                 | 1 st.<br>1 st.<br>0<br>1 cir.<br>1 st.   | 0 0<br>0 0<br>0 0                        | 0 1 st.<br>0 1 st.<br>0 0   | 0 : 0<br>0   0<br>0   0               | 00 1<br>00 1<br>00 0   | cir. 2 st.<br>st.<br>st.<br>cir. st. 1 st.<br>st.                          | 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00<br>00<br>00   | 1 st.<br>1 st.<br>1 st.<br>0<br>1 cir. st. 1 st.<br>1 st.   | 0 0 0                                     | 00<br>05<br>00<br>00<br>00   | 0<br>1 st.<br>1 st.<br>1 st.<br>1 st.   | 0<br>0<br>0<br>0                        | 00   |   |
| Leit, 1 st. 1 st. 1 st. 1 st. 2 st. 2 st. 2 st. 2 st. 3 st. 4 st. 4 st. 5 v. 5 v. 6 v. 6 v. 6 v. 7 st. 6 v. 7 st. 6 v. 7 st. 7 st. 8 v. 8 v. 8 v. 8 v. 8 v. 8 v. 8 v. 8 v  | 0   00<br>0   00<br>0   00<br>0   00                           | 1 st.<br>1 st.<br>0<br>1 cir.<br>1 st.<br>10 st.<br>3 cir. 5 st. SW<br>1 st.   | 0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 | 0 1 st.<br>0 1 st.<br>0 0<br>0 0<br>0 1 st.<br>0 5 st.<br>0 1 st.<br>0 1 st.<br>0 1 st.   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00 1<br>00 0<br>00 1<br>00 1<br>00 1<br>00 1<br>00 2<br>90 1<br>10 1   | st.<br>st.<br>cir. st. 1 st.   | 0<br>0<br>0   | 00 00 00 00  | 1 st.<br>1 st.<br>0<br>1 cir. st. 1 st.<br>1 st.  | 0<br>0<br>0<br>0                          | 00<br>00<br>00<br>00   | 1 st.<br>1 st.<br>1 st.   | 0                                       | 00   | (                                       |
| Left, 1 st.  1 st. 1 st. 1 st. 2 st. 2 st. Light baze, 1 st. 1 st. 2 st. 2 st. 3 st. 3 st.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>V.* 00<br>0 00 | 1 st.<br>1 st.<br>0<br>1 cir.<br>1 st.<br>10 st.<br>3 cir. 5 st. SW<br>1 st.<br>Light haze. 1 st.<br>4 st.<br>Light haze. 1 st.  | 0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 | 0 1 st.<br>0 1 st.<br>0 0 0<br>0 0<br>0 0<br>0 1 st.<br>0 5 st.<br>0 1 st.<br>0 1 st.<br>1 tr. st. 1 st.<br>0 2 ctr. 1 st.<br>1 uin 1 st.   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00 1<br>00 1<br>00 0<br>00 1<br>10 1<br>10 1<br>10 2<br>10 2<br>10 1<br>10 2<br>10 1<br>10 2<br>10 1<br>10 2<br>10 1<br>10 2<br>10 1<br>10 2<br>10 2<br>10 1<br>10 2<br>10 1<br>10 2<br>10 2<br>10 3<br>10 3<br>10 4<br>10 4<br>10 4<br>10 4<br>10 5<br>10 5 | st.<br>st.<br>cir. st. 1 st.<br>st.<br>st.<br>st.<br>st.<br>cir. st. 1 st. | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>8W.**  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 1 st.<br>1 st.<br>0<br>1 cir. st. 1 st.<br>1 st.<br>10 st.<br>1 st.   | 0<br>0<br>0<br>0<br>0<br>8W.*             | 00<br>00<br>00<br>00<br>00<br>00<br>00   | 1 st.<br>1 st.<br>1 st.<br>1 st.<br>1 st.<br>10 st.<br>0  | 0 0 0 0 0 0 0 0 0 0                     | 00<br>00<br>00<br>00<br>00   | 1 1                                     |
| Lett. 1 st.  1 st. 1 st. 1 st. 2 st. 2 st. 2 st. 4 st. 2 st. 4 st. 5 st. 4 st. 5 st. 5 st. 5 st. 5 st. 5 st. 5 st. 5 st. 6 st. | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 0    | 1 st. 1 st. 1 st. 1 st. 1 cir. 1 st. 10 st. 3 cir. 5 st. 1 st. Light haze. 1 st. 4 st. 4 st. Light haze. 1 st. 10 nim. 8 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. | 0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 | 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 o 0 0 0 0 0 1 st. 0 5 st. 5 5 st. 5 1 st. 0 1 st. 1 st. 0 2 cir. 1 st. 0 2 cir. 1 st. 0 3 st. 0 3 st. 0 3 st. 0 1 st. 1 st. 0 1 st. 0 3 st. 0 1 st.                                       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00 1<br>00 1<br>00 0<br>00 1<br>00 1 | st. st. 1 st. st. st. st. st. st. st. st. st. st.                          | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 1 st. 1 st. 0 1 cir. st. 1 st. 1 st. 10 st. 1 st. 2 cir. st. 3 st. 2 cir. st. 3 st. 2 cir. 1 st. 10 nim. 1 st.  | 0<br>0<br>0<br>0<br>0<br>0<br>8W.**       | 06<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>1 00<br>00<br>00<br>00   | 1 st.<br>1 st.<br>1 st.<br>10 st.<br>0 0<br>1 st.<br>1 ctr. st. 3 st.<br>1 st.<br>2 cir. 1 st.<br>10 nim.<br>1 st.  | 0 0 0 0 0 0 0 0 0 0 0                   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00             | 6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| cor. 1 st. 1 st. 1 st. 1 st. 2 st. 2 st. 2 st. 1 st. 2 st. 1 st. 2 st. 1 st. 1 st. 2 st. 1 st. 2 st. 1 st. 2 st. 2 st. 2 st. 2 st. 2 st. 2 st. 2 st. 2 st. 2 st. 2 st. 3 | 0 00 00 00 00 00 00 00 00 00 00 00 00 0                        | 1 st. 1 st. 1 st. 1 st. 10 st. 3 cir. 5 st. 1 st.  | 0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 | 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 o 0 0 0 0 0 0 t st. 0 5 st. 5 1 cir. st. 1 st. 0 1 st. 0 2 cir. 1 st. 0 2 st. 1 st. 0 1 st. 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00 1<br>00 0<br>00 1<br>00 1<br>00 1<br>00 1<br>00 1<br>00 2<br>00 1<br>00 1 | st. st. 1 st. st. st. st. st. st. st. st. st. st.                          | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 1 st. 1 st. 1 st. 1 st. 1 st. 10 st. 1 st. 2 st. 2 st. 2 cir. st. 3 st. 2 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. | 8W.** 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 06<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>1<br>00<br>00<br>1<br>00<br>00 | 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 1 st. 10 st. 0 1 st. 1 st. 1 cir. st. 3 st. 1 cir. st. 3 st. 1 st. 2 cir. 1 st. 10 nim. 1 st. 1 | 000000000000000000000000000000000000000 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |

# Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction reduced to mean local time,  $-\delta$  hours, 17 minutes. Precipitation is given in inches. In this

|   | 1 a. m.   |                        | 2 a. m.  |                      | 3 a. m.  |                       | 4 a. m.   |                            | 5 a. m.  |                            | 0 a. m   |
|---|---|------------------------|--|----------------------|--|-----------------------|---|----------------------------|--|----------------------------|--|
| Date.   | Amount, kind, and direction of clouds.  | Precipitation.         | Amount, kind, and<br>direction of clouds.  | Precipitation        | Amount, kind, and direction of clouds.   | Precipitation.        | Amount, kind, and direction of clouds.  | Precipitation.             | <sup>1</sup> Amount, kind, and direction of clouds.  | Precipitatism.             | Amount, kind and direction of clouds.  |
| 1883,<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | 9 st. 0<br>D. has. 9 st. D. haz. 0<br>7 st. SW. (<br>D. haze. 3 st. 0                     | 00<br>00<br>00         | 10 st. 0<br>D. haz. 9 st. D. haz. 0<br>D. haze. 9 st. 0<br>D. haze. 10 st. 0       | 00                   | 3 at. 0 1  | 00                    | Lt. haz. 3 st. 0<br>D. haz. 7 st. D. haz. 0<br>D. haz. 8 st. D. haz. 0<br>10 st. 0            | 00                         | Lt. haze, 1 st. 0<br>D. haze, D. haze 0<br>Lt. haze, 1 st. 0<br>Lt. haze, 5 st. 0            | 00<br>00<br>00<br>00       | D. haze. D. haze. 0 00<br>U.t. haze. 4 at. 0 00<br>U.t. haze. 4 at. 0 00                   |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | 10 nim. 6 .6 .7 st. 0 0 .6 .1 D. haz. 4 st. D. haz. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | . 02<br>00<br>00<br>00 |  | 00                   | 10 nim, 0<br>10 st. 0<br>10 st. 0<br>D. haz. 3 st. D. haz. 0<br>10 nim, 0                            | 00                    | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>0 0<br>10 nim. 0   | 00<br>00<br>00<br>00       | 10 nim, 0<br>10 at. 0<br>10 st. 0<br>0 0<br>10 nim, 0  | 01<br>00<br>00<br>00       | 10 nim. 0 .01<br>10 at. 0 .01<br>10 at. 0 .00<br>0 0 0 0<br>10 nim. 0 .01                  |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 13<br>Feb. 14 | I.t. haze. 2 st. 0 (1) D. haze. 9 nim. 0 (1) nim.   | 00   00   01           | 10 st. 0<br>0 0<br>Lt. haz. 3 st. D. haz. 0<br>4 cir. st. 3 st. 0<br>10 nim. NW. † |                      | D. haze. 8 nim. 0  | 00                    | 10 st. 0<br>0 0<br>D. haz. 8 nim. 0<br>1 cir. st. 1 st. 0<br>D. haz. 6 nim. NW.t              | . 01                       | 10 st,   | 00                         | 10 st, 0 00<br>10 nim, 0 00<br>2 st 0 00<br>1 st, 0 00                                     |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | 0 0 0 0 10 st. 0 0  | 00<br>00               | 10 st. 0<br>D. haz. 9 st. D. haz. 0<br>10 st. 0                                    | 00<br>00<br>00<br>00 |  | 00                    | 3 cum. 5 st. 0<br>1 cir. st. 7 st. NW.*<br>1 cir. st. 4 st. 0<br>10 st. 0<br>D. haze. 9 st. 0 | 00<br>00<br>00<br>00       | 1 cum. 9 st. 0<br>2 cir. st. 5 st. 0<br>2 cir. cum. 2 st. 0<br>10 st. 0<br>Lt. haze. 3 st. 0 | 00<br>00<br>00<br>00<br>00 | 10 st.<br>1 cir. st. 3 st. 0 00<br>5 cum. 4 st. 0 00<br>10 st. 0 00<br>2 st. 0 00          |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | 8 st. SSE. # 6  | . 00                   | 1 cir. at, 0 .   | 90<br>00             | 10 st. NW. 1 lcir. 1 cir. st. 5 st. 8. 1 lcir. st. 0 lcir. st. 1 st. 0 lcir. st. 1 st. 0 lcir. st. 0 | 00<br>00<br>00        | 10 st. NW.t<br>1 cir. 2 cir. st. 3 st. 0<br>1 st. 0<br>1 cir. st. 0<br>0                      | 00<br>00<br>00             | 10 st. NW.t<br>2 cir. 2 cir. st. 3 st. 0<br>0 t.t. haze. 0<br>0 0                            |                            | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                       |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | 0 0 0<br>2 st. 0 0<br>10 pim. 0 0   | 00<br>00<br>00<br>01   | 0<br>D. haz. 4 st. D. haz. 0<br>D. haz. 8 st. 0                                    | 00<br>00<br>00       | 0<br>Lt. haz, 3 st. 0<br>10 st. 0  | . 00                  | 0<br>Lt. haz. 2 st. D. haz. 0<br>D. haz. 8 st. D. haz. 0                                      | 00                         | 1 st. 0<br>0 0<br>Lt. haze, 1 st. 0<br>D. haze D. haze, 0                                    | 00<br>00<br>00<br>00       | * -  |
|   | 5. 92   |                        | 6, 64  | 1 1                  | 6. 11  |                       | 5. 82   |                            | 4.42   |                            | 4. 67  |
| Date.   | f p. m.   | 1                      | 2 p. m.  | -                    | 3 p. m.  |                       | 4 p. m.   |                            | 5 p. m.  |                            | 6 p. m.  |
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4       | Dense haze, 5 st. 0 0   | 00                     | 1 st. 0<br>Lt. haz. 6 st. 0<br>10 st. 0<br>1 cir. cum. 8 st. 0                     | 00                   | 1 st. 0<br>1 cir. 5 st. SW.+<br>10 nim. 0<br>1 cir. cum. 7 st. SW.+                                  | 00                    | 0<br>1 cir. 7 st. SW. †<br>10 nim. 0<br>2 cir. 4 st. SW. †                                    | 00<br>00<br>. 01<br>00     | 0<br>1 ci.5 st. SW, †D. fog.<br>4 cir. 5 st. SW.*<br>5 cir. st. 3 st. SW. †                  |                            | 1 st. D. haze. D. fog. 0 10 st. SSW (4 cir. st. 6 st. SW) (5)                              |
| Feb. 5<br>Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9      | 10 st. 0 .00<br>1 st. NW.* 0<br>10 st. 0 .00<br>2 st. 0 .00<br>10 nim. 0 .00              | 00 00                  | 4 at. 0  | 00                   | 1 cir. 1 st. NW.*<br>10 nim. 0<br>8 st. 0  | 00                    | 10 st. 0<br>2 cir. 0<br>0 st. W.*<br>10 nim. 0<br>8 st. 0                                     | .01                        | 3 cir. 1 st. 0 5 st. W.*   | 00<br>00<br>00<br>01       | 10 st. 0 c;<br>4 cir. 1 st. 7 c;<br>3 st. W<br>10 nim. 0<br>10 st. 0 m                     |
| Feb. 10<br>Feb. 11<br>Feb. 12<br>Feb. 13<br>Feb. 14 | Lt. haze, 4 st. WNW.* 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                               | 00<br>01<br>00         | 0 0  | 00                   | 0 0  | 00                    | 0 0   | 00                         | 3 st. W.* 0 0 10 nim, 0 5 st. W.† 1 cir. 4 st. W.†   | 00                         | 3 st, W · · · · · · · · · · · · · · · · · ·  |
| Feb. 15<br>Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19 | 1 cir. 1 st. 0 (<br>2 st. 0 (<br>10 st. 0 (   | 00<br>00<br>00<br>00   | 10 st. 0<br>1 cir. 3 st. 0<br>1 st. 0<br>10 st. 0                                  |                      | 2 cir. 2 st. 0 :   | 00                    |   | 00<br>00<br>00<br>00<br>00 | 1 st. 0 10 st. 0   | 00<br>00<br>00<br>00       | 8 st. W 7 cir. 1 st. 0 cc 0 t 1 1 st. 10 st. 10 st. 10 st. 10 st.                          |
| Feb. 20<br>Feb. 21<br>Feb. 22<br>Feb. 23<br>Feb. 24 | 10 st. 0 6  | 00                     | 0 0 1<br>4 cir. 4 st. 0  | ,                    | 10 st. 0 . 0 . 0 . 2 cir. 7 st. 0 :  | 00 00                 | 0<br>1 cir. 8 st. 0   |                            | 0 0  | 00<br>00<br>00<br>00<br>00 | 1 ci.1 ci.st.4 st. SW.† w-<br>10 nim. 0 .=<br>1 st. 0 to<br>4 cir. 4 st. 0 %<br>1 cir. 0 % |
| Feb. 25<br>Feb. 26<br>Feb. 27<br>Feb. 28            | 1 st. 0 (0<br>0 + 0<br>2 cir. oum. 6 st. SE. 1 (1<br>1 cir. 7 st. SSW. †                  | 00                     | 1 cir. 1 st. 0<br>0 0<br>1 ci. cum, 4 st. SE. 1<br>1 cir. 8 st. SSW. †             | 00                   | 1 st. 0<br>3 cir. cum. 5 st. SE.†  | 00<br>00<br>00<br>.01 | 8 st. SE. †   | 00 00                      | 7 cir. 2 st. SE. 1   | 00<br>00<br>00<br>00       | 0 0 0<br>1 cir. 2 st. 0 00<br>5 cir. 2 st. 0 00<br>10 nim. 0                               |
|   | 5, 57   |                        | 5. 89  |                      | 6. 14  |                       | 5. 92   |                            | 6. 03  |                            | 5. 92  |

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0 to nim.
D. haze.

o nin. Light laze 9 st. 2 st 10 nin. 10 st. 0 5 cum. 3 st

D. haze. D

O

Light haze.
Dense haze.

5 cm, st. 1 ; D.fog.5st.8' lost. lost. 5 cm, 2 st. 9 st. 9 st. 10 st.

1 st 10 mm 2 cin 4 st, 2 cin 5 st, 3 st, 5 ctr. 3 st, 1 st 1 cr. 7 st 7 tree.

3 (a.48) 1 cm 7 (b.28), 1 cm 2 st, 5 cm 3 st, 6.7

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

table signifies rapid, taignities slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| î a. Bi.   | 8 a. m.   | 9 a. m.  | 10 a. m.   | 11 a. m.  | 12 m.   | cipi  |
|--|---|--|--|---|---|---|
| Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.  | Amount of precipitation.  |
| Light haze. 3 st. 0  | 00 Light haze. 2 st. 0  | 0 0  | 0 Dense haze. 5 st. 0  | 00 Dense haze. 5 st. 0<br>00 I st. 8.1  | 00 1 st. 0 00<br>00 1 hense haze, 6 st. 0 00<br>00 4 st. 8, † 00<br>00 9 st. 0 00   | .06   |
| 0 pim. 0   | - 10 nim. 0 . 00 4 st. 0 . 00 10 st. 0 . 00 0 0 0 0 0 0 .   | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00 2 st. W. * 00 10 st. 0  | 00 10 nt. 0   | - 10 nim. 0 1 st. W. 1 00 00 00 0 1 st. 0 00 00 00 0 1 st. 0 00 00 00 1 st. 0 00 00 00 00 1 st. 0 00 00 00 00 1 st. 0 00 00 00 00 00 00 00 00 00 00 00 00   | . 16<br>00<br>. 03<br>. 04<br>. 15  |
| haze. D. haze. 0   | 01 10 nim. 0 .<br>00 Dense haze. 8 st. 0  | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00 0 0 0<br>= 10 nim. 0 .<br>00 Dense hazo, 5 st. 0  | 00 0 0 0<br>10 nim. 0 .<br>00 Dense haze. 8 st. 0   | 00 Lt. haze. D.haze. 0 00 0   | 00<br>00<br>. 17<br>. 01<br>. 05  |
| 1 st. 0  | 00 Lt. haze. Lt. fog. 0<br>— 10 nim. 0 .  | 00 Lt. haze. Lt. fog. 0   0   10 nim.  | 00 Lt. haze. Lt. haze. 0<br>10 nim. 0 .  | 00 Light haze. 1 st. 0  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 01<br>96<br>96<br>96  |
| 6 cir. cum. 3 st. 0  | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 0 6 cum. 3 st. 0 , 0   | 00 Light haze. 8 st. 0<br>00 0 0<br>00 Dense haze. 7 st. 0   | 60 10 st. 0<br>00 3 cir. cum. 3 st. 0<br>00 0 0 0<br>00 Dense haze, 8 st. 0<br>00 0   | 00 9 st. 0 00<br>00 10 st. 0 00<br>00 0 0 0 0 0<br>06 Light haze, 8 st. 0 00<br>00 0 0  | (H<br>  |
| ight haze, 5 at. 0   | 00 0 0 0 0 0 0 0 0 0 0 1.ight haze. 6 st. 0   | 0 0 0  | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00 1 cir, 3 st. 0<br>00 0 0 0<br>00 1 st. 0<br>   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | - th  |
| 4. 28  | 4. 07   | 4. 03  | 4.75   | 4. 89   | 5, 21   | . 8   |
| 7  |   |  |  |   |   |   |
| 7 p. m.  | 8 p. m.   | 9 p. m.  | 10 p. m.   | 11 p. m.  | 12 p. m.  | Daily means.  |
| 5 cir. st. 1 st. 0<br>l.fog.5st.SW.*D.fg.0   | 00 Light haze. 5 st. 0   00 Den. fog. Den. fog. 0   00 10 st. 0   |  | 00 Light haze. 4 st. 0<br>00 10 st. 0<br>02 10 nim. 0  | 00 Light haze, 4 st. 0<br>00 9 st. 0<br>03 10 st. 0   | 12 p.m.  60 Light haze, 5 st, 0 00  60 Dense fog, 0 00  - 2 st, 0 00  10 10 mm, 0 03  | 2. 1<br>5. 1<br>6. 1  |
| ocir, st. 1 st. 0<br>f. f.   | 00 Light haze. 5 at. 0<br>00 Den. fog. Den. fog. 0<br>00 10 at. 0<br>00 10 st. 0<br>00 9 st. 0<br>00 8 st. SW.^4<br>- 10 nim. 0   | 00 Light haze 3 st. 0<br>10 to st. SW.†<br>10 lumin. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0   | 00 Light haze. 4 st. 0<br>00 10 st. 0<br>02 10 nim. 0<br>02 10 nim. 0<br>00 10 st. 0<br>00 4 st. 0<br>00 5 st. SW.*<br>10 nim. 0   | 00 Light haze, 4 st. 0<br>00 0 at. 0<br>03 10 st. 0<br>04 10 st. 0<br>00 10 st. 0<br>00 4 st. 0<br>00 10 st. 0<br>00 7 st. W.   | 00 Light hazo, 5 st. 0 00<br>00 Dense fog. 0 00<br>01 00 10 nim. 0 03<br>00 10 st. 0 00<br>00 3 st. 0 0   | 2. 4 5 1 6. 1 7 2 10. 0 5 4 4 5 9   |
| Seir. st. 1 st.  | 00 Light haze. 5 at. 0 00 Pen. fog. Den. fog. 0 10 at. 0 | 00 Light haze 3 st. 0<br>00 10 st. SW.†<br>01 10 nim. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 inim. 0<br>10 st. 0<br>10 inim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0 | 00 Light haze. 4 st. 0<br>00 10 st. 0<br>20 10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>10 nim. 0<br>60 4 st. 0<br>60 5 st. SW.*<br>10 nim. 0<br>60 2 st. W.*<br>10 nim. 0<br>10 zt. 0<br>10 zt. 0<br>10 zt. 0<br>10 zt. 0<br>10 nim. 0<br>10 zt. 0<br>10 nim. 0<br>10 zt. 0<br>10 zt. 0<br>10 nim. 0<br>10 zt. 0   | H p.m.  UO Light haze, 4 st. 0 00 9 st. 0 00 10 st. 0 00 10 st. 0 00 4 st. 0 00 10 st. 0 00 7 st. W. 01 10 nim. 6 00 10 st. 0 00 11 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0   | 00 Light hazo. 5 st. 0 00<br>00 Dense fog. 0 00<br>01 0 10 nim. 0 03<br>01 10 st. 0 00<br>00 3 st. 0 00<br>00 10 nim. 0 00  | 10.00 5.00 8.4 4.9 9.7 4.1 5.0 1.0 6.0 5.0 8.4 6.9 9.7 4.1 5.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6  |
| Seir, st. 1 st. 0  Infog.5st.SW.*D.fg.0  st. 0  st. 0  st. 0  veir.2 st. 0  veir.2 st. 0  i.vi SW.†  i.vi 0  i | 00 Light haze 5 st. 0   00 Den. fog. Den. fog. 0   10 st. 0   10 st. 0   00 Patl. 0   00 Patl. 0   00 Patl. 0   10 mm. 0 | 00 Light haze. 3 st. 0<br>100 10 st. SW.f. 1<br>10 nim. 0  | 00 Light haze. 4 st. 0<br>00 10 st. 0<br>02 10 nim. 0 .0<br>02 10 nim. 0 .0<br>03 10 st. 0<br>04 4 st. 0<br>04 5 st. 8W.2<br>10 nim. 0 .0<br>06 2 st. 0<br>07 10 st. 0<br>08 10 st. 0<br>09 2 st. 0<br>09 2 st. 0<br>09 2 st. 0<br>00 10 st. 0<br>00 10 st. 0<br>00 10 st. 0<br>00 10 st. 0<br>00 2 st. 0<br>00 10 st. 0<br>00 2 st. 0<br>00 10 st. 0<br>00 1 st. 0<br>00 1 cir. st. 1 st. 0<br>00 2 st. 0<br>00 10 nim. 0<br>00 10 nim. 0<br>00 10 st. 0<br>00 10 nim. 0<br>00 10 nim. 0<br>00 10 nim. 0<br>00 10 nim. 0  | 00 Light haze, 4 st. 0 00 9 st. 0 01 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 7 st. W. 01 10 nim. 0 00 10 st. 0 00 10 st. 0 01 1 st. 0 00 10 st. 0   | 60 Light hazo, 5 st. 0 00 00 Dense fog. 0 00 01 0 01 01 10 nim. 0 03 00 10 st. 0 00 01 3 st. 0 00 01 10 nim. 0 00 01 10 nim. 0 00 01 10 nim. 0 00 00 3 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 1 st. 0 00 00 10 st. 0 00  | means.  2.4 5.1 6.1 7.2 10.0 8.4 6.7 9.1 6.7 9.1 6.7 9.1 6.7 9.1 6.7 9.1 6.7 9.1  |
| 5 cir. st. 1 st. 0 5 figg.5 ct. SW. *D.fg.0 0 st. 0 0 st. 0 6 cir. 2 st. 0 0 cir. 2 st. 0 0 inim. 0 0 it. 0 1 it 0 1 it 0 1 it. 0 1 it | 00 Light haze. 5 st. 0   00   Den. fog. Den. fog. 0   10 st. 0   10 st. 0   00   10 st. 0   00   10 st. 0   00   00   10 st. 0   00   00   10 st. 0   00   00   00   00   00   00   00  | Description    | 00 Light haze. 4 st. 0 00 10 st. 0 01 10 st. 0 02 10 mim. 0 02 10 mim. 0 03 10 st. 0 04 4 st. 0 05 st. SW. 10 nim. 0 06 2 st. W. 10 nim. 0 07 10 st. 0 08 10 st. 0 09 1 cir. st. 1 st. 0 09 2 cir. st. 6 st. 0 10 nim. 0 10 nim. 0 10 nim. 0 10 icir. st. 1 st. 0 | ## p.m.  ## | 00 Light haze, 5 st, 0 00 00 Dense fog, 0 00 01 2 st, 0 00 00 3 st, 0 00 00 10 st, 0 00 01 10 him, 0 00 01 3 st, 0 00 00 10 st, 0 00 01 1 st, 0 00 00 3 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 10 st, 0 00 00 10 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 10 st, 0 00 00 10 st, NW, 00 00 0 9 st, N, 1 00   | 10.00 (1.00 |
| Seir, st. 1 st. 0  Infog.5st.SW.*D.fg.0  0 st. 0  over, 2 st. 0  over, 2 st. 0  i st | 00 Light haze. 5 st. 0   00   Den. fog. Den. fog. 0   10 st. 0   0   10 st. 0   0   0   0   10 st. 0   0   0   0   10 st. 0   0   0   0   10 st. 0   0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   10 st. 0   0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   0   10 st. 0   0   0   0   1 st. 0   0   0   0   1 st. 0   0   0   0   0   0   0   0   0   0  | Description    | 00 Light haze. 4 st. 0 00 10 st. 0 01 10 nim. 0 02 10 nim. 0 02 10 nim. 0 03 10 st. 0 00 10 st. 0 00 5 st. SW.* 10 nim. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. NW.† 00 10 st. NW.† 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0 00 10 st. 0  | ## p. m.  ## p. | 00 Light haze, 5 st, 0 00 00 Dense fog, 0 00 01 10 nim, 0 03 00 3 st, 0 00 00 13 st, 0 00 01 10 nim, 0 00 01 10 nim, 0 00 01 10 nim, 0 00 01 10 nim, 0 00 01 10 nim, 0 00 01 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 1 st, 0 00 00 2 st, 0 00 00 10 st, NV, 00 00 10 st, NV, 00 00 10 st, NV, 00 00 9 st, N, 1 00 00 2 st, N, 1 00 00 10 st, NV, 1 00 00 10 st, NV, 1 00 00 2 st, N, 1 00 00 2 st, N, 1 00 00 10 st, NV, 1 00 00 10 st, NV, 1 00 00 2 st, N, 1 00 00 2 st, 0 00 |   |

ds, and amount and

Amount, kind and direction of clouds.

10 st. 0 10 nim. 2 st 1 st. 10 st. 1 cir. st. 3 st. 5 cum. 4 st. 10 st. 2 st.

10 st. 5 cir. st. 2 st. 6 D. haze. D. haze.

Lt. haze. 3 st D. haze. 9 st 4.67

1 st. D. fng. 0 10 st. SSW. 4 cir. st. 6 st. SW. 10 st. 4 cir. 1st. 0 4 cir. 1st. 0 7 3 st. W 10 min. 0 10 st. 0

6 p. m

3 84. W 10 nim. p 10 st. 6 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 nim. p 10 st. p 10 st. p 10 nim. p 10 st. p 10 nim. p 10

5, 92

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, +5 hours 17 minutes. Precipitation is given in inches 1,1,1,1,

| 1  | 4  | 2 a. m.  |  | 3 a. m.  |  | 1 a. m.  |  | 5 a. m.  |  | **   |   |
|--|--|--|--|--|--|--|--|--|--|--|---|
|  | 1 a. m.  | 2 11. 111.   |  | 4 H. III.  |  | # 26. 111.   |  | o (t. 111.   |  | 6 a. m   |   |
| Date.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Preipitation.  | Amount, kind, and direction of clouds.   | P. evipitation.  | Amount, kind, and direction of clouds.   | Previpitation.   | Amount, kind, and<br>direction of clouds.  | Precipit tion.   | Amount, kind, an<br>direction of cloud   | Presponding   |
| 1883.<br>Mar. 1  | 2 at. 0 00   | Dense haze, 5 st. 0 .  | 00   | Light haze, 2 st. 0  | . 00   | 0 0  | 00   | 0 0  | (1()   | Light haze.  | 0   |
| Mar. 2<br>Mar. 3<br>Mar. 4<br>Mar. 5<br>Mar. 6   | 1 st. 0 0 00<br>2 cir. st. 1 st. 0 00<br>1 st. 0 00<br>1 cir. st. 0 00<br>1 cir. st. 2 st. 0 00  | 5 cir. cum. 2 st. 0 .<br>1 st. 0 0   | 00<br>(ii)<br>(ii)<br>(ii)<br>(ii)<br>(ii)                                 | 0 clr. st. 2 st. 0 0 0 0 0 0 Clght haze, 3 st. 0   | 00<br>00<br>00<br>00<br>00   | 0 1 cir. st. 2 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00                                     | 0 1 at. 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00   | Light haze, 2 at, 0 0 Light haze, 1 st.  | 0 ug<br>0 to<br>0 to                                |
| Mar. 7<br>Mar. 8<br>Mar. 9<br>Mar. 10<br>Mar. 11   | 2 st. 0 00<br>1 cir. st. 2 st. 0 00<br>1 st. 0 00<br>1 st. 0 00  | D, h'ze, 4 st. D, h'ze, 0<br>2 st. 0<br>0  | 00<br>00<br>00<br>00<br>00   | Lt.h'ze, 2st, D.h'ze, 0<br>D.h'ze, 2st, D.h'ze, 0<br>1 st, 0<br>0 0<br>0   | 00<br>00<br>00<br>00<br>00   | 3 st. 0 D. haze. 0<br>Lt.h'ze. 3 st. D.h'ze. 0<br>1 st. 0<br>0 0<br>0 0  | 00<br>00<br>00<br>00                                     | Light haze. 2 at. 1 st. 6 0 0 0  | 00   | Light haze,<br>Light haze, 3 st,<br>0<br>0<br>0  | 0 cq<br>0 cq<br>0 cq<br>0 co<br>0 cq<br>0 co        |
| Mar. 12<br>Mar. 13<br>Mar. 14<br>Mar. 15<br>Mar. 16  | 3 cir. st. 3 st. 0 00<br>9 st. 0 00<br>1 st. 0 00<br>0 9 00<br>1 cir. st. 1 st. 0 00   | 1 st. 0  | 00<br>00<br>00<br>00   | 3 cir. st. 1 st. 0<br>4 st. 0<br>0 0 0<br>1 st. 0  | 00<br>00<br>00<br>00   | 7 cir. at. 2 st. 0<br>4 st. 0<br>0 0<br>1 st. 0  | 00   | Light haze. 3 st. 0 0 0 0 0  | 00   | 2 st.<br>2 st.<br>0<br>0<br>Light fog.   | 0 pp<br>0 pq<br>0 pq<br>0 pq<br>0 pq                |
| Mar. 17<br>Mar. 18<br>Mar. 19<br>Mar. 20<br>Mar. 21  | 1 cir. st. 1 st. 0 00<br>1 st. 0 (0<br>1 st. NE. 0<br>1 cir. st. 1 st. 0 00<br>1 cir. 1 st. 0 00   |  | 00<br>00<br>00<br>00   | 1 cir. st. 1 st. 0<br>0 0 0<br>1 st. 0<br>1 st. 0<br>1 cir. st. 1 st. 0  | 00<br>00<br>00<br>00   | 1 cir. st. 1 st. 0<br>0 0<br>1 st. 0<br>1 st. 0<br>2 cir. st. 4 st. 0  | 00 00 00 00  | 0 6<br>0 6<br>0 6<br>0 6<br>3 cir. at. 2 at.   | 00   | 2 st.<br>0<br>0<br>3 st.<br>4 cir. st. 2 st.   | 0 1<br>0 01<br>0 1<br>ft 1                          |
| Mar. 22<br>Mar. 23<br>Mar. 24<br>Mar. 25<br>Mar. 26  | 10 st, 0 00<br>1 st, 0 0 00<br>3 cir. st, 4 st, SW.† 00<br>1 cir. st, 9 st. S † 00<br>1 st. 0 00   | 2 cir. st. 2 st. 0 · 0 st. 0   | 00<br>00<br>00<br>00<br>00   | 10 st. 0<br>9 st. 8.<br>5 cir. st. 3 st. 0<br>10 nim. 0<br>1 st. 0   | 00 00 00   | 9 st. 0<br>10 nm. 0<br>5 cir. st. 3 st. 0<br>10 nim. 0<br>9 st. 0  | 00 00 01 00  | 10 st. (10 nim. (10 n | 00   | 10 st,<br>3 st,<br>5 cum, 2 st,<br>10 st,<br>9 st,   | 0 to<br>8 (1<br>6 s<br>8 (2)<br>8 (3)               |
| Mar. 27<br>Mar. 28<br>Mar. 29<br>Mar. 30   | 1 cir. st. 1 st. 0 00<br>3 cir. st. 1 st. SW. t 00<br>10 st. 0 0<br>Dense fog. 0 00  | 1c. s. 1ci.eu, 2s. SW.†<br>10 st. 0  | 00<br>00<br>00   | Light haze. 4 st. 0<br>1 st. 0<br>9 st. 0  | 00<br>00<br>00<br>00   | Dense haze, 5 st. 0<br>1 st. 0<br>1 cir. st. 0 st. 0   | 00<br>00<br>00   | 0<br>Dense haze, 8 st.   | 00 ± 00  | Light haze, 6 st. 2 st. 10 st.   | 0 (1<br>0 (e)<br>0 ()                               |
| Mar. 31  | 9 st. W. † 00  | 10 at. 0   | 00   | 9 at. 0<br>10 at. 0  | 00   | 10 st. 0<br>10 st. 0   | 00   | 10 st. (   | - 00   | 10 st.<br>10 st.   | 0 11  |
| Mar. 31<br>Means.  | 9 st. W. † 00  | 10 st. 0   |  |  |  |  |  |  |  |  | 0 01  |
| Mar. 31  | 9 st. W. † 00  | 10 at. 0   |  | 10 st. 0   |  | 10 st. 0   |  | 10 st.   |  | 10 st.   | 0 ti  |
| Mar. 31 Means. Date. 1883.   | 9 st. W. † 00<br>3.29  | 3, 19<br>2 p. m.   | 00   | 3, 22<br>3 p. m.   | 00   | 3.74<br>4 p. m.  | 00   | 2. 83<br>5 p. m.   | : 00   | 10 st. 3.16 6 p.m.   | 0 101   |
| Mar. 31 Means. Date.   | 9 st. W. † 00<br>3.29  | 0 3.10 2 p. m. 2 1 cir. 1 st. 0 2 cir. 2 st. 0 1 st. 0 10 st. 0  |  | 3, 22<br>3 p. m.   | 00   | 10 st. 0   | 00 00 00 00 00 00  | 2. 83<br>5 p. m.   | : 00<br>: 1<br>: 00<br>: 00<br>: 00<br>: 00<br>: 00          | 10 st.<br>3.16   | 0 10<br>6 0 10<br>6 0 10<br>6 0 10<br>8 00          |
| Mar. 31  Means.  Date.  1883. Mar. 4  Mar. 2  Mar. 3  Mar. 4  Mar. 5   | 1 p. m.  1 st. 0 00 1 cir. 1 st. 0 00 1 cir. 3 st. 0 00 1 cir. 1 st. 0 00 1 cir. 3 st. 0 00 1 cir. 3 st. 0 00  | 0 0 0 1 cir. 1 st. 0 2 cir. 2 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 2 cir. 2 st. 1 cir. 4 st. 1 cir. 6 st. N.W.† 2 st. Light haze. 0 2 st. Light haze. 0 2 st. Light haze. 0 2 st. Light haze.   | 00<br>00<br>00<br>00<br>00<br>00<br>00                                     | 3 p. m.  3 p. m.  0 0 0 5 cir. 1 st. 0 2 cir. 3 st. 0 1 st. WNW.   | 00   | 0 0 0 3 cir. 2 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 1 cir. 1 st. 0 0 0 0 0   | 00 00 00 00 00 00 00 00 00 00 00 00 00                   | 2.83  5 p. m.  4 cir. 2 st. 1 cir. st. 2 st. 1 st. 8 st. NW  | : 00<br>: 00<br>: 00<br>: 00<br>: 00<br>: 00<br>: 00<br>: 00 | 10 st.  3.16  6 p.m.  5 cir. 2 st. 1 cir. st. 2 st. 1 st. 6 cir. 3 st.   | 0 10 b (1 t) (0 t) (0 t) (0 t) (0 t)                |
| Mar. 31  Means.  Date.  1883. Mar. 4  Mar. 2  Mar. 3  Mar. 3  Mar. 5  Mar. 5  Mar. 7  Mar. 7  Mar. 9  Mar. 9   | 9 st. W. † 00 3.29  1 p. m.  1 st. 0 00 1 cir. 1 st. 0 00 1 cir. 3 st. 0 00 1 cir. 1 st. 0 00 1 st. 0 00 1 st. 0 00 2 cir. 4 st. NW; fu 2 st. 0 00 0 00  | 0 3.19  2 p. m.  1 cir. 1 st. 0 2 cir. 2 st. 0 1 st. 0 1 st. 0 1 st. 0 2 st. W.† 2 cir. 6 st. NW.† 2 st. Light haze. 0 3 cir. 1 st. Light haze. 0 1 cir. 1 st. Light haze. 0 2 st. Light haze. 0 2 st. Light haze. 0 4 st. Light haze. 0 4 st. Light haze. 0 4 st. Light haze. 0 4 st. Light haze. 0 4 st. Light haze. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00             | 0 3.22  3 p. m.  0 0 0 5 cir. 1 at. 0 2 cir. 3 st. 0 1 at. WNW. 1 1 st. WNW. 1 1 st. 0 1 cir. 2 st. 0 1 st. Light haze. 0 1 cir. 1 st. XE. 1 cir. 1 st. Lt. haze. 0 0 3 cir. 5 st. 0 3 cir. 5 st. 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 0 0 0 3 cir. 2 st. 0 1 cir. st. 3 st. 0 1 cir. 7 st. NW. 2 cir. 7 st. D. fog. 0 1 cir. 1 st. 0 0 4 st. Light haze. 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 5 p. m.  5 p. m.  4 cir. 2 st. 1 cir. st. 2 st. 1 cir. st. 3 st. NW 7 cir. st. 3 st. 10 st. Dense fog. 1 st. 2 st. Light haze. 2 cir. 2 st. 9 st. 1 cir. 1 st. NE  | ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;                       | 0 8t. 8 p.m. 0 5 cir. 2 st. 1 cir. st. 2 st. 1 cir. 3 st. 3 st. 3 st. 10 st. 2 cir. 1 st. 1 st. 2 cir. 1 st. 2 cir. 1 st. 2 cir. 1 st. 1 st. 2 cir. 1 st. 1 st. 2 cir. 1 st. 1 st. 2 cir. 1 st. 1 st. 2 cir. 1 st. 1 st. 2 cir. 1 st | 0 10 6 10 6 10 10 10 10 10 10 10 10 10 10 10 10 10  |
| Mar. 31 Megans.  Date.  1883, Mar. 4 Mar. 2 Mar. 3 Mar. 4 Mar. 5 Mar. 6 Mar. 7 Mar. 8 Mar. 9 Mar. 11 Mar. 11 Mar. 12 Mar. 13 Mar. 14   | 9 st. W. † 00 3.29  1 p. m.  1 st. 0 00 1 cir. 1 st. 0 00 1 cir. 3 st. 0 00 1 cir. 1 st. 0 00 1 st. 0 00 2 cir. 0 00 2 cir. 4 st. NW. 00 2 st. 0 00 6 cir. 0 00 6 cir. 0 00 1 cir. 1 st. 0 00 1 cir. 0 | 2 p. m.  2 p. m.  10 0 0 1 cir. 1 st. 0 2 cir. 2 st. 0 1 st. 0 1 st. 0 1 st. 0 2 cir. 6 st. NW.† 2 st. 2 st. NW.† 2 st. 1 cir. 1 st. Lt. haze. 0 3 cir. 1 st. Lt. haze. 0 4 st. 0 1 st. 0 1 st. 0 1 cir. 4 st. D fog. 0 1 cir. 4 st. D fog. 0  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 0 3.22  3 p. m.  0 0 0 5 cir. 1 at. 0 2 cir. 3 st. 0 1 at. WNW. 1 1 st. WNW. 1 1 st. 0 1 cir. 2 st. 0 1 st. Light haze. 0 1 cir. 1 st. XE. 1 cir. 1 st. Lt. haze. 0 0 3 cir. 5 st. 0 3 cir. 5 st. 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0 3 cir. 5 st. 0 0   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 0  3.74  4 p.m.  0 0 0  3 cir. 2 st. 0 1 cir. st. 3 st. 0 1 st. 0 8 st. NW. 2 cir. 7 st. D. fog. 0 1 cir. 1 st. 0 4 st. Light haze. 0 4 st. Light haze. 0 0 tr. 2 st. Ne. 0 cir. 2 st. Ne. 0 cir. 2 st. 0 2 cir. 3 st. 0 0 cir. 3 st. 0 0 cir. 3 st. 0 0 cir. 3 st. 0 0 cir. 3 st. 0 0 cir. 3 st. 0   | 00 00 00 00 00 00 00 00 00 00 00 00 00                   | 2.83  5 p. m.  4 cir. 2 st. (1 cir. st. 2 st. 1 kt. 8 st. NW 7 cir. st. 3 st. 10 st. 1 bcnse fog. 1 st. 2 cir. 2 st. 1 cir. 1 st. 2 cir. 2 st. 1 cir. 1 st. 0 st. NE 1 cir. 1 st. 0 cir. 2 st. 1 cir. 1 st. 0 cir. 2 st. 1 cir. 1 st. 0 cir. 2 st. 1 cir. 1 st. 0 cir. 2 st. 1 cir. 1 st. 0 cir. 1 st. 1 cir. 1  | : : : : : : : : : : : : : : : : : : :                        | 10 st.  3. 16  6 p. m.  0  5 cir. 2 st. 1 cir. st. 2 st. 1 st. 6 cir. 3 st. 3 st. 2 cir. 1 st. 1 st. 0 2 st. 1 st. 0 5 cir. 1 st. 1 st. 0 5 cir. 1 st. 1 st. 0 5 cir. 1 st.  | 0 10 6 10 6 10 00 00 10 10 10 10 10 10 10 10 10 10  |
| Mar. 31 Means.  Date.  1883. Mar. 12 Mar. 2 Mar. 3 Mar. 4 Mar. 5 Mar. 6 Mar. 7 Mar. 8 Mar. 10 Mar. 10 Mar. 11 Mar. 12 Mar. 13 Mar. 14 Mar. 15 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 18 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 17 Mar. 18 Mar. 19 Mar. 19 Mar. 19 Mar. 19  | 9 st. W. † 00 3.20  1 p. m.  1 st. 0 00 1 cir. 1 st. 0 00 1 cir. 3 st. 0 00 1 cir. 3 st. 0 00 1 st. 0 00 1 st. 0 00 2 cir. 4 st. NV † 00 2 st. 0 00 9 st. 2 st. 0 00 9 st. Light haze. 0 00 1 st. Light haze. 0 00 2 st. 0 00 2 st. 0 00 0 00 0 0 00 0  | 2 p. m.  2 p. m.  1 cir. 1 st. 0 1 cir. 2 st. 0 1 st. 0 1 st. 0 1 st. 0 1 st. 0 2 cir. 2 st. 0 1 st. 0 2 cir. 2 st. V.† 2 st. Light haze. 0 2 st. Light haze. 0 3 cir. 1 st. 0 1 cir. 1 st. Lt, haze. 0 2 st. Light haze. 0 4 st. 2 st. 0 1 cir. 1 st. 4 st. 0 1 cir. 4 st. D. fog. 0 1 cir. 4 st. D. fog. 0 1 cir. st. 4 st. 0 10 st. 1 cir. st. 4 st. 0 10 st. 1 cir. st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. St. 5 st. 5 | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 3 p. m.  3 p. m.  0 0 0 5 cir. 1 at. 0 2 cir. 3 st. 0 1 at. 0 1 st. WNW.4 1 st. 1 st. 1 t. 1 st. 2 co. 1 st. 1 cir. 1 at. 2 cir. 2 st. 0 1 cir. 1 at. 4 cir. 1 at. 0 3 cir. 5 st. 0 1 cir. 1 at. 0 0 1 cir. 5 st. 0 1 cir. 1 at. 0 1 cir. 1 at. 0 0 1 cir. 5 st. 0 1 cir. 1 at. 0 0 1 cir. 5 st. 0 1 cir. 1 at. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 0  3,74  4 p.m.  0 0 0  3 cir. 2 st. 0 1 cir. 3 st. 0 1 cir. 1 st. 0 8 st. NW. 5 st. NW. 2 cir. 7 st. D fog. 0 1 cir. 1 st. 0 4 st. Light haze. 0 9 st. NE. 1 cir. 1 st. 0 2 cir. 3 st. 1 1 cir. 1 st. 0 0 cir. 2 st. 0   | 000 000 000 000 000 000 000 000 000 00                   | 2.83  5 p. m.  4 cir. 2 st. 1 cir. 8t. 1 st. 1 st. 1 st. 1 lost. Dense fog. 1 st. 2 st. Light haze. 2 cir. 2 st. 9 st. 1 cir. 1 st. 6 cir. 1 st. 1 st. 1 st. 1 st. 2 cir. 2 st. 1 st. 2 cir. 2 st. 1 cir. 1 st. 6 cir. 1 st. 6 cir. 1 st. 1 cir. 1 st. 6 cir. 1 st. 6 cir. 1 st. 7 cir. 1 st. 8 cir. 1 st. 9 cir. 1 st. 9 cir. 1 st. 1 cir. 1 st. 9 cir. 1 st. 1 cir. 1 st. 9 cir. 1 st.   | 1 00 00 00 00 00 00 00 00 00 00 00 00 00                     | 0 St. 3.16  6 p.m.  5 cir. 2 st. 1 cir. st. 2 st. 1 st. 6 cir. 3 st. 3 st. 1 st. 6 cir. 1 st. 1 cir. 1 st. 1 cir. 1 st.  | 0 10 6 10 6 10 0 10 0 10 10 10 10 10 10 10 10 10 10 |
| Mar. 31 Means.  Date.  1883. Mar. 4  Mar. 2 Mar. 3 Mar. 3 Mar. 5 Mar. 5 Mar. 5 Mar. 10 Mar. 12 Mar. 13 Mar. 13 Mar. 13 Mar. 13 Mar. 14 Mar. 15 Mar. 17 Mar. 18 Mar. 17 Mar. 18 Mar. 19 Mar. 20 Mar. 22 Mar. 22 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 23 Mar. 24 Mar. 25 | 9 st. W. † 00  3.29  1 p. m.  1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 3 st. 0 00  1 cir. 3 st. 0 00  1 st. 0 00  2 cir. 0 00  2 cir. 4 st. NW † 00  2 st. 0 00  4 cir. 0 00  5 st. Light haze. 0 00  1 st. Light haze. 0 00  1 st. 0 00  2 st. 0 00  1 st. 0 00  2 st. 0 00  1 cir. 1 st. 0 00  2 st. 0 00  3 cir. 2 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 1 st. 0 00  1 cir. 2 cir. 3 cir. st. 3 st. 0 00  1 cir. 2 cir. 3 cir. st. 3 st. 0 00  6 cir. cum. 3 st. 8 W to 00  6 cir. cum. 2 st. 0 00  6 cir. cum. 2 st. 0 00  6 cir. cum. 2 st. 0 00  6 cir. cum. 2 st. 0 00  6 cir. cum. 2 st. 0 00  | 2 p. m.  2 p. m.  2 p. m.  1 cir. 1 st. 0 2 cir. 2 st. 0 1 st. 0 6 cir. 2 st. W.+ 2 cir. 6 st. NW.+ 2 st. Light haze. 0 3 cir. 1 st. 0 6 st. 2 st. Light haze. 0 1 st. 0 1 cir. 1 st. Lt. haze. 0 2 st. Light haze. 0 1 cir. 1 st. St. 0 1 cir. 1 st. St. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 2 st. 1 cir. 1 st. 0 2 st. 1 st. 0 2 st. 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 1 cir. 1 st. 1 st. 0 2 cir. 1 st. SW.+ 1 cir. 1 st. 0 2 cir. 1 st. SW.+ 1 cir. 1 st. 0 2 cir. 1 st. SW.+ 1 cir. 1 st. 0 2 cir. 1 st. SW.+ 2 cir. cir. Sw.+ 1 cir. 1 st. 0 2 cir. cir. Sw.+ 1 cir. 1 st. 0 2 cir. cir. cir. Sw.+ 1 cir. 1 st. 0 1 cir. 1 st. SW.+ 1 cir. 1 st. 0 2 cir. cir. cir. SW.+ 1 cir. 1 st. 0 1 cir. 1 st. SW.+   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 3 p. m.  3 p. m.  0 0 0 5 cir. 1 st. 0 2 cir. 3 st. 0 1 st. WNW: 1 st. 0 3 cir. 2 st. 0 1 cir. 1 st. 1 0 1 cir. 1 st. 0 5 st. 1 cir. 1 st. Lt. haze. 0 0 1 cir. 1 st. 1 0 1 cir. 1 st. Lt. haze. 0 0 1 cir. 1 st. 0 0 0 0 1 cir. 7 st. 0 0 1 st. 0 0 0 1 cir. 7 st. 0 0 1 st. 0 0 0 1 cir. 7 st. 0 0 1 st. 0 0 0 1 cir. 7 st. 0 0 1 st. 0 0 0 1 cir. 7 st. 0 0 1 st. 0 0 0 1 cir. 7 st. 0 0 1 cir. 8 st. 0 0 1 cir. 9 st. 0 0 1 cir. 9 st. 0 | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 0  3.74  4 p.m.  0 0 0  3 cir, 2 st. 0 1 cir, st. 3 st. 0 1 st. N.W. 5 st. N.W. 2 cir, 7 st. D. fog. 0 1 cir, 1 st. 0 4 st. Light haze. 0 2 cir, 2 st. 0 0 cir, 2 st. 0 0 cir, 2 st. 0 0 cir, 2 st. 0 0 cir, 1 st. 0 0 cir, 2 st. 0 0 cir, 2 st. 0 0 cir, 3 st. E. 0 cir, 1 st. 0 0 cir, 1 st. 0 0 cir, 2 st. 0 0 cir, 2 st. 0 0 cir, 3 st. 0 0 cir, 3 st. 0 1 cir, 1 st. 0 0 cir, 3 s | 00 00 00 00 00 00 00 00 00 00 00 00 00                   | 2.83  5 p. m.  4 cir, 2 st. 1 cir, st. 2 st. 1 cir, st. 2 st. 1 st. 8 st. NW 7 cir, st. 3 st. 1 st. 1 st. 1 st. 2 cir, 2 st. 1 cir, 1 st. 6 cir, 1 st. 6 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 1 st. 1 cir, 2 st. 1 cir, 3 st. 1 cir, 3 st. 1 cir, 3 st. 1 cir, 3 st. 1 cir, 2 st. 1 cir, 3 st. 2 cir, 2 st.  | 1 00 00 00 00 00 00 00 00 00 00 00 00 00                     | 10 st.  3.16  6 p.m.  0  5 cir. 2 st. 1 cir. st. 2 st. 1 st. 6 cir. 3 st. 3 st. 10 st. 2 cir. 1 st. 1 st. 0 2 st. 10 st 1 st. 0 1 cir. 1 st. 1 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 10 st. 2 cir. 2 st. 3 st. 2 cir. 4 st. 2 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st. 1 cir. 4 st.  | 0 to 6 to 6 to 6 to 6 to 6 to 6 to 6 to             |

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and amount and

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mount, kind, and ection of cloud.

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> 3. 16 **6 p.** m.

i cir. 2 st. | cir. st. 2 st. | st. | cir. 3 st. | st.

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| 7 n. m  |                            | % a. m.   |                           |                                  | 9 a. m.  |                       |                            | 10 a. m.  |                            | 11 a. m.  |                                     | <b>12</b> m.  |                            | precip                                   |
|---|----------------------------|---|---------------------------|----------------------------------|--|-----------------------|----------------------------|---|----------------------------|---|-------------------------------------|---|----------------------------|--|
| Amount, klad, and arection of clouds.   | Precipitation.             | Amount, kind,<br>direction of cl  | and<br>onds.              | Precipitation.                   | Amount, kind, direction of clo   | and<br>ouds.          | Precipitation.             | Amount, kind, and direction of clouds.  | Precipitation.             | Amount, kind, and direction of clouds.  | Preipitation.                       | Amount, kind, and direction of clouds.  | Precipitation.             | Amount of pritation.                     |
| Light hane.   | 00                         | 2 st.   | 0                         | 00                               | 1 st.  | 0                     | 00                         | i nr. o   | 00                         | 1 st. 0   |                                     | 1 st. 0   | 00                         | (10                                      |
| Light haze, 8 st. 0   | 00<br>00<br>00<br>00       | Light haze. 8 st<br>Light haze. 8 st<br>1 st.<br>0<br>2 st.                   | . 0<br>0<br>0             | 00<br>00<br>00<br>00             | Light haze. Light haze. 1 st. 1 st. Light haze. 5 st. 2 st.                | 0                     | 00<br>00<br>00<br>00       | 0 Light haze. 0 0 10 st. 0 0  | 00<br>00<br>00<br>00       | 0 1 at. Light hase. 0 0 10 at. 1 at. 0  | 00<br>00<br>00                      | 1 cir. 1 st. 0<br>1 cir. 1 st. Lt. haze. 0<br>0 0<br>10 st. 0<br>1 st. 0        | 00<br>00<br>00<br>00<br>00 | 00<br>00<br>00<br>00                     |
| ight haze. 5 st. 0<br>1 st. 0<br>1 st. 0  | 00<br>00<br>00<br>00       | 1 at.<br>Light hase. 5 at<br>3 at.<br>0                                       | . 0<br>0<br>0             | 00<br>00<br>00<br>00<br>00<br>90 | 0<br>2 st.<br>2 st.<br>0   | 0                     | 00<br>00<br>00<br>00       | Light haze. 0 0 1 at. 0 Light haze. 0 0 0   | 00<br>00<br>00<br>00       | 0 10 at. W. 1 cir. 1 at. 0 Light fog. 1 at. 0   | 00                                  | 1 cir. 0<br>10 st. W.<br>4 st. 0<br>Light fog. 0<br>1 st. 0                     |                            | 00<br>00<br>00<br>00<br>00               |
| 5 st. 0<br>2 st. 0<br>0<br>0<br>0<br>1<br>1<br>1<br>1<br>1<br>1<br>0<br>0   | 00<br>00<br>00<br>00       | 4 st.<br>2 st.<br>1 st.<br>0<br>Lt. haze. Lt. fe                              | 0<br>0<br>0<br>0<br>0g. 0 | 00<br>00<br>00<br>00             | Light haze. 4 st<br>3 at.<br>0<br>0<br>Light fog.                          | 0 0                   | 00<br>00<br>00<br>00       | 1 cir. 3 st. 0<br>1 at. 0<br>Light haze. 0<br>1 st. ENE.*                         | 00<br>00<br>00<br>00       | 1 cir. 9 st. NE.<br>0 Light haze.<br>2 cir. 2 st.<br>1 st. ENE  | 00                                  | 4 cir. 5 st. NE.<br>Light haze, 0<br>Light haze, 0<br>5 st. 0<br>1 cir. 1 st. 0 | 00<br>00<br>00<br>00       | 00<br>00<br>60<br>00                     |
| 1st. 0<br>0<br>0<br>hight haze, 5 st. 0   | 00<br>00<br>00<br>00       | 1 st.<br>0<br>0<br>Light fog.<br>2 st.  | 0<br>0<br>0<br>0          | 00<br>00<br>00<br>00             | 1 at.<br>0<br>0<br>1.ight fog.<br>2 st.                                    | 0 0 0                 | 00<br>00<br>00<br>00<br>00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 00<br>00<br>00<br>00       | 0<br>0<br>0<br>0<br>Light haze 5 st. 6<br>3cir. 1 ci.cum. 1 st. 6   | 00                                  | 0 0 0<br>0 0 0<br>2 cir. 1 st. 0<br>6 cir. 1 st. 0                              | 00                         | 00<br>00<br>00<br>00<br>00               |
| ter. cum. 1 st. 0<br>teir. st. 2 st. 0<br>teir. st. 2 st. 0   | 00 00 00                   | 10 st.<br>0<br>4 cir. st. 3 st.<br>10 nim.<br>10 st.                          | 0<br>0<br>0<br>0          | 00 00                            | 10 st.<br>0<br>Light haze, 5 st<br>2 cir, 6 st.<br>9 st.                   | 0<br>0<br>0<br>88E. t | 00<br>00<br>00<br>00       | 10 st. 0<br>0 0<br>3 cir. 4 st. SE. 4<br>4 cir. cum. 2 st. SSE. 8<br>8 st. ENE. 1 | . 60                       | 10 st. 0<br>1ci. 2ci.cu. 3st. 8E<br>6 cir. cum. 1 st. 6   | 00<br>+ 00<br>+ 00                  | 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                    | 00<br>00<br>00<br>00       | . 01<br>. 01<br>. 00<br>. 02<br>. 00     |
| t et. 0 t et. 0 t et. 1 et. 0 t et. 0 | 00<br>00<br>00<br>00       | 5 cir. cum. 2 st.<br>1 st.<br>5 cir. cum. 3 st.<br>1 st.<br>2 cum. 6 st.      | 0                         | 00<br>00<br>00<br>00             | 3 cir. cum. 3 st.<br>0<br>6 cir. cum. 2 st.<br>1 st.<br>5 st.              | 0 0 0                 | 00<br>00<br>00<br>00<br>00 | 1 cir. cum. 1 st. 0<br>1 st. 0<br>10 st. 0<br>0 0<br>10 st. 0                     | 00<br>00<br>00<br>00       | 3 cir. cnm. 3 st. (1 st. (10 st. (1 cir. cum. 1 st. (2 cir. cum. 1 st. (3 cir. cum. 7 st. (4 cir. cum. 7 cir. cum. 7 st. (4 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. (4 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. 7 cir. cum. (4 cir. cum. 7 cir. cum. 2 cir. cum. | 00 00                               | 4 cir. cum. 3 st. 0<br>1 cir. 0<br>10 nim. 0<br>1 st. 0<br>6 cir. cum. 4 st. 0  | . 00                       | . 01<br>. 00<br>. 67<br>. 00<br>. 01     |
| 3, 06   |                            | 2. 87   |                           |                                  | 2.45   |                       | _                          | 2.77  |                            | 3, 64   |                                     | 3.77  |                            | . 13                                     |
| 7 p. m.   | -                          | 8 p. m.   |                           |                                  | 9 p. m.  |                       |                            | 10 p. m.  |                            | 11 p. m.  |                                     | 12 p. m.  |                            | Daily means.                             |
|   | 00                         | 1 at.   | 0                         | 00                               | 1 st.  | 0                     | 00                         | 1 at. 0   | 00                         | 1 at.   | 00                                  | 1 at. 0   | 00                         | , t <sup>e</sup> 2                       |
| feir, 1 st. 0<br>leir, st. 1 st. 0<br>l st. 0<br>6 cir, 3 st. 0   | 00<br>00<br>00<br>00       | 6 cir. 3 st.<br>1 cir. 1 st.<br>1 st.<br>7 cir. st. 2 st.<br>5 cir. st. 2 st. | 0<br>0<br>0<br>0          | 00<br>00<br>00<br>00<br>00       | 1 cir. st. 4 st.<br>1 st.<br>1 st.<br>1 cir. st. 3 st.<br>1 cir. st. 2 st. | SE.†                  | 00<br>00<br>00<br>00<br>00 | 1 cir. st. 2 st. 0<br>1 st. 0<br>1 st. 0<br>1 cir. st. 7 st. NW.<br>4 st. SW.     | 00<br>00<br>00<br>00<br>00 | 1 st.<br>1 st.<br>8 st. NW  |                                     | 1 cir. st. 2 st. 0<br>1 st. 0<br>1 st. 0<br>1 cir. st. 3 st. 0<br>4 st. 0       | (10)                       | 2, 62<br>2, 54<br>, 70<br>5, 54<br>2, 62 |
| 7 cir. 3 st. 0<br>1 cir. 1 st. 0<br>0 0<br>1 cir. 1 st. 0   | 00                         | 4 cir. st.<br>1 cir. 1 st.<br>0<br>0<br>2 cir. 1 st.                          | 0<br>0<br>0<br>0          | 00<br>00<br>00<br>00<br>00       | 2 st.<br>1 st.<br>0<br>0<br>1 cir. 3 st.                                   | 0<br>0<br>0<br>0      | 00<br>00<br>00<br>00<br>00 | 2 st. 0<br>1 st. 0<br>0 0<br>0 0<br>6 st. 0                                       | 00<br>00<br>00<br>00       | 1 st.<br>0  | 00 00<br>00 00<br>00 00<br>0 00     | 1 st. 0<br>0 0<br>1 st. 0   | 00                         | 1, 20                                    |
| 4t. NE.†<br>1 st. 0<br>4 cir. 2 st. 0<br>1 cir. 1 st. 0   | 00<br>00<br>00<br>00<br>00 | 9 st.<br>1 st.<br>0<br>5 cir. 2 st.<br>4 cir. 1 st.                           | NE.†                      | 00<br>00<br>00<br>00<br>00       | 8 st.<br>1 st.<br>0<br>1 cir. 4 st.<br>1 cir. 1 st.                        | W. 1<br>0<br>0<br>0   | 00<br>00<br>00<br>00       | 6 st. W.1<br>1 st. 0<br>0 0<br>1 cir. 4 st. 0<br>1 cir. 3 st. 0                   | 00<br>00<br>00<br>00<br>00 | 0<br>2 cir. st. 4 st.   | .† 00<br>00<br>00<br>00<br>00<br>00 | 1 st. 0<br>0 0<br>3 cir. st. 3 st. 0  | 00                         | 2. 04<br>. 25<br>3. 41                   |
| 1 st. 0<br>0 0<br>1 st. 0<br>4 st. Dense fog. 0<br>E.†  | 00<br>00<br>00<br>00       | 1 st.<br>0<br>9 st.<br>Dense fog.<br>10 st.                                   | 0<br>0<br>0<br>E.†        | 00<br>00<br>00<br>00             | 1 st.<br>1 st.<br>9 st.<br>Light fog.<br>10 st.                            | NE. +                 | 00                         | 1 st. 0<br>1 st. NE.<br>9 st. 0<br>Uense fog. 0<br>10 st. 0                       | 00                         | 1 st. NE<br>1 cir. st. 3 st. SE   | 0 00                                | 1 st. NE.<br>1 cir. st. 3 st. 0<br>2 st. 0                                      | 00 t.<br>00 0              | 1. 66<br>3. t 4                          |
| lomm. 0<br>3 cir. 2 st. 0<br>2 cir. 7 st. 0<br>1 cir. 2 st. 0<br>8 st. SE.1   | 00                         | 10 nim.<br>3 cir. 5 st.<br>8 st.<br>10 st.<br>8 st.                           | 0<br>0<br>0<br>0          | . 01<br>00<br>00<br>00<br>00     | 3 st.<br>10 st.<br>9 st.<br>2 st.<br>9 st.                                 | SE. †                 | 00                         | 10 st. 0<br>10 st. 0<br>3 cir. 5 st. 0<br>5 st. SW.<br>8 st. SE.                  | 00<br>00<br>00<br>1 00     | 10 st.<br>9 st. SI  | 0 00                                | 5 st, (<br>9 st. (<br>1 st. (   | ) 00<br>) 00<br>) 00       | 4, 33<br>7, 33<br>6, 79                  |
|   |                            |   |                           |                                  | 9 at.  | 0                     | 00                         | 7 st. SW.   | t 00                       | 6 st. SW  | .1 00                               | 5 st. SW.   | 1 10                       | 6, 41                                    |
| lor. 5 st. 0<br>l st. 0<br>8 st. W.*<br>lor 1 st. 0<br>l tam. NNW, t  | 00                         | 6 st.<br>10 st.<br>10 st.<br>1 cir. st. 5 st.<br>3 cir. st. 3 st.             | W.+                       | 60                               | 10 st.<br>9 st.<br>1 cir. 4 st.<br>4 cir. st. 2 st.                        | W.+                   | 00                         | 10 st. 0<br>2 st. 0   | 00<br>00<br>00             | ! 10 st.<br>Dense fog.<br>. I cir. st. 8 st. W  | 0 00<br>0 00<br>1 00                | 9 st,<br>Dense fog. 6<br>9 st. W.   | 00 (<br>60 (<br>60 t,      | 5.45<br>7.91                             |
| l st. 0<br>8 st. W.*<br>limitst. 0  | 00                         | 10 st.<br>10 st.<br>1 cir. st. 5 st.  | 0<br>W. t                 | 00<br>00                         | 10 st.<br>9 st.<br>1 cir. 4 st.  | W.+                   | 00<br>00<br>00             | 10 st. 0<br>2 st. 0<br>1 cir. 5 st. W.  | 00<br>00<br>00             | ! 10 st.<br>Dense fog.<br>. I cir. st. 8 st. W  | 0 00<br>0 00<br>7,† 00              | 9 st,<br>Dense fog. (9 st. W.   | 00 (<br>60 (<br>60 t,      | 5. 45<br>7. 91<br>5. 00                  |

Means

7.13

6.96

#### EXPEDITION TO POINT BARROW, ALASKA.

Statement showing the amount, kind, and direction of clouds, and amount and

| Date.    Amount kind, and direction of clouds.   | 6 a. m.                             |
|--|-------------------------------------|
| Apr. 1 10 mim.   | nt, kind and                        |
| 1865   1976   1977    |                                     |
| pr. 12   0 st.   ENE   0   0   Est.   ENE   EST.    iaze. 3 at.                         |
|  | 21880. 5 nt.                        |
| 10 nim.   0   0   0 nim.   0   0   0   0   0   0   0   0   0   |                                     |
| 1  | Light fog.                          |
| Sept.   Sept |                                     |
| 1  | 6, 66                               |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | 6 p. m.                             |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | 1 st.                               |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 2 nt.                               |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | se. Lt. fog.<br>cum. 5 st.<br>l st. |
| $\begin{array}{llllllllllllllllllllllllllllllllllll$   |                                     |
| r 2: 1 cir cum 2 nim 0 = 10 nim. 0 nt 1 cir cum 9 nim 0 01 1 cir cum 8 nim 0 = 10 nim. 0 = 10 nim.   | i st.                               |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | st. 2 st.                           |

7. 13

6.90

charac

2 eir. at. 3 0 1 st. 10 mm. 10 st.

10 st. 10 st. 10 pim. ,0 st. 14 st.

10 st. 1 c t. 2 cir. g 2 st. 10 st. 3 cir. 1 st.

9 st. 10 st. Lt. lt. z. T st. 1 4 (Jr. 5 st. 1 st.

10 st 9 st, 2 st, 10 st, 7 st,

6.43

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

, and amount and

given in inches. In this

Amount, kind, and

0 nim. 3 st. 1 st. light haze. 3 st. light haze. 8 st.

u nt. 3 nt. 1 nt. 3 cir. cum. 5 nt. 6 cir. cum. 4 nt.

10 nim. 10 st. 10 st. Light fog. 1 cir. st. 2 st. 10 nim.

> 6, 66 6 p. m.

1 cir. 1 st. 2 st. 0 1 cir. 10 st.

10 st. 2 cir. 2 st. 2 st. 10 st. 1 st.

1 st. 1 cir. 1 st. 10 st. 10 st. 10 nim.

8 st. 10 st. Lt. haze. Lt. fog. 4 cir. cum. 5 st. 1 cir. 1 st.

3 cir. cum. 5 st. 3 cir. 4 st. 6 cir. 3 st. 10 st. 10 nim.

10 st. 9 st. 5 cir. st. 2 st. 10 st. 9 st.

6.43

E.1 2

0 st. 0 1 st. 10 nim. 10 st.

10 st. 10 st. 10 nim. 10 st. 10 st. table ' signifies repid, † algarifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| î a. m.   |                           |                              | 8 a. m.   |                       |                            | 9 a. m.  |                | 10 a.m.  |                      | 11 a. m.  |                      | 19 m.   |                              | berip.                                     |
|---|---------------------------|------------------------------|---|-----------------------|----------------------------|--|----------------|--|----------------------|---|----------------------|---|------------------------------|--|
| Amount, kind, an<br>direction of cloud                                    | d<br>in.                  | Precipitation                | Amount kind,<br>direction of cle  | end<br>outla          | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation  | Amount, kind, and direction of clouds.   | Precipitation.       | Amount, kind, and direction of clouds.                                | Precipitation.       | Amount, kind, and direction of clouds.  | Precipitation.               | Amount of pre-                             |
| 9 st.<br>0<br>0<br>0<br>10 st.  | 0 0 0                     | 00<br>00<br>00<br>00         | 9 st.<br>0<br>0<br>0<br>10 st.  | 0                     | 00<br>00<br>00<br>00       | 3 cir. eum. 5 st. 0<br>0 0 0<br>0 0<br>0 0<br>10 st. W.  | 00             | 4 st. 0<br>0 0<br>1 cir. st. 1 st. 0<br>0 0<br>10 st. 0  | 00<br>00<br>00<br>00 | 1 cir. 3 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                    | 00<br>00<br>00<br>00 | 1 cir. 7 st. 0<br>0 0<br>1 st. 0<br>0 0<br>10 nim. 0                                  | 00 00 00                     | . 01                                       |
| to nim.  9 at. 1 at. Light base. 8 at. Light base. 6 at.                  | 0 0                       | 00<br>00<br>00               | 10 nim.<br>10 at.<br>0<br>2 at.<br>2 cir. *, 3 at.                              | 0                     | 01<br>00<br>00<br>00<br>00 | 10 nim. 0 10 nt. 0 1 nt. 0 1 nt. 0 1 nt. 0 8 nt. 0   | 00             | 10 nim. 0<br>10 at. 0<br>0 0<br>4 cir. 1 at. 0<br>2 st. 0  | 00<br>00<br>00<br>00 | 10 nim. 0 1 10 nim. 0 1 cir. 0 5 cir. 2 st. 0 4 cir. st. 3 st. ENE.   | 00<br>00<br>00       | 10 st. 0<br>10 nim. 0<br>7 cir. 0<br>7 cir. 0<br>4 cir. cum. 2 st. 0                  | 00 00 00                     | . 00                                       |
| 10 st.<br>2 st.<br>2 cir. cum. 1 st.<br>3 cum. 4 st.<br>6 cir. cum. 4 st. | 0 0 0                     | 00<br>00<br>00<br>00         | 4 cum. 5 st.<br>2 cir, cum. 8 st.<br>3 st.<br>4 cum. 5 st.<br>5 cir. cum. 3 st. | 0 0                   | 00<br>00<br>00<br>00<br>00 | 4 cum. 6 st. 0<br>3 cum. 5 st. 6<br>1 cir. cum. 2 st. 0<br>6 cum. 3 st. 0<br>4 cir. cum. 5 st. 0 | 00             | 4 cum. 6 st. 0<br>5 cum. 4 st. 0<br>5 cir. cum. 2 st. 0<br>7 cum. 2 st. 0<br>4 cir. cum. 4 st. 0 | 00                   | 7 cum. 3 st. 0 6 cum. 4 st. 0 10 nim. 0 7 cum. 3 st. 0 3 cir. 6 st. 0 | 00 00 00             | 10 st. 0<br>7 cum. 3 st. 0<br>2 cir. 4 st. 0<br>5 cum. 5 nim. 0<br>3 cir. st. 4 st. 0 | 00 00 01 00                  | . 00                                       |
| 2 cir. st. 3 st.<br>0<br>1 st.<br>10 mm.<br>10 st.                        | 0<br>0<br>0               | 00 00 00                     | 3 at.<br>0<br>1 at.<br>10 nim.<br>10 nim.                                       | 0                     | 00                         | 2 nt. 0<br>0 0<br>1 nt. 0<br>10 nim. 0<br>10 nim. 0  | 00             | 1 nt. 0<br>0 0<br>1 at. 0<br>10 nim. 0<br>10 nt. 0   | 00                   | 0 0 0 0 1 st. 0 0 1 st. 0 0 1 st. 0 0                                 | 00 00                | 0 4 cir. cum. 0 0 2 cir. cum. 1 at. 0 10 nim. 0 10 at. 0                              | 00 00 00                     | .00<br>.00<br>.03<br>.13                   |
| to at.<br>10 st.<br>3 at.<br>3 at.<br>to nim.                             | 0                         | . 01<br>00<br>00<br>00<br>00 | 10 st.<br>10 st.<br>2 st.<br>1 cir. st. 2 st.<br>10 nim.                        | 8E.                   | 00<br>00<br>00<br>00       | 10 nim. 0<br>10 nt. 0<br>1 nt. 0<br>Lt. haze. 5 st. 8E.<br>10 nim. 0                             | 00<br>00<br>00 | 10 at. 0<br>10 at. 0<br>1 at. 0<br>6 cir. 2 at. ENE.<br>10 nim. 0                                | 00                   | 10 nim. 0<br>10 st. 0<br>1 cir. 0<br>1 cir. 9 st. ENE.*               | 00<br>00<br>00       | 10 nim. 0<br>10 at. 0<br>5 cir. 0<br>10 at. ENE.<br>10 nim. 0                         | .01<br>00<br>00<br>00        | . 00<br>. 00<br>. 11                       |
| 10 st.<br>10 st.<br>10 nim.<br>.0 st.                                     | 0<br>0<br>0<br>0          | 00 00 00                     | 10 nim.<br>10 st.<br>10 nim.<br>10 st.<br>10 st.                                | 0 .                   | 01<br>00<br>00<br>00       | 10 nim. 0  |                | 10 nim. 0<br>4 cum. 6 st. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0                                 | 00                   | 10 nin. 0 4 cum. 6 st. 0 10 st. 0 10 st. 0 10 st. 0                   | 00                   | 10 nim. 0<br>7 cum. 3 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                       | . 01<br>00<br>00<br>00<br>00 | .05  |
| 6. 40   |                           |                              | 6. 30   |                       |                            | 6. 53  |                | 6. 56  | i                    | 7. 16   | -                    | 7. 43   |                              | . 52                                       |
| 7 p. m.   |                           |                              | 3 p. m.   | -                     |                            | 9 p. m.  | 1              | 10 p. m.   |                      | fi p. m.  |                      | 12 p. m.  |                              | Daily<br>means.                            |
| 0<br>2 st.<br>0<br>0<br>10 st.  | 0 0 0                     | 00<br>00<br>00<br>00         | 0<br>1 at.<br>0<br>0<br>10 st.  | 0                     | 00<br>00<br>00<br>00       | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00             | i st. 0<br>1 st. 0<br>0 0<br>1 st. 0<br>10 st. 0   | 00                   | 1 st. 0   | 00<br>00<br>00<br>00 | 0 0 1 at. 0 0 0 3 st. 0 10 nim. 0   | 00<br>00<br>00               | 4, 79<br>, 50<br>, 45<br>, 37<br>9, 95     |
| 10 st.<br>1 cir. 2 cir. ut. 1 st<br>2 st.<br>10 st.<br>1 cir. 1 st.       | 0 (1                      | 00<br>00<br>00<br>00         | 9 st.<br>3 st.<br>2 st.<br>10 st.<br>6 cir. 2 st.                               | 0                     | 00<br>00<br>00<br>00       | 1 cir. 8 at. SW. 2 st. 0 2 st. 0 10 st. 5 st. ENE.   | 00<br>00       | 1 cir. 9 at. 8W.<br>2 at. 0<br>2 at. 0<br>10 at. 9<br>4 at. ENE.                                 | 00<br>00<br>00       |   | 00<br>00<br>00<br>00 | 1 cir. 5 at. SW. 2 st. 0 3 st. 0 10 at. 0 7 at. ENE.                                  | 60                           | 9, 66<br>5, 87<br>3, 12<br>5, 79<br>5, 54  |
| 9st.<br>10st.<br>Lt.h.z. 7st. <b>D.</b> fog<br>4 cir. 5 st.<br>1 st       | 0<br>E.†<br>; 0<br>0<br>0 | 00<br>00<br>00<br>00         | 10 st.<br>10 st.<br>Light hase. 6 s<br>1 cir. cum. 8 ni<br>1 cir. 1 st.         | SE. t<br>t. 0<br>m. 0 | 00                         | 9 st. 0<br>10 nim. 0<br>10 st. 0<br>2 cir. cum. 7 nim. 0<br>2 cir. 1 st. 0                       | 00             | 9 st. 0<br>10 nim. 0<br>10 at. 0<br>1 ci, cu. 9 nim. ENE.<br>2 cir. st. 3 at. 0                  | 1                    | 10 nim. 0<br>6 st. 0<br>1 cl. cu. 9 nim. ENE.                         | 00                   | 6 st. 0<br>10 nim. 0<br>6 st. 0<br>4 cir. cum. 6 nim. 0<br>4 st. NE.                  | . ****                       | 8, 75<br>8, 37<br>6, 60<br>8, 70<br>5, 83  |
| l st.<br>st<br>l st<br>l) nam.<br>lo nim.                                 |                           | 00<br>00<br>00<br>. —        | 1 at.<br>0<br>10 at.<br>10 at.<br>10 nim.                                       | 0                     | 00<br>00<br>00<br>02       | 1 st. 0<br>1 st. 0<br>10 nim. 0<br>10 st. 0<br>10 nim. 0   | 00             | 1 at. 0<br>1 at. 0<br>10 nim. 0<br>10 at. 0  | 00                   | 10 nim. 0   | 00 00 00 00          | 1 st. 0<br>1 st. 6<br>10 nim. 0<br>10 st. 0<br>10 nim. 0                              | 00                           | 2.95<br>1,29<br>5,54<br>10,00<br>10,00     |
| 2er. eum. 7 st.<br>502 2 st.<br>4 cv. 4 st.<br>10 st.<br>1 cr. 5          |                           | 00<br>00<br>00               | 2 cir. cum. 7 st<br>5 cir. 1 st.<br>8 cir. 3 st.<br>10 st.<br>10 nim.           | 0 :                   | 00<br>00<br>00<br>00       | 10 at. 2 cir. at. 5 at. SE. 3 at. 0 10 at. 0 10 nim. 0   | 00<br>00       |  |                      | 7 st. SE. (<br>8 st. SE.)   | 00 00                | 10 st. 0<br>6 st. 0<br>1 cir. st. 6 st. SE.<br>10 nim. 0                              | 1 00                         | 9, 66<br>9, 60<br>5, 91<br>8, 37<br>10, 00 |
| 9 st.<br>2 st.<br>10 st.  | 0 0                       | 00<br>00<br>00<br>00         | 10 st.<br>5 cir. st. 4 st.<br>1 st.<br>10 st.<br>10 st.                         | 0                     | 00<br>00<br>00<br>00<br>00 | 5 cir. cum. 4 st. 0<br>8 st. 0<br>1 st. 0<br>10 st. 0  | 00             | 2 cir. cum. 2 st. 0<br>6 st. N.<br>10 st. 0  | 1 10                 | 9 st. 0<br>9 st. 0<br>10 nim. 0                                       | 00                   | 2 cir. cum. 7 nim. E. 8 st. 6 10 st. 6 10 nim. 6 9 st. ENE.                           | 4 11                         | 9, 70<br>9, 20<br>5, 16<br>10, 00<br>9, 62 |
| 6. 33   |                           |                              | 6, 40   | -                     |                            | 6.30   |                | 6. 36  | 1                    | 6.73  | 1                    | 6, 63   |                              | 6.76                                       |

Statement showing the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, --5 hours 17 minutes. Precipitation is given in inches. 15 ths.

|  | 1 a.m.  | 2 a. m.  | 3 a.m.   | 4 n. m.  | 5 a. m.   | 6 a.m.  |
|--|---|--|--|--|---|---|
| Date.  | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds   |
| 1883.<br>May 1<br>May 2<br>May 3<br>May 4<br>May 5 | 9 st. NE.* 00 60 5 cir. st. 3 st. 1 cir. st. 9 st. ESE 1 00 cir. st. 9 st.                                      | 3 cum. 5 st. NE. 1 00<br>3 cir. st. 1 st. 0 0<br>2 cir. 2 cir. st. 3 st. 0 0<br>4 cir. 4 st. 8E.5<br>1 cir. st. 9 st. 0 1 00   | 0 2 cir. st. 1 st. 9 00<br>0 2 cir. st. 2 st. 9 00<br>0 4 cir. st. 3 st. 9 00    | 9 at. NE.† 00<br>2 cir. st. Lt. fog. 0 00<br>1 cir. st. 1 at. 0 00<br>3 cir. st. 2 st. 0 00<br>1 cir. st. 9 at. 0 00 | 10 st, NE. 1 00<br>2 cir, st. Lt. fog. 0 00<br>2 st. 0 00<br>1 cir. st. 2 st. 0 00<br>10 st. 0 00                                   | 10 st. NE i (0<br>3 st. 0 (9)<br>2 st. 0 (9)<br>2 ctr st. 1 st 0 (9)<br>10 st. 0 (9)                    |
| May 6<br>May 7<br>May 8<br>May 9<br>May 10         | 9 st. SW.† 00<br>10 st. 0 00<br>10 st. 0 00<br>9 st. 0 00<br>10 st. 0 00  | 5 8t. SW.† 00<br>10 8t. 0 00<br>10 8t. 0 00<br>9 8t. E.† 00<br>10 8t. 0 00   | 0 10 st. 0 00<br>0 10 st. 0 00<br>0 9 st. 0 00                                   | 9 st, 10 nim, 0 ! — 0 00 9 st, SE, † 00 00 Dense fog.  | 9 st. SW. 1<br>10 st. 0<br>10 st. 0<br>3 cum. 6 st. 0<br>Dense fog. 0<br>00   | 9 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>9 cum. E + 00<br>Dense fog. 0 00                            |
| May 11<br>May 12<br>May 13<br>May 14<br>May 15     | 1 cir. 6 st. SW.* (a) 10 st. 0 (b) 10 st. 0 (c) 10 st. 0 (d) 10 st. 0 (d) 10 st. 0 (d)                          | 9 st. 0 ; 00<br>; 10 st. 0 ; 00<br>; 9 st. NE. 0<br>10 st. 0 00<br>10 st. NNW.† 0  | 0 10 st 0 00 00 1 cir. st. 8 st. NE.* (0 00 00 00 00 00 00 00 00 00 00 00 00     | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 10 st. Light fog. 0 00 00 8 st. 10 nim. 0 00 00 10 st. 10 nim.  | 10 st. 0 rd<br>10 st. 0 60<br>5 cum. 5 st. E. 1 00<br>10 nim. 0 ct<br>10 st. 0 00                       |
| May 16<br>May 17<br>May 18<br>May 19<br>May 20     | 10 nim. 0 .— 10 nim. 0 .— 10 nim. 0 .— 10 nim. 0 .— 9 st. SW.† 00 10 st. 0 00                                   | 10 nim. 0 10 nim. 0 10 st. 0 1 cir. st. 8 st. SW. f (6 to st. 8 st | - 10 st. 0 .—<br>- 10 st. 0 .00<br>5 cir. st. 2 st. 0 .00                        | 10 nim. 0 '.01<br>10 st. 0 00<br>10 nim. 0 .—<br>4 cir. st. 2 st. 0 00<br>4 cir. st. Dense fog. 0 00                 | 10 nim. 0 1 — 10 st. 0 00 10 nim. 0 1 — 5 cir. st. 1 st. 0 00 5 cir. st. Lt. fog. 0 00  | 10 nim. 0<br>10 st. Light fog. 0<br>10 nim. 0<br>3 cir. st. 2 st. 0 .00<br>3 cir. st. 2 st. SW. 6 .00   |
| May 21<br>May 22<br>May 23<br>May 24<br>May 25     | 4 cir. cum. 3 st. 0 00<br>Dense fog. 0 00<br>10 st. 0 00<br>Dense fog. 0 00<br>10 st. 0 00                      | 6 cir cum. 1 st. 0 0c<br>Dense fog. 0 0c<br>10 st. 0 0c<br>1 cir. st. D. fog. 0 0c<br>10 st. 0 0c  | Dense fog. 0 c0 + 10 st. 0 00 0 0 3 ci.s.2 ci.cu.2 s.SW + 00                     | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | Dense fog. 0 00<br>Dense fog. 0 00<br>10 st. 0 00<br>3 cl. s. 6 st. Lt, fog. 0 03<br>10 st. 0 00                                    | 4 cir. cum, 2 st. 0 co<br>Dense fog. 0 10<br>10 st. 0 00<br>5 cum, 3 st. SW 1 01<br>10 st. 0 10         |
| May 26<br>May 27<br>May 28<br>May 29<br>May 30     | 10 st. SW. † 00<br>Dense fog. 0 00<br>1 cir. st. 7 st. 8.* 00<br>3 cir. Light fog. 0 00<br>10 st. 0 00          | 9 st. SW.† 00<br>Dense fog. 0 00<br>9 st. Dense fog. 0 00<br>Light fog. 0 00<br>9 st. E.* 00   | Dense fog. 0 00<br>Dense fog. 0 00<br>Dense fog. 0 00<br>Dense fog. 0 00         | 9 st. SW.* 00<br>Dense fog. 0 00<br>Dense fog. 0 00<br>4 cir. st. Lt. fog. 0 00<br>1 ci. 2 ci. cu. 4 st. E. † 00     | 10 st,   SW, † 00<br>  Dense fog,   0   00<br>  Dense fog,   0   00<br>  4 cir. st. Lt. fog.   0   00<br>  4 cim. 2 st.   E, †   00 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| May 31   | 2 cir. cum. 7 st. 0 00  | 1 cir. st. 9 st. SW. 1 00  | 1 cir. st. 8 st. SW. † 00  | 1 cir. st. 8 st. SW. † 00  | 9 st. SW. + 00  | $-3$ cum, 5 st. $-8\mathrm{W}_{\ast}$ ( $_{00}$   |
| Means.   | 8. 63   | 7. 83  | 7. 06  | 7. 29  | 7. 09   | 7. 41   |
|  | 1 p. m.   | 2 p. m.  | 3 p. m.  | 4 p. m.  | 5 թ. ա.   | <b>B</b> p. m.  |
| 1885.<br>May 1<br>May 2<br>May 3<br>May 4<br>May 5 | 1 st. 0 00<br>5 cir. 1 st. 0 00<br>1 cir. st. 1 st. 0 00<br>1 cir. 1 st. 0 00                                   | 1 st. 0 00<br>3 cir. 3 cir. st. 2 st. 0 00<br>0 0 0 0 00<br>3 cir. st. 1 st. 0 00<br>2 cir. 4 st. SW. f  | 0 4 cir. st. 5 st. 0 00<br>1 at. 0 00<br>2 cir. 2 cir. st. 1 st. 0 00            | 1 st. 0 00<br>3 cir. st. 5 st. 0 00<br>1 st. 0 00<br>3 cir. st. 2 st. 0 00<br>8 W.* 00                               | 1 cir. st. 1 st. 0 00<br>3 cir. st. 5 st. 0 00<br>2 st. E.* 00<br>9 st. SW.* 00   | 2 cir. st. 1 st. 6 be<br>4 cir. st. 4 st. 0 m<br>5 st. E. 9<br>4 cir. st. 3 st. 0 cs<br>8 st. 8W. 0     |
| May 6<br>, by 7<br>V 0 8<br>May 9<br>May 10        | 10 st. D. fog. N.* 00<br>10 nim. 0 .02<br>0 0 00<br>10 st. 0 00<br>4 cir. 2 st. NE.† 00                         | 10 st.   N.*   00   10 nim.   0   00   1 st.   0   00   10 st.   3 cir. 6 st.   0   00   00   00   00   00   00   0  | 2 10 nim. 0 1.03   0 1 st. 0 00   00   00   0 10 st. 0 00   00   0 00   0 10 st. | 10 st.   N.†   00   10 nim.   0   0   0   1 st.   0   10 st.   0   10 st.   0   00                                   | 10 at. NE. * 00 10 at. 0 10 at. 6 10 at. 10 at. 0 00 8 at. 0 00 00  | 9 st. NNE. 1 to<br>10 st. 0 to<br>2 cir. 1 st. 0 v0<br>10 st. 0 m<br>4 cir. 4 st. SW. 0                 |
| E ty 11<br>5/2 y 12<br>2 ay 13<br>May 14<br>May 15 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 10 st. Dense fog. 0 00<br>8 st. NE. † 00<br>10 nim. 0 0 01<br>10 st. 0 00<br>8 st. N.† 00  | 0 10 mm. 0 1   | 1 cir, 7 st. 3 cir, 1 st. 10 nim. 9 st. 50 to 10 st. 50 to 0 00  | 10 st. 4 ctr. 4 st. NE. 90 10 nim. SW. 00 10 nim.   | 10 st. 0 00<br>9 st. NE 10<br>10 st. 0<br>9 st. SW. 00<br>10 st. 0                                      |
| May 18<br>May 18<br>May 18<br>May 19<br>May 20     | 10 uim. 0   | 10 atm. 0  | 0   9 st. SW.† 00<br>0   10 st. 0 00   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 10 st. 0 00<br>9 st. 8W.* 00<br>10 st. 0 00<br>10 st. 0 00<br>11 st. 0 00<br>1 st. 0 00   | 10 st. 0 ct. 9 st. 8W.1 co. 10 st. 0 ct. 10 st. 0 ct. 10 st. 0 ct. 2 cir. 1 st. 8W.1 to                 |
| May 21<br>May 22<br>May 23<br>May 24<br>May 25     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 1 st. 0 00<br>10 st. 0 00<br>10 st. 0 00<br>1 cir. 8 st. SW. 1 00<br>10 st. SW. 0 00   | 0 10 st. 0 00<br>0 10 st. 0 00<br>0 10 st. SW. t 00                              | Light fog. 0   00   10 st. 0   00   10 st. 0   00   00   00   00   00   00   00                                      | Light fog.  | Lt. fog. Lt. fog. 0 0 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                      |
| May 26<br>May 27<br>May 28<br>May 29<br>May 30     | Dens fog, 0 00<br>4 st. 8E.† 00<br>2 cir. 3 st. 0 100<br>2 cir. 3 cir. st.3 st. 0 100<br>6 cir. cum. 5 st. 0 00 | Dense fog 6 00<br>8 st. ESE.† D. fog. 00<br>1 cir. 3 st. 0 00<br>4 cir. st. 5 st. 0 00<br>4 cir. cum. 4 st. 0 00   | 0 6 st. D. fog. ESE.† 00<br>0 3 cir. 2 st. 0 00<br>0 10 st. 0 00                 | Pense fog. 0 00<br>5 st. D. fog ESE † 00<br>4 cir. 2 st. 0 00<br>10 st. 0 00<br>1 cir. 8 st. E. † 00                 | Dense fog. 8   00<br>3 st. ESE, † 00<br>4 cir, 3 st. 0 co<br>10 st. 0 to<br>3 cir, 5 st. E, † 00                                    | Dense fog. 0 60 60 6 8t. 4 cir. 3 st 0 0 10 10 st. 2 cir. 5 st. 0 10 10 10 10 10 10 10 10 10 10 10 10 1 |
| May 31   | 9 st. E.+. 00   | 10 st. 0 00  | 0 10 st. 0 00  | 10 st. 0 00  | i0 st. 0 00   | 10 at. 0 19   |
| Means  | 6.54  | 7. 16  | 7. 19  | 7. 22  | 7. 45   | 7.74  |

character

Ameunt, k

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p st. 28f. ir ha e. r 28f. n n 28f. m 68f.

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t t t t t.lst.

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883-Continued.

the eignifies rapid, t signifies slow. Daily means of amount of cleads on the right below; amount of precipitation on the right above.]

| 7 a.   | 111.               |                                   | 8 a. 1   | m.                       |                            | 9 a. m.   |   | 10 a. m.   |                            | ## a. m.   |                            | 12 m.  |                              | precipi        |
|--|--------------------|-----------------------------------|--|--------------------------|----------------------------|---|---|--|----------------------------|--|----------------------------|--|------------------------------|----------------|
| Amount, kindirection of                                      | nd, and<br>clouds. | Precipitation.                    | Amount, kin<br>direction of c  |                          | Precipitation.             | Amount, kind, and direction of clouds                                     | Precipitation                                 | Amount, kind, and direction of clouds.   | Precipitation              | Amount, kind, and direction of clouds.   | Precipitation.             | Amount, kind, and direction of clouds.   | Precipitation.               | Amount of pre- |
| cir.3 st.<br>1 st.<br>1 st.<br>1 cir. st. 1 st.              | 0 0                | ( 0<br>00<br>00                   | 2 st.<br>1 cii. 1 st.<br>2 st.<br>3 cir. cum. 2 s<br>10 st.                    | 0<br>0<br>0<br>0<br>t, 0 | 00<br>00<br>00<br>00<br>00 | 1 6t.<br>2 c <sup>1</sup> r.<br>1 st.<br>3 cir. st. 2 st.<br>10 st.       | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | 1 st. 0<br>5 cir. 0<br>1 st. 0<br>6 cir. cum. 1 st. 0  | 00<br>00<br>00<br>00       | 1 cir. cum. 6 st. E.   | 00  <br>00  <br>00  <br>00 | 0 0 0 0 0 7 st. E.* 9 st. 0  | 00<br>00<br>00<br>00         |                |
| st.<br>st.<br>st.  | 0 '                | 00<br>00<br>00<br>00<br>00        | 10 st. Light i<br>10 nim.<br>10 st.<br>10 st.<br>Dense fog.                    | fog. 0<br>0<br>0<br>E. t | 00<br>00<br>00             | 10 st. Light fog.<br>10 nim.<br>10 st.<br>10 st.<br>Deuse fog.            | 0 00<br>0 00<br>0 00<br>0 00                  | Dense fog. 0<br>10 nim. 0<br>10 st. 0<br>10 st. 0<br>7 cir. cum. Lt. fog. 0                  | 00<br>02<br>00<br>03<br>00 |  | 02                         | 10 nim. 0<br>1 st. SW. †   | 00<br>00<br>00<br>00         |                |
| st.<br>st.<br>cum. 2 st.<br>nuo.<br>st.                      | 0 1                | 00<br>00<br>00<br>02<br>00        | 10 st.<br>4 cum. 3 st.<br>10 st.<br>10 nim.<br>10 st. Light i                  |                          | 00<br>00<br>00<br>01       | 8 st. XXI<br>10 st.<br>10 nim.  | V. † 00<br>E. † 00<br>0 00<br>0 . —<br>0 00   | 10 st. NNW.1 t cir. 1 st. 0 10 st. 0 10 st. 0 10 st. 0                                       | 00                         | l cir. 5 st. NE. t   |                            | 10 st. NNE.† 8 st. NE.† 10 nim. 0 10 nim. 0 10 st. 0   | 00<br>00<br>.01<br>.01       |                |
| st.<br>st.<br>cum, 4 st.<br>di. st. 1 st.                    | W.+                |                                   | 10 st.<br>10 st.<br>5 cum. 4 st.<br>1 cir. st. 2 st.<br>2 st.                  | 0<br>0<br>0              | 00<br>00<br>00<br>00<br>00 | 10 st,<br>4 cum. 2 st. W  | 0 .—<br>0 00<br>0 00<br>7.† 00<br>0 00        | 10 nim. 0 10 st. 0 10 st. 0 Count 2 st. 0 Count 2 st. Clight fog. 0 0                        | 00<br>00<br>00             | 10 nim. 0 10 st. 0 7 cam. 2 st. SW. 1 Light fog. 0   | 00<br>00<br>00             | 10 nim. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>Light fog 0   | . 01<br>00<br>00<br>00<br>00 |                |
| onm. D. for<br>t. Light for<br>t.<br>onm. 2 st.<br>use fog.  | sw. f              | 00<br>00<br>00<br>00<br>00        | 4 cum. D. fo<br>10 st. Light f<br>10 st.<br>5 cum. 3 st.<br>Dense fog.         | g. 0<br>og. 0<br>SW.†    | 00<br>00<br>00<br>00       | 5 cum. Lt. fog.<br>10 st. Light fog.<br>10 st.<br>7 cum. 2 st.<br>10 st.  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | 4 cum. Lt. fog. 0<br>10 st. Light fog. 0<br>10 st. 0<br>10 st. 8W. 1<br>10 st. 0             | 0.0                        | Dense fog. 0<br>10 st. Light fog. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                            | 00<br>00<br>00<br>00       | Light fog. 0<br>10 st. Light fog. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0                                    | 00<br>00<br>00<br>00         |                |
| um.6 st.<br>ir st.2 st.<br>ir haze.<br>ii 2 st.<br>u n.2 st. | 3 st. 0            | 60<br>60                          | Dense fog.<br>6 cir. cum. 1 s<br>Dense fog.<br>5 cum. 1 st.<br>4 cir. cum. 2 s | 0                        | 00<br>00<br>00<br>00<br>00 | Dense (bg. 5 cur. 5 st. 1 cum. Lt. fog. 3 c r.3 ctr.cum.3 st 1 c.r. 1 st. | 0 00<br>0 00<br>0 00<br>0 00<br>0 00          | Dense fog. 0<br>7 cir. cum. 2 st. 0<br>Light fog. 0<br>5 cir. cum. 2 st. 0<br>2 cir. 1 st. 0 | . 00                       | Dense fog. 0<br>7 cir. cum. 1 st. 0<br>4 cir. Light fog. 0<br>5 ci.4 ci.cu.1 st. NE. †<br>5 cir. 0 | 00<br>00<br>00<br>00       | Dense fog. 0<br>1 cir.2 cir.cum.1 st. 0<br>6 cir. Light fog. 0<br>5 cir.3 cir.cum.1 st. 0<br>8 cir. cum. 0 | 00<br>00<br>00<br>00<br>00   |                |
| 5 6 st.  | sw.+               | ()(1                              | 10 st.   | SW. t                    | 00                         | 10 st. SW   | 7. f 00                                       | 10 st. SW.   | 00                         | 10 st. SW. †   | 00                         | 4 cir.cum.6 st. ENE.*  | 00                           |                |
| 74   |                    |                                   | 6, 54  |                          |                            | 6. 61   |   | ii. 9v   |                            | 7.432  |                            | 7. 35  |                              |                |
| 7 p.   | 10.                |                                   | 5 p. 1   | n.                       | -                          | () p. m.  |   | 10 p. m.   |                            | 11 p. m.   |                            | 12 p. m.   |                              | Dai            |
| dr 1 st.<br>dr st. 3 st.<br>st.<br>dr st. 2 st.              | E.*                | 00                                | 1 st,<br>4 cir. st. 2 st,<br>8 st,<br>2 st,<br>1 st,                           | 0                        | 00<br>00<br>00<br>00       | 1 st.<br>2 cir. st. 4 st.<br>8 st. ESI<br>4 st.<br>1 st.                  | 0   00<br>0   00<br>E. ' 00<br>0   00         | 1 st. 0<br>3 cir. 4 st. 0<br>10 st. 0<br>9 st. 0<br>8 st. SW.                                | 00                         | 1 st. 0<br>2 cir. 6 st. 0<br>9 st. ESE.t<br>7 st. E.t<br>9 st. SW.t                                | 00<br>00<br>00<br>00       | 1 st. 0<br>2 cir. 6 st. 0<br>10 st. ESE.t.<br>9 st. E t<br>9 st. SW.t                                      | 00                           |                |
| t.<br>t.<br>m. 1 st.<br>t.<br>ir. 1 st.                      | ()<br>()<br>()     | 60<br>60<br>60<br>60<br>60        | 9 st.<br>10 st.<br>1 cir. 1 st.<br>10 st.<br>5 cir. 2 st.                      | 0                        | 00<br>00<br>00<br>00       | 10 st. NNI<br>10 st.<br>1 cir. 1 st.<br>10 st.<br>6 st.                   | E.†! 00<br>0 : 00<br>0 : 00<br>0 ! 00<br>0 00 | 10 st. NNE.t<br>10 st. 0<br>1 cir. 1 st. 0<br>10 st. 0<br>1 cir. 6 st. 0                     | 00<br>00                   | 10 st. 0<br>10 st. 0<br>2 cir, cum. 2 st. 0<br>10 st. 0<br>7 st. 0                                 | 00  <br>00  <br>00  <br>00 | 10 st. 0<br>10 st. 0<br>2 cir. cum. 3 st. 0<br>10 st. 0<br>1 cir. 4 st. 0                                  | 00<br>00<br>00<br>00         | 1              |
| t.<br>t.<br>t.   | E.S.               | 60<br>0-1<br>00<br>00<br>00<br>00 | 10 st.<br>9 st.<br>10 st.<br>8 st.<br>10 nim.                                  | 0 0 0                    | 00<br>00<br>00<br>00       | 10 st.<br>10 st.<br>10 st.<br>9 st.<br>10 num.                            | 0 00<br>0 : 00<br>0 : 00<br>0 00              | 10 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. ESE.t<br>10 nim. 0                                | 00                         | 10 st, 0<br>10 nm, 0<br>10 st, 0<br>10 st, 0<br>10 st, 0   | 00  <br>00  <br>00         | 10 st. 0   | 00<br>.01<br>.00<br>.00      |                |
| t.<br>t.<br>t.<br>t.<br>t. 1 st.                             | SSW.f              | 00<br>60<br>00<br>00<br>00        | 10 st.<br>9 st.<br>10 st.<br>10 st.<br>2 cir. 1 st.                            | SSW.t                    | 00<br>00<br>00<br>00<br>00 | 10 st.<br>9 st. SV<br>10 st.<br>10 st.<br>1 cir. 1 st.                    | 0 00<br>V.1 00<br>0 00<br>0 00<br>0 00        | 10 st. 0 SW.1 10 st. 0 1 st. 0 1 st. 0 1 st. 0   | 00<br>00<br>00<br>00       | 10 st,   | 60<br>00<br>00<br>00<br>00 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 00<br>00<br>00<br>00         | . 1            |
| ht fog,<br>t<br>t.   | 8W.1               | 00<br>00<br>00<br>(d)             | Light fog,<br>10 st,<br>10 st,<br>10 st,<br>10 st,                             | 8W.†                     | 00<br>00<br>00<br>00       | Dense fog.<br>10 st.<br>10 st.<br>10 st.<br>10 st.<br>8 V                 | 0 00<br>0 00<br>0 00<br>V.† 00<br>0 00        | Dense fog. 0<br>10 st. 0<br>10 nim. 0<br>8 st. SW.1<br>10 st. 0                              | 00                         | Dense fog. 0   | 00 00 00                   | Dense fog. 0<br>10 st. 0<br>Dense fog. 0<br>10 st. 0   | 00 00 00                     |                |
|  | E.†                | 00<br>00<br>00<br>00<br>e0        | Dense fog.<br>10 nim.<br>3 cir. 4 st.<br>10 st.                                | 0 0 0                    | 00                         | Bense fog.<br>10 nim.<br>9 st.<br>10 st.                                  | 0   00<br>0   00<br>0   00                    | Dense fog. 0<br>10 st. 0<br>1 cir. 7 st. 0<br>10 st. 0                                       | 00                         | Dense fog. 0<br>10 %t,<br>4 cir. 8 st. Lt. fog. 0<br>10 st. 0                                      | 00<br>00<br>00             | Dense fog. 0<br>9 st. S.†<br>8 st. 0<br>10 st. 0   | 00<br>00<br>00<br>00         |                |
| ir. 4 st.  |                    | 60                                | 1 cir. 2 st.   |                          | 00                         | 2 cir. cum. 2 at.   | 0 00  | 1 cir. cum. 4 st.  | 00                         | 7 at. E.1  | 00                         | 9 nt. 0  | (9)                          | 1 4            |
| ir.4 st.<br>et.<br>ir 3 st.<br>t.                            | 0                  | 00                                | 1 cir. 2 st.<br>10 st.   | 0                        |                            | 2 cir. cum. 2 st.<br>10 st.   | 0 00  | !  |                            | 7 at. E.!<br>10 st. 0  |                            | 9 st. 0<br>10 st. 0  | 00                           |                |

ense fog. st. cir. 3 st. st. cir. 5 st. 7.74

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nim. 0 .-st. Light fog. 0 00
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cir. st. 2 st. SW. + 00

cir. cum. 2 st. 0 00 cuse fog. 0 16 st. 0 00 cum. 3 st. SW, † 00 st. 0 00

st. 0 00 cir.st.3 st. Lt.fog. 0 00 .haze, 5 st. Lt.fog. 0 00 cir. st. 1 st. 0 00 cum. 3 st. 0 00 cum. 5 st. SW. 1 00 7.41 6 p.m.

cir. st. 1 st. cir. st. 4 st. st. cir. st. 3 st. st.

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st. st. st. st. cir. 1 st.

st. st. st. st.

SW.

NE. 00 

0 00 0 0, 00 0 0

Lt. fog. 0 00 0 00 0 00 8W. 1 00 0 00

Statement showning the amount, kind, and direction of clouds, and amount and

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In this

| i  | 1 a.m.   |   | 2 a. m.   | 3 a  | . m.   |  | 4 a. m.  |  | 5 а. та.   |  | 6 a. m.  |
|--|--|---|---|--|--|--|--|--|--|--|--|
| Date.  | Amount, kind, and<br>direction of clouds.  |   | Amount, kind, and aircetion of clouds.  | Amount, ki   | nd, and<br>clouds.   | Precipitation.   | Amount, kind, and direction of clouds  |  | Amount, kind, and direction of clouds.   | Precipitation.   | Amount, kind, and<br>direction of clouds   |
| June 1<br>June 2<br>June 3<br>June 4   | 10 nim. 0 '  | 00 10   | 10 st. 0 , 0 (10 st. 0 )  | - 10 nim.<br>0 , 10 st.  | NW. 1  | 00   | 10 st.<br>10 st.<br>10 nim.<br>10 st.  | 0 00<br>W. t. —  | 10 st. 0   |  | 10 st. 0 0<br>10 st. 0 0<br>6 cu. 3 cu. st. NW. 1<br>10 st. 0 0  |
| June 5<br>June 6<br>June 7<br>June 8<br>June 9   | Denso fog. 0 (<br>2 cir. st. 0 (   | 00 D<br>00 1<br>00 D  | 10 st 0 0 Dense fog. 0 0 1 cir. st. 1 st. 0 0 Dense fog. 0 0 10 nim. E.*                                    | 0 Dense fog.<br>2 cir. st. 1 st<br>0 Dense fog.  | t. 0<br>0<br>0<br>0  | 00<br>00<br>00<br>00   | 10 st.<br>Dense fog.<br>1 cir. 2 cir. st. 1 st.<br>Dense fog.<br>10 nim.   | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 01                           | 10 st.   0<br>  2 cir. st.   0<br>  2 cir. st. 1 st.   0<br>  10 st. Light fog.   0<br>  10 nim.   0 | 00   | 10 st. 0 0 0<br>1 cir. 0 0 0<br>1 cir. 1 cir. st. 1 st. 0 0<br>10 nim. 8 cum. 0  |
| June 10<br>June 11<br>June 12<br>June 13<br>June 14  | 4 cir. 3 st. E. † 0<br>10 st. E.* 0<br>10 nim. 0   | 00   3<br>00   10<br>  10   | 1 cir. 1 cir. st. 2 st. 0 0 0 0 0 0 st. E.* 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                           | Dense fog.   | 8 st. E. t   | 00<br>00<br>00<br>.01<br>60  | 10 st.<br>10 st.<br>10 st.<br>10 st.   | W. † 00<br>E. * 00<br>0 00<br>0 00                                     | 5 cum. 2 st. 0<br>10 st. 0<br>10 st. 0<br>10 st. 0<br>10 nim. 0<br>10 st. 0                          | 00   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| June 15<br>June 16<br>June 17<br>June 18<br>June 19  | Dense fog. 0 0<br>Dense fog. 0 0   | 00 D<br>00 D<br>00 5  | 0 st.  Dense fog.  Dense fog.  5 cir. cum. 1 st.  0   00   - 00    0   0    E.* 00                          | Dense fog. Dense fog. Licir cum. 9:  | 0 :<br>0<br>st. NE.*   | (0)  | 10 st. Light fog.<br>10 st. NI<br>b cir. Dense fog.<br>Dense fog.<br>10 nim.   | 0 00<br>0 00<br>0 00<br>E.*  | 10 st. 0<br>10 st. 0<br>4 cir. Light fog. 0<br>10 nim. 0<br>E.                                       | . —  | 3 cum. 5 st. 0 10 nim. 0 .0 5 cir. st. Lt. Fog. 0 0 Dense Fig. 0 0   |
| June 20<br>June 21<br>June 22<br>June 23<br>June 24  | Dense fog.   | 00   10<br>00   10<br>10   1  | Oense fog. 0 00<br>0 st. ENE.* 00<br>0 st. NE.* 00<br>1 cir. cum. 6 st. NE.* 00<br>1 cir. cum. 6 st. E.* 00 | 10 st.<br>10 st.<br>Dense fog.   | NE.*   | 00<br>00<br>00<br>00<br>00   | Dense fog. Dense fog. Dense fog. 10 st. Lt. fog. N. 10 st.   | 0 00<br>0 00<br>0 00<br>E.* 00<br>E.* 00                               | 10 nim. 0<br>10 st. NE.  | 00   | Dense fog. (0.10 nim. Light fog. 0.10 nim. 10  |
| June 25<br>June 26<br>June 27<br>June 28<br>June 29  | 1 cir. cam. 6 st. E. † 0<br>1 cir. st. 8 st. E. * 0<br>10 nim. 0 .0<br>10 st. SSE. * 0<br>2 cir. st. 2 st. 0 0   | 00 4<br>02 10<br>00 10  | 2 ci. 1 ci. cu. 3 st. E.* 06 4 cir. cum. 4 st. E.* 06 0 nim. 0   05 0 st. SSE. i 3 cir. st. 2 st. 0   06    | 1 cir. st. 9 st. 10 nim.   | SSE.   |  | Dense fog.   | 0 00<br>E.* 00<br>0<br>E.†   | 5 cum. 2 st. 0<br>5 cum. 3 st. E.<br>Dense fog. 0<br>10 st. SSE.<br>5 cum. 2 st. 0                   | 00<br>00<br>00   | 10 st. ENE. 0<br>10 st. E. 0<br>Dense fog. 0 0<br>3 cum. 6 st. S. + 0<br>4 cum. 3 st. 0 6  |
| June 30  | 10 nim. SSE.*.0  | 2 10  | 0 nim. W. i . 08  |  |  | . 02   |  | W.* 00   | 10 st. SW.   | 00   | 6 cum. 3 st. Lt. fog. 0 , 0  |
| Means.   | 6. 63  | 1   | 7. 03   | 6.80   |  |  | 6. 56  |  | 7. 60  |  | 7.48   |
| Date.  | 1 p. m.  |   | 2 p. m.   | 3 p  | o. m.  |  | 4 p. m.  |  | 5 p. m.  |  | 6 m.   |
| June 1   | 1  |   |   |  |  |  |  |  |  |  |  |
| June 2<br>June 3<br>June 4   | 10 at. 0 0   | 00 10<br>00 10  | 9 st. WNW. †. 00<br>0 st. 0 00<br>0 st. 0 00<br>0 st. 0 00  | )   10 st.<br>)   10 st.   | 0  | 00   | 10 st.<br>10 st.<br>30 st.<br>10 st.   | 0 00<br>0 00<br>0 00<br>0 00   | 9 st. W.<br>10 st. 0<br>10 st. 0<br>10 st. 0   | 00   | 10 st.   |
| June 2<br>June 3   | 10 st. 0 0 0 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 00 10<br>00 10<br>00 10<br>00 10<br>00 D<br>00 D<br>00 D  | 0 st. 0 00  | ) 10 st.<br>) 10 st.<br>) 10 st.<br>) Dense fog.<br>) Dense fog.<br>) 10 st.   | 0<br>0<br>0<br>0<br>0<br>0<br>E.*  | 00<br>00<br>00<br>00<br>00<br>00   | 10 st.<br>10 st.<br>10 st.<br>Light fog.<br>0<br>Dense fog.<br>10 st.  | 0 00   | 10 st. 0   | 00<br>00<br>00<br>00<br>00<br>00   | 10 st. 0 0   |
| June 2<br>June 3<br>June 4<br>June 5<br>June 6<br>June 7<br>June 8   | 10 st.   | 00 100 00 100 00 10 00 10 00 10 00 10 00 10 00 10 00 30 00 30 00 30 00 10   | 0 st. 0 00 00 00 00 00 00 00 00 00 00 00 00   | ) 10 st.<br>) 10 st.<br>) 10 st.<br>) Dense fog.<br>) Dense fog.<br>) 10 st.<br>  8 st.<br>) 2 cir. cum.<br>3 2 cir. 3 st.<br>) 10 st.   | 0<br>0<br>0<br>0<br>0<br>E.*<br>E.*                                      | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                         | 10 st. 10 st. 10 st. Light fog. 0 Dense fog. 10 st. 1 cir. I st. 4 cir. cum. 2 st. 1 cir. cum. 5 st. N1 10 st. 81  | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>E.* 00<br>0 00 | 10 st.   | 00<br>00<br>00<br>00<br>00<br>*, 60<br>*, 00<br>† 00                       | 10 st. 0 0 10 st. 10 st. 0 0 10 st. 0 1 |
| June 2<br>June 3<br>June 4<br>June 5<br>June 6<br>June 7<br>June 8<br>June 9<br>June 10<br>June 11<br>June 12<br>June 12   | 10 st.   | 000 1000 1000 1000 1000 1000 1000 1000  | 0 st. 0 00 00 00 00 00 00 00 00 00 00 00 00   | 10 st.   1 | 7 st. E. † SE. † E. c  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00       | 10 st. 10 st. 10 st. 11 st. 12 st. 10 st. 10 st. 10 st. 10 st. 1 cir. 1 st. 1 cir. cum. 2 st. 1 cir. cum. 5 st. N. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st.  | 0 00 00 00 00 00 00 00 00 00 00 00 00 0                                | 10 st.   0   10 st.   0   10 st.   0   10 st.   0   10 st.   0   0   0   0   0   0   0   0   0       | 00<br>00<br>00<br>00<br>00<br>* 60<br>* 60<br>† 00<br>† 00<br>† 00<br>† 00 | 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 1 cir. 1 st. 0 0 0 4 cir. cum. 4 st. 0 10 st. 0 0 9 st. 8 E. 0 0 9 st. 8 E. 0 0 9 st. 8 E. 0 0 9 st. 8 E. 0 0 0 9 st. 8 E. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| June 2<br>June 3<br>June 3<br>June 5<br>June 6<br>June 7<br>June 7<br>June 9<br>June 10<br>June 11<br>June 12<br>June 12<br>June 13<br>June 14<br>June 15<br>June 17<br>June 17<br>June 17   | 10 st.   | 90 100 100 100 100 100 100 100 100 100 1  | 0 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   8 st.   10 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                    | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 1 cir. 1 st. 1 cir. 3 st. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. 1 st. N. 1 cir. 3 st. N. 1 st. N. 1 cir. 3 st. N. 1 cir. 3 st. N. N. 1 cir. 3 st | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 0            | 10 st.   0   10 st.   0   10 st.   0   10 st.   0  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 0 0 10 st. 0 0 6 0 10 st. 0 0 6 10 st. 0 0 6 10 st. 0 0 6 10 st. 0 0 6 10 st. 0 0 6 10 st. 0 0 6 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 0 10 st. 0 |
| June 2 June 5 June 5 June 6 June 7 June 7 June 7 June 8 June 10 June 11 June 12 June 13 June 14 June 15 June 18 June 18 June 19 June 20 June 20 June 21 June 22 June 22 June 23 June 24 June 27 June 2 | 10 st. 0 0 10 st. 0 0 10 st. 0 | 100   100 | 0 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   8 st.   10 | 7 at. E.† NE.† NE.† NE.† SE.† E.*  1 at. 0 NE.* ENE.*  t. 0 0 0 t. ENE.* | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 10 ot. 10 | 0 00 00 00 00 00 00 00 00 00 00 00 00 0                                | 10 st.   0   10 st.   0   10 st.   0   10 st.   0   10 st.   0                                       | 000 000 000 000 000 000 000 000 000 00                                     | 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 1 10  |
| June 2 June 5 June 6 June 6 June 7 June 7 June 8 June 7 June 8 June 9 June 10 June 11 June 12 June 13 June 14 June 15 June 17 June 18 June 17 June 18 June 19 June 20 June 21 June 22 June 23 June 24 June 25 June 25 June 27 June 28 June 27 June 28 June 27 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 28 June 29  | 10 st.   | 000 1000 1000 1000 1000 1000 1000 1000  | 0 st. 0 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | 10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   10 st.   8 st.   2 cir. 3 st.   10 st | 7 at. E.† NE.† NE.† NE.† SE.† E.*  1 at. 0 NE.* ENE.*  t. 0 0 0 t. ENE.* | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 10 st. 10 st. 10 st. 10 st. 10 st. 1 cir. 1 st. 1 cir. cum. 2 st. 1 cir. cum. 5 st. NI 10 st. 10 st. 1 cir. st. 7 st. 1 st. 2 st. 1 cir. st. 7 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 3 st. 1 cir. 1 cir. 3 st. 1 cir. 2 st. 7 st. 1 cir. 2 st. 7 st. 1 cir. 3 st. 1 cir. 1 cir. 3 st. 1 cir. 2 st. 1 cir. 2 st. 7 st. 1 cir. 3 st. 1 cir. 4 cir. 4 cir. 4 cir. 4 cir. 4 cir. 5 cir. 5 cir. 5 cir. 5 cir. 6 ci | 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 0            | 10 st.   0   10 st.   0   10 st.   0   10 st.   0   10 st.   0                                       | 00 00 00 00 00 00 00 00 00 00 00 00 00                                     | 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 0 10 st. 1 10  |

characte

Amount, k

lest. 10 st. 4 cu. 4 cu. 8t. 1 st. 10 st. Light 1 cir. 2 cir. 1 st. 1 1 - 1 cir. 2 cir. 1 st. 1

tom. 3 st. 1 mm 1 st. 1 mm 1 st. 1 mm 1 st. 1 mm 1 st. 1 mm 1 st. 1 mm 1 st. 1 bmm 5 cm. st. Lt. Dense fog. 1 st. 1 km tom. 1 st. Light for

| 1 ath. | 1 ath. | 1 ath. | 1 ath. | 1 st. | 1 st. | 1 st. | 1 st. | 1 st. | 1 st. | 2 st. | 2 st. | 2 st. | 3 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. | 4 st. |

t teum, 4 st. E

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

and amount and

iven in inches. In this 6 a.m.

st cir. cir. 1 cir. st. 1 st. nim. cum.

3 cum. 5 st. 0 .—
0 nim. 0 .01
5 cir. st. Lt. Fog. 0 00
ense fig. 0 00
0 st. 0 .—

Dense fog. 5 00 0 nim. Light fog. 0 .— 0 nim. 0 .— Dense fog. 0 00 0 st. E. 00

6 cum. 3 st. Lt. fog. 0 , 00

7.46 6 ... m.

0 st. 10 st. Dense fog. 3 cum. 6 st. 4 cum. 3 st.

10 st. 0 Dense fog. 10 st. 1 cir. 1 st.

4 cir. cum. 4 st. 7 st. 10 st. 0 st. 10 st.

10 st. 10 st. 1 cir. st. 5 st. 9 st. 2 st.

10 st. 10 st. Dense fog. 1 cir. 1 st. 3 cir. cum. 5 cu. st

9 st. 7.26 NE. ..

 $\leq W$ 

Daily means of amount of clouds on the right below; amount of precipitation on the right above.

| 7 a. m.                           |                                       |                          | 8 a. n  | n.                  | 1                    | 9 a. m.  |  | 10 a. m.   | 1                 | !! a. m.   |                            | i2 m.   | precipi                    |
|-----------------------------------|---------------------------------------|--------------------------|---|---------------------|----------------------|--|--|--|-------------------|--|----------------------------|---|----------------------------|
| amount, kind,<br>rection of clo   | and<br>ands.                          | i tecupitationi.         | Amount, kine<br>rection of c                                | d, and<br>louds.    | Precipitation.       | Amount, kind, and direction of clouds  | Precipitation.                             | Amount, kind, and direction of clouds.   | Precipitation.    | Amount, kind, and direction of clouds.                                       | Precipitation.             | Amount, kind, and direction of clouds.  | mount of                   |
| st.<br>st.<br>st. ten.st. NI      | 0 , 0<br>0 , 0<br>NW.† 6              | 0 10<br>0 10             | ) at.<br>) st.<br>) st.<br>) st. Light i                    | 0                   | 00<br>t 0 :<br>00 :  | 10 st.<br>10 st.<br>2 cum. 3 cum. st. M  | 0 00<br>0 00<br>1.4 00                     | 10 st. N. †<br>10 st. 0<br>3 cum. 0<br>16 st. Light fog. 0                     | 00<br>00<br>00    | 10 cu.n. st. N. !  | 00                         | 8 st. N. 1 00<br>10 st. 0 0<br>10 st. 0 0<br>10 st. Light fog. 0 0                                | ) ;                        |
| st. Light fog.                    | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 F<br>- 10              | ense fog.<br>ense fog.<br>) nim.<br>) nim.                  | 0                   | 00                   | Dense fog. Dense fog. 10 nim. 10 nim.  | 0 00<br>0 00<br>0 00<br>0                  | Dense fog. 0 0 0 0 Dense fog. 0 10 nim. 0 10 nim. 0                            | 00 00             | Dense fog. 0 ,   | 00                         | Dense fog. 0 00 Dense fog. 0 0 4 cam. 6 st. ENE.* 10 nim. E.*.                                    | 9                          |
| emast.                            | 0 0<br>E. 1 - 0<br>0 - 0<br>0 - 0     | - 10<br>10 10<br>- 10    | ) st.<br>) nim. Lt. fo<br>  st.<br>) nim. Lt. fo<br>) st.   | ng. Ü               | 00                   | 10 st.<br>6 ci. 2 s. ENE '. L. fo<br>10 st.<br>10 nim. Light fog.<br>10 st.                              | 0 00                                       | 10 st. 0<br>6 ci. 2 s. NNE.† L. fog.<br>10 st. 0<br>10 nim. ESE.†<br>10 st. 0  | 00                | 10 st. 0<br>1 cir. 1 st. 0<br>10 st. 0<br>10 st. SE. 1<br>10 st. 0           | 60                         | 1 cir. ' 0 0  | 0                          |
| om 6 st. E                        | ENE.† (<br>NE.†<br>g. 0   0<br>0 (    | - 10<br>0 1              | ) cum.<br>) nim.<br>7 cir. st. 1 st.<br>lense fog.<br>) st. |                     | 00 00 00             | 1 cir. cnm, 9 cu. Nl<br>3 cum, 6 cum, s. Nl<br>8 cir. s. 1 s. Lt. fog<br>Dense tog.<br>10 st. Light fog. | E. t . —                                   | 0 st. NE.1<br>10 st. 0<br>8 ci. s. 1 s. Lt. fog. 0<br>8 cum. 0<br>Dense fog. 0 | 00                |  | 00                         | 9 st. NE.† 0<br>10 mim. 0 . –<br>7 cir. st. 2 st. 0 0<br>8 nim. 0 . –<br>10 mim. ENE.† . –        | 0                          |
| at. Light fog.                    | 0.0                                   | 1 1 1                    | Ci. ou. 4 s. I<br>O st.<br>O nim.<br>O st.<br>O st.         | ENE.*  ENE.*  ENE.* |                      | 4 cir. 3 st. ENI<br>10 st. Light fog.<br>10 mm.<br>10 st. In ENI   | 0 00<br>0 . —                              | 3 cir. 4 cum. 0<br>10 nim. 0<br>10 st. NE.<br>10 st. ENE.<br>10 st. ENE.       | 00                | 8 cum. 0<br>10 st. 0<br>10 st. NE.4<br>10 st. ENE t<br>10 st. ENE.*          | 00                         | 5 cir. 2 cum. 0 0<br>9 st. NE.* 0<br>10 st. ENE.* 0<br>10 st. 0 6<br>10 st. ENE.* 0               | 0                          |
|                                   | ENE. (                                | 0 1<br>0 1               | ) st.<br>) st.<br>) enso fog.<br>) st.<br>) st.             | 8.1                 |                      | 10 st.<br>10 st.<br>Dense fog.<br>6 cir. cum. 1 cum.<br>10 nim. p  | 0 00<br>0 00<br>0 00<br>0 00               | 10 st. ENE.* 10 st. 0 Dense fog. 0 1 cir. cum. st. 0 10 nim. 0                 | 00<br>00          | 1 cir. cum. 2 st. ESE. †   | 00 .                       | 10 st. ENE. 0<br>10 st. Light fog. 0<br>Dense fog. 0<br>2 cir. cum. 2 st. 0<br>7 cir. cum 3 st. 0 | 0<br>0<br>0                |
|                                   | sw.+ c                                | ю -                      | l cum. 3 st.  | sw.t                | 00                   | 10 st. SV  | V. 1 00                                    | 10 st. SW.   | 00                | 10 st. SW †  | 00                         | 10 st. SW. 1  | 0                          |
| 8, 63                             |                                       |                          | 8. 03   |                     |                      | 7.83   |  | 7. 53  |                   | 8.00   |                            | 7. 83   |                            |
| 7 p. m.                           |                                       |                          | 8 p. 1  | n.                  |                      | ₽ p. m.  | =  | 10 p. m.   |                   | 11 p. m.   | -                          | 12 p. m.  | Dai                        |
| 41<br>2'<br>2 al.                 | SW.+ 0                                | 00 1                     | 0 at.<br>0 at.<br>0 at.<br>0 at.                            | SW. 1               | 00<br>00<br>00       | 1 cir. 2 st.<br>10 st.<br>10 st.<br>10 st.   | 0 00<br>0 00<br>0 00<br>0 00               | 9 st. NW.<br>10 st. 0<br>10 st. 0<br>10 st. 0                                  | 00                | 0 st. NW. t<br>10 st. 0<br>10 st. 0<br>10 st. 0                              | 00 00 00                   | 10 st. 0 (  |                            |
| st.<br>Ese fog.<br>st             | 0 0<br>0 0<br>E.* 0                   | 00 I<br>00 I             | 0 st.<br>0<br>Dense fog.<br>0 st.<br>2 cir. 1 st.           | 0<br>0<br>0<br>E.*  | 00<br>00<br>00<br>00 | Dense fog.<br>1 st.<br>Dense fog.<br>10 nim.<br>2 st.  | 0 00<br>0 00<br>0 00<br>E, † . —<br>0 00   | Dense fog. 0   | 00<br>00          | Dense fog. 0 1 st. 0 1 ost. 0 1 ost. E.† 1 cir. 2 st. 0                      | 00                         | 1 st. 0 0<br>Dense fog. 0 0<br>10 nim. E. t   | 00 1<br>00 1               |
| o.r. 2 st.<br>or. 2 st.<br>ol5.   | E.* (                                 | 10<br>10<br>10           | 8 st.<br>4 cir. 3 st.<br>9 st.<br>3 st.<br>0 st.            | E. (-               | 00                   | 3 st.<br>2 cir. cum. 6 st.<br>10 st.   | E. † 00<br>0 00<br>0 00<br>E 00<br>E. † 00 | 8 st. E.<br>2 cir. 5 st. KE<br>10 st. NE.                                      | 00<br>00          | 6 st. E.† 9 st. NE.† 10 st. 0 10 st. 0 10 st. E.†                            | 00<br>00<br>00             | 6 st. 0 + 6<br>Deuse fog. 0 + 6<br>10 nim. 0<br>10 st. 0 + 6<br>10 st. 0 + 6                      | 10                         |
| st.<br>st.<br>ch. st. 3 at.<br>er | NE. † (                               | 10<br>10<br>10           | 0 st.<br>0 st.<br>5 cir. st. 3 st.<br>9 st.<br>5 st.        | NE.†                | (i)<br>(i)<br>(i)    | 3 cir. 4 st  | 0 00<br>E.† 00<br>0 00<br>E.* 00<br>E.* 00 | 8 st. ENE.   | 00                | 10 st. 0<br>Dense fog. 0<br>4 cir. cum. 3 st. 0<br>10 st. E. †               | 00<br>00<br>00<br>00<br>00 | Dense fog. 0<br>3 cir. cum. 2 st. 0<br>10 st. E. t  | 00<br>00<br>00<br>10       |
| st<br>st<br>com. 4 st. F          | NE,* 0                                | 00<br>00<br>00 1<br>10 1 | 1 st.<br>8 st.<br>0 st.<br>0 st.<br>4 cir. st. 1 st.        | NE '                | 00<br>00<br>00<br>00 | 1 st.<br>10 st. N<br>10 st.<br>10 st.<br>2 ci. cum. 5 st EN  | 0 00<br>E. † 00<br>0 06<br>0 00<br>E. † 00 | 1 st. 0<br>Dense fog. 0  | 00 00             | 1 st, 0<br>Dense fog, 0<br>10 st, 0<br>10 st, E,†<br>1 ci. cum. 7 st. ENE. † | 00<br>00<br>00<br>00<br>00 | 1 st. 0<br>9 st NE.*<br>10 st. 0<br>5 st. ENE.†   | 00  <br>00  <br>00  <br>00 |
| er<br>er<br>Les Togs              |                                       | 00 1<br>00 1             | 5 st.<br>0 st.<br>Dense fog.<br>1 cir. 1 st.                | 0                   | 00<br>00             | 8 st. EN<br>10 st.<br>Dense fog.<br>2 cir. cum. 2 st.  | E. 00<br>0 00<br>0 00<br>0 00              | 7 st. ENE.<br>10 st. 0<br>Dense fog. 0<br>1 cir. 2 st. 0                       | * 01<br>00<br>100 | 9 st. ENE.*<br>10 nim. 0<br>10 st. 0<br>1 ci. 1 ci. cum. 2 st. 0             | (+0<br>+-0<br>+0)          | 9 st. ENE." 10 nim. 0 10 st. E.*  | 03 1                       |
|                                   | SW + 0                                | ю                        | 9 st.   | 8.1                 | (.0                  | 9 at.  | (11)                                       | 10 st. SW.   | 1 110             | 10 at. SE. I   | (31)                       | 10 st. ESE, † )   | 10                         |
|                                   | SW. + (                               |                          |   | wsw.*               |                      |  | V. 00                                      | 1 cir. st. 9 st. WSW.  |                   | 9 st. WSW.^  |                            | 10 st. ESE. + 0   |                            |

Statement showing the amount, kind, and direction of clouds, and amount  $a_{\rm mid}$ 

|   | 1 a.m. 🐞   | 2 a. m.   | 8 a. m.   | 4 a. m.  | 5 a. m.  | в а. п.   |
|---|--|---|---|--|--|---|
| Date.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.                                      | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds   |
| 1883.<br>July 1<br>July 2<br>July 3<br>July 4       | 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | - 10 st. E.* 0 00   | 10 st. 0 00<br>10 nim. ESE.*. 0 02<br>10 nim. 0 02<br>10 nim. 0 01  | 10 st. SW.* 00<br>10 nim. 0 02<br>10 nim. 0 01<br>10 nim. 0 0  | 9 st. WSW. † 00<br>10 st. 0 . —<br>10 nim. 0 . 61<br>10 st. 0 . —  | 9 st. SW.<br>10 mm.<br>10 mm.<br>10 st.   |
| July 5<br>July 6<br>July 7<br>July 8<br>July 9      | 10 nim. 0 . — 10 st. E. † 0 2 ci. 3 ci. s. 3 s. SSW.† 0 10 nim. S. † . — 1 cir. st. 4 st. W. † 0   | 9 st. 8,1,03  | 10 st, 0 l.—<br>10 nim. 0 l.—<br>1 cir. st. 9 st. 8.† 00<br>10 st. 8.† 00<br>2 cir. 1 cir. st. 1 st. 0 + 60       | Dense fog. 0 100<br>10 nim. 0 .—<br>10 nim. 0 .01<br>10 st. S. † 00<br>4 cir. 1 st. 0 00                               | Dense fog.   | Dense fog,<br>10 nim. Light fog<br>10 nim.<br>10 nim.<br>2 cir. 1 st.                   |
| July 10<br>July 11<br>July 12<br>July 13<br>July 14 | Dense fog. 0 0 0 0 1 cir 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 1 1 cir. st. 1 st. 0 00<br>10 st. 0 00<br>10 nim. 0 .—                      | 10 st.NE.*Dense fog.   00<br>6 st. NE.*   00<br>10 st.   0   00<br>10 nim.   0   01<br>1 cir. st. 7 st. WSW.   00 | 10 st.NE.*Dense fog. 00<br>3 st. E.* 00<br>10 st. 0 0.0<br>10 nim. 0 0.0<br>1 cir. st. 5 st. WSW. † 00                 | Dense fog. 0 00<br>  1 cir. cum. 2 st.   | Dense fog.<br>1 cum. 2 st. E<br>10 mm.<br>10 st. Light fog.<br>3 st.                    |
| July 15<br>July 16<br>July 17<br>July 18<br>July 19 | 0 st. 0 . 0<br>Dense fog. 0   0<br>Dense fog. 0   0<br>2 ci. 2 cir, st. 1st. 0 0<br>2 ci. 1 ci. cum, 2 st. 0 0                           | Dense fog. 0 00<br>Dense fog. 0 00<br>4 cir. st. 1 st. 0 00                 | 10 st. 0   00<br>10 st. 0   60<br>Dense fog. 0   00<br>5 cir. st. 1 st. 0   00<br>3 cir. 2 cir. cu. 2 st. 0   00  | 10 st. 0   00<br>10 st. 0   00<br>1 cir. Dense fog. 0   00<br>4 cir. st. 1 st. 0   00<br>3 ci. 1 ct. cu. 3 s. SSE   00 | 10 st. 0 00<br>10 ense fog. 0 00<br>4 cir. 2 st. Lt. fog. 0 00<br>2 cir. 1 st. 0 00<br>4 cir. st. 1 st. 0 00 | 10 st.<br>Dense fog.<br>6 ct. s. 1 st. Lt. fog.<br>2 cir. st. 1 st.<br>3 cir. st. 2 st. |
| July 20<br>July 21<br>July 22<br>July 23<br>July 24 | 1 cir. st. 8 st. E.* 0 10 cnse fog. 0 00 10 st. 0 Dense fog. 0 00 NE.* 00  | Dense fog. 0 00<br>9 st. ENE. † 00<br>1 cir. 6 st. E.* 00                   | 10 st. 0 0 0<br>Dense fog. 0 0 0<br>9 st. NE. 1 00<br>9 st. E.* 00<br>ENE *                                       | 10 st. 0 00<br>Dense fog. 0 00<br>9 st. NE. † 00<br>Dense fog. 0 00<br>10 nim. ENE. * .01                              | 10 at. 0 00<br>Dense fog. 0 00<br>3 cum. 5 st. E.* 00<br>Dense fog. 0 00<br>10 nim. 0 .—                     | 10 st.<br>Pense fog.<br>2 cum. 7 st.<br>9 st. E. Light fo                               |
| fuly 25<br>fuly 26<br>fuly 27<br>fuly 28<br>fuly 29 | 1 st, 0 00<br>1 cir, st, 2 st, E* 00<br>0 0 00<br>3 cir, 3 cir, st, 2 st, 0 0 00<br>Dense fog. 0 00                                      | 9 st. E.* 00<br>1 st. 0 00<br>2 cir. 2 cir. st. 4 st. S.† 00                | 1 st. 0 00 ibense fog. 0 00 00 00 1 st. 0 00 00 1 cir. 9 st. E.* 00   | 1 st. 0   00<br>Dense fog. 0   00<br>1 st. 0   00<br>9 st. 0   00<br>10 st. °E.* 00                                    | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 2 st.<br>Lt.haz, 5 st.E.*Lt.t<br>0<br>10 st.<br>10 st. Light fog.                       |
| uly 30<br>uly 31                                    | $\begin{array}{cccc} 10 \text{ st.} & \mathbb{E}, * & 00 \\ 2 \text{ cir.} & 2 \text{ cir.} \text{ st.} & 1 \text{ st.} & 0 \end{array}$ |   | 10 st. E.* 00<br>1 cir. 1 cir. st. 1 st. 0 00   | 10 st. E.* 00<br>2 cir. 2 ci. st. 1 st. E.* 00   | 10 st. E.* 00<br>3 cir. st. 2 st. E. † 00  | 10 nim.<br>2 cir. st. 6 st.   |
| Means.  | 5, 77  | 6. 77   | 7. 51   | 6. 83  | 5. 96  | 6, 64   |
| Date.   | i p. m.  | 2 p. m.   | 3 p. m.   | 4 p. m.  | 5 p. m.  | 6 р. ш  |
| 1883.<br>uly 1<br>uly 2<br>uly 3<br>uly 4           | 10 st. 0 000<br>10 nim. 0 .—<br>Dense fog. 0 00<br>10 nim. 0 .—  | 10 st. 0 00<br>10 nim. 0 0 0<br>2 st. SW. Dense fog.† 00<br>10 nim. 0 01    | 10 st. 0 00<br>10 nim. 6 03<br>10 st. SW.1 00<br>10 nim. 0 —  | 10 st. 0 00<br>10 nim. 0 .04<br>1 cir. 7 st. 0 .00<br>10 nim. 0 .01  | 8 st. Light fog. 0 00<br>10 nim. 0 .02<br>Dense fog. 0 00<br>Dense fog. 0 —                                  | 8 st. Light fog.<br>10 nim.<br>5 cir. 4 st.<br>Dense fog.                               |
| uly 7   | 9 st. 0 00<br>10 nim. 0 02<br>1 cir. 9 st. 0 00<br>10 st. 0 00<br>1 cir. st. 1 st. E.* 00  | 10 st. 0 00<br>W.* 00   | 2 cir. 6 st. WSW, † 00   0.01   10 st. 0   0.01   9 st. W.* 00   9 st. ENE.* 00                                   | 10 st.   W, † 00   10 st.   0 00   10 st.   0 00   10 st.   9 st.   ENE.*  | 10 st. 0 00<br>Dense fog. 0 00<br>10 st. 0 00<br>10 st. W. 00<br>Dense fog. 0 00                             | 10 st.<br>  Dense fog.<br>  10 st.<br>  10 st.<br>  Dense fog.                          |
| uly 11<br>uly 12<br>uly 13                          | 10 st.   | 1 cum. 0 00<br>Danse fog. 0 00  | 10 st.   NE.*   00   10   10   10   10   10   10   1  | 10 st.   | 3 st. E.* 00<br>1 st. 0 00<br>10 st. 0 00<br>Dense tog, 0 00<br>3 cir. 6 st. SW.† 00                         | 2 st.<br>1 st.<br>10 st.<br>10 st.<br>9 st.   |
| uly 15<br>nly 16<br>nly 17<br>nly 18<br>nly 19      | 10 st. 0 00<br>10 st. 0 0<br>2 cir. 6 st. SE, + 0<br>1 cir. 0 0<br>2 cir. 2 cir. cum. 0 00   | 10 st. 0 00<br>10 st. 0 09<br>9 st. ESE. 1 00<br>1 cir. 0 00<br>2 cir. 0 00 | 10 st. 0 00<br>10 st. 0 00<br>10 st. ESE,† 00<br>1 cir. 0 00<br>2 cir. 0 00                                       | 10 st. 0 00<br>10 st. 0 00<br>8 st. ESE.† 00<br>1 cir. 1 st. 0 00<br>2 cir. 1 cir. cu. 1 st. 0 00                      | 10 st. N.† 00<br>10 st. 0 00<br>8 st, ESE.† 00<br>1 cir. 1 st. 0 00<br>2 c. 1 ci. cu. 4 s. ESE.†. 00         | 10 st.<br>10 st.<br>9 st. ES<br>2 cir.<br>9 nim. ES                                     |
| uly 23  | 10 st. E.*. — 2 cir. cum. 7 st. NE.† 00 10 st. 0 00 11 st. 0 00 Dense fog. 0 00  | 10 st. NE. 00<br>1 st. 0 00   | 10 nim. 0 . 01<br>10 st. NNE, † 06<br>10 st. NE.* 00<br>2 st. 0 00<br>1 cir. 1 st. 0 00                           | 10 st. ENE.* .— 10 st. NNE.† 00 10 st. ENE.* 0 1 st. 0 00 1 st. 0 00   | 10 st.   E.* 00   10 54.   NNE.† 00   9 st.   ENE.* 00   10 t.   1 st.   0 00   1 st.   0 00                 | 10 st. NN<br>2 cir. cu. 4 st. EN<br>1 st.<br>1 st.                                      |
| uly 25<br>uly 26                                    | 1 st. 0 00<br>1 cir. 7 st. ESE.* 00<br>4 cir. st. 2 st. 0 00   | 1 st. ESE.* 00  | 1 st, 0 : 00<br>2 st, E,* 00<br>3 cir. st. 1 st. 0 : 00   | 1 st. 0 00<br>1 st. E.* 00<br>2 st. 0 00   | 1 st. 0 00<br>0 0 00<br>2 st. 0 00   | 1 st.<br>1 st.<br>2 eir. 1 st.<br>1 st.   |
| uly 27<br>uly 28<br>uly 29                          | 1 cir. 1 st. 0 00<br>1 cir. 9 st. NE.* 00  |   | 1 st. 0 00<br>3 cir. 6 st NE.* 00   | 1 cir. 1 st. 0 00<br>10 st. NE.* 90  | 1 st. 0 (6)<br>10 st. ZNE.* 00   |   |

character

Amount, k

le st.
Je minle st.
Je minle st.
Je minPense fog.
Je minDense fog.
Je ir, st. 1 s.
Dense fog.

leanse fog. 18t. prim.
Dense fog. 28t. 18t. Pense fog. 3c. 4t. 18t. t.r. 8t. 28t. leanse fog. 3c. 4t. 18t. t.r. 8t. 28t. leanse fog. 3c. 4t. 18t. leanse fog. 3c. 4t. 18t. leanse fog. 3c. 4t. leanse fog. 3c.

gst. contalist. L. thaze. 4 cm st. 5 st. betse 102 leann. lest.

bease fog. crim. Light whim. est. st. bease fog. ost.

lest.
Dense fog.
est.
! -t
irst
est.
-cir
-cir, cum. 3

et. et. et. 1 et. et. et. et.

1 st. 1 c.n.2 st. st. 5.

## character of precipitation, at Uylaamie, from October, 1881, to August, 1883-Continued.

ls, and amount and

8 given in inches. In 6 ,
8 a. m

Amount, kind, and direction of clouds

Dense fog. 10 nim. Light fog. 6 91 10 nim. 8 2 2 cir. 1 st.

Dense fog. 1 cum. 2 st. E 10 num. 10 st. Light fog. 1 st. 3 st.

10 st.
Dense fog.
6 cl. s. 1 st. Lt. fog.
2 cir. st. 1 st.
3 cir. st. 2 st.

10 st. 1. 10 st. 1. 10 st. 1. 10 st. 1. 10 st. 1. 10 st. 1. 10 st. 1. 10 nim.

2 st. Lt.haz, 5 st.E. Lt log 0 10 st. 10 st. Light feg.

> 6.64 6 p. m

E. -

10 nim. 2 cir. st. 6 st.

8 st. Light fog. 10 nim. 5 cir. 4 st. Dense fog.

to st. Leense fog. 10 st. 10 st. Dense fog.

10 st. 10 st. 9 st. 2 cir. 9 nim.

ESI

ENI ENI

0 st. F. 0 st. NNE : 2 cir, eu. 4 st. ENE : 1 st. 1 st.

6. 09

9 st. IO mm. IO mm. IO st. nble signifies rapid, t signifies slow. Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  | N a. m.   | 9 a. m.   | 10 a. m.  | 11 a. m.   | 12 m.  | à                             |
|--|---|---|---|--|--|-------------------------------|
| Amount, kind, and  | Amount, kind, and direction of clouds.                      |   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount of precipi-<br>tation. |
| st. 0 00<br>nnm. 0<br>st. 0<br>n.m. 0 [  | 10 st. 0 . 10 nim. 0 . 10 st. 0                             | 01 10 nim. 0 . (  | 30 10 st. 0 00<br>02 10 nim. 0 02<br>04 10 nim. 0 01<br>11 10 nim. 0 .—   | 10 st. 0 00<br>10 nim. 0 .01<br>10 nim. 0 .01<br>10 nim. 0 .0                                  | 10 st. 0 00<br>10 nim, 0 04<br>10 st. 0 —<br>10 nim, 0 01  | . 0                           |
| ense fog. 0 00 00 00 00 00 00 00 00 00 00 00 00  | 10 nim. E. 1. 10 cum. st. S. 1. Dense fog. 0                | — 10 nim. 0<br>— 7 cum. 3 st. 8. † (00 10 st. WSW.*)                            | 00 0 cir. cum. 3 st. 0 : 00<br>11 10 nim. 0 : 03<br>10 3 cum. 6 st. S.* 00<br>10 10 nim. WSW.*. —<br>10 4 cir. 1 st. 0 : 00 | 6 cir. cum. 4 st. 0 00<br>10 nim. 0 .05<br>10 st. 8.* 00<br>10 st. 0 .—<br>1 cir. 9 st. E.† 00 | 10 st. 0 00<br>10 nim. 0 04<br>4 cir. 6 st. S.* 00<br>10 st. WSW.* 00<br>1 cir. 2 cum. 0 00                | .1                            |
| ense fog. 0 000 st. 0 100 c. 0 1 00 c. 0 1 00 c. 0 1 00 c. 1 0 | 0<br>10 nim, Lt. fog. 0<br>10 st. Light fog. 0              | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  | Dense fog.  | 10 st. NNE.* 00<br>0 00<br>Dense fog. 0 00<br>Dense fog. 0 00<br>10 st. NNW. † 00              | 10 st. NNE.* 00<br>0 00 00<br>Dense fog. 0 00<br>Dense fog. 0 00<br>10 st. WNW.! 00                        | . 0<br>. 0<br>. 0             |
| st. 0 00<br>bense fog. 0 00<br>cit st. 1 st. 0 00<br>cit st. 2 st. 2 st. Lt. fog. 0 00   | 10 st. Light fog. 0<br>5 cir. 2 st. 0<br>2 cir. st. 1 st. 0 | 00 10 st. Light fog. 0 0<br>00 6 cir. Light fog. 0 0<br>00 2 cir. st. 1 st. 0 0 | 00   10 st.<br>0   Dense fog.<br>00   0 cir. Light fog.<br>00   1 cir. 1 st.<br>00   7 cir. cum.                            | 6 eir 2 st. Lt. fog. 0 00  | 10 st. 0 00<br>10 st. ENE.† Lt. fog. 00<br>6 cir. 2 st. SE.† L. fog. 00<br>1 cir. 0 00<br>2 cir. cum. 0 00 | . (                           |
| P.B. E.* . 02<br>1 o fog. 0 00<br>st. Light fog. 0 06<br>or. NE.* 00<br>. ma. 0 . 01   | Dense fog. 0<br>10 cum. 0<br>5 st. NE.* Lt. fog.            | 00 Dense for 0 0 Light fog. 0 0   | 22 10 st. E. f. 02<br>00 10 st. 0 0 00<br>00 9 st. Light fog. 0 00<br>00 Light fog. 0 00<br>00 Dense fog. 0 00              | Dense fog. 0 00<br>Dense fog. 0 00<br>1 st. NNE. + 00  | 10 nim.  |                               |
| et. 0 00<br>111 haze, 4 st. 0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00<br>0 00   | Light haze. 3 st. 0<br>0 0 0<br>6 cum. 2 st. 0              | 00 Light haze. 2 st. E. † 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                  | 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 st. ESE.† Lt. fog. 0 0 0 0 1 cir. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                    | 0 00<br>1 st. ESE.* Lt. fog. 00<br>2 cir. st. 0 00<br>1 st. 0 00<br>5 cir. 3 st. ENE. * 00     | 0 0 00<br>3 st. SE.* 00 5 cir. st. 0 00<br>1 st. 0 00<br>10 st. ENE.* 00                                   |                               |
| E.* . 01<br>E.* . 00   | 10 nim. Light fog. 0  | 10 st. 0 0 0 0 0 0 0 0  | - 10 st. NE.*: 00<br>00 10 st. ENE.*: 00  | 10 st. NE.* 00<br>1 cir. st. 9 st. ENE.* 00  | 10 st, NE.* 00<br>1 cir. cu. 9 st. ENE.* 00  | :                             |
| 5, 58  | 6. 22   | 5. 35   | 5. 77   | 5. 70  | 6. 22  | 1.                            |
| 7 p. m.  | 8 p. m.   | 9 p. m.   | 10 p. m.  | 11 p. m.   | 12 p. m.   | Daily<br>mean                 |
| nst fog, 0 00<br>nnt. Light fog04<br>S. t<br>st. 0 00  | 10 st. 0  | - 10 st. 0  | 00 10 st. 0 00<br>00 10 st. E.† 00<br>10 st. 0 00<br>10 st. SW.† 00   | 10 st. 0 : 00  | 10 st. 0   00<br>10 st. SE.† 00<br>10 nim. 0 .01<br>10 nim. 0  | 8<br>10<br>8<br>8             |
| th 0 00 00 00 00 00 00 00 00 00 00 00 00   | 10 st. 0<br>8 st. S.†<br>9 st. W.*                          | 00 8 st. 8 c c c c c c c c c c c c c c c c c c                                  | 00   10 st.   | 9 st. S.† 00<br>10 st. 0 ,—<br>7 st. W.* 00  | 10 st. 2 cir. 5 st. 0 0 00<br>2 cum. 5 st. SE. † 00<br>7 st. W.* 00<br>Dense fog. 0 00                     | 7<br>8<br>9<br>8<br>5         |
| t. E.* 00<br>: 0 00<br>t. 0 00<br>t. 0 00<br>t. 0 00<br>t. 0 00  | 2 st. 0<br>10 st. 0<br>Dense fog. 0                         | 00 1 cir. 1 st. 0 0 00 10 st. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0             | 1 st. 0 06<br>1 st. 0 06<br>1 cir. st. 2 st. 0 06<br>10 st. 0 06<br>10 pense fog. 0 06<br>10 cir. cum. 7 st. NW.° 06        | 1 cir. 2 st. NE. 1 00<br>1 10 st. 0 00<br>1 Dense fog. 0 00                                    | 10 st. 0 00<br>8 st. 0   00  | 3<br>1<br>7<br>4              |
| t NE,† 00<br>ct 0 60<br>ct, 0 00<br>ur. cum. 3 st, 0 ,—  | 10 st. 0<br>5 st. ESE.*<br>1 cir. 0                         | 00 , 10 st. 0<br>00 10 st. 0<br>00 2 cir. 3 st. E. f                            | 00 1 cir. 1 st 0 00   | 9 10 st. 0 00<br>1 2 cir. 3 st. E. † 00<br>1 1 cir. 2 st. 0 00                                 | 10 st. 0 ; 00<br>1 cir. 3 st. 0 ; 00<br>2 cir. cum. 2 st. 0 ; 00   | 5<br>2<br>2                   |
| E. *   | - 10 st. ESE.* ) 10 st. NE.† ) 8 st. ENE.* ) 1 st. 0        | 00 9 st. E.† 00 10 st. NE.† 00 10 at. NE.† 00 2 st. 0                           | 00 10 st. 0 00<br>00 10 st. 0 00  | 10 st, ENE. 1 00<br>10 st, 0 60<br>0 8 st, NE. 2 00<br>0 8 st, NNE. 2 00                       | 10 st. 0 00<br>10 nim. 0 .—<br>0 st. NE. 00<br>Dense fog. 0 00   | 1                             |
| cir.st. 1 st. 0 00<br>st. ENE, † 00  | 0 0 0 0<br>0 4 cir. st. 1 st. 0<br>1 st. 0                  | 00 1 st. 0<br>00 1 st. 0<br>00 3 cir. st. 2 st. 0                               | 00 1 st. 0 00<br>00 1 st. 0 00<br>00 2 cir. 2 st. 0 00<br>00 10 st. ENE. 0<br>00 10 st. ENE. to                             | 3 1 st. 0 (0<br>3 cir. st. 2 st. 0 00<br>10 st. ENE. 0   | 1 st. 0 00<br>3 cir. 1 st. 0 00<br>Dense fog. 0 00   | 2258                          |
|  |   | 00 1 cir. 1 st. 0   |   | 0 2 cir. 2 st. 0 00  |  | 8                             |
| e.i. 2 st. ENE.* 00<br>st. ENE.* 00  |   | 00 10 st. ENE.*   | 00 9 at. ENE." 0  |  |  | 8.                            |

#### EXPEDITION TO POINT BARROW, ALASKA.

Statement showing the amount, kind, and direction of clouds, and amount and

character

table signif

Dense fog. 10 st. Light Dense fog. 10 cum. Lt. fo

Dense fog. 1) st. 10 nm. 10 st. 7, 59

Iest. 10 st. Dense fog. Iest. Seir. cum, 3 st.

4 cir. 2 st. Dense fog. 4 cir. st. 2 st. Dense fog. Dense fog.

lost. Ivst. Dense fog. 6 st. 16 nim.

10 st. 8 st. 9 st, 1 cir. cum. 7 s\*. 7.11

[Washington mean time. Correction to reduce to mean local time, -5 hours 17 minutes. Precipitation is given in inches. In the

|  | 1 a. m.   |                          | 2 a. n.  | 3 a. m.  |                      | 4 a. m.  |                      | 5 a. m.  | 6 a. m.  |
|--|---|--------------------------|--|--|----------------------|--|----------------------|--|--|
|  |   |                          |  |  | 4                    |  | i                    |  | * 14 U.  |
| Date.  | Amount kind, and direction of clouds,   | Precipitation            | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Precipitation        | Amount, kind, and direction of clouds.   | Precipitation        | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.                   |
| 1883.<br>Aug. 1<br>Aug. 2<br>Aug. 3                      | 10 st. ENE. * 10 st. E. † 10 st.  | 1, 00                    | 10 st. 0 00  | 10 at. 0 00  | 00                   |  | ,                    |  | 10 st. E. * Lt. fog. 69<br>3 cum. 5 st. ESE, + 6.        |
| Ang. 4   |   | 1 00<br>1 00<br>00       | 10 st, 0 00<br>9 st, NE,† 00<br>10 st, 0 00<br>2 cir, cum. 4 st, 0 00  | 10 st. 0 00<br>10 st. N.E. 1 00<br>10 st. 0 00<br>3 cum. 5 st. S. 1 00   | 00<br>00<br>00       | Dense fog. 0   10 st, ENE.*   Lt fog. 10 st, NE.†   NE.†   10 st, ESE.†   10 nim.   S.†. | 00                   |  | Dense fog.   0 00   10   10   10   10   10   10          |
| Aug. 9<br>Aug. 10<br>Aug. 11<br>Aug. 12<br>Aug. 13       | 1 st. 0<br>Dense fog. 0<br>4 cum. st. 6 st. 8. † .<br>10 st. 0                          |                          | 1 st. 0 00 Dense fog. 0 00 1 cir. cum. 9 st. SE.t 00 Dense fog. 0 00   | 2 st. 0 00<br>Dense fog. 0 00<br>9 st. SSW.1 00<br>10 st. 0 00   | 00<br>00<br>00       | Dense fog. 0<br>10 nim. 8, † .<br>10 st. ESE. †  | 00<br>00<br>.01      | 2 cum 3 st. 0 00 100 10 st. S.†.— 10 st. E.† 00  | 10 at. S.: 00<br>10 at. ESE. + 00                        |
| Ang. 14<br>Ang. 15                                       | 6 st. NE. † 6 st. SE. † 9 st. S. † 10 nim. 0 1 cir. 5 st. S. †                          | 00<br>02                 | 9 st. 0 00<br>11 cir. cum. 2 st. 0 00<br>10 nim. 8. ft. –<br>10 nim. 0 0 0<br>4 st. 0 0  | 10 st. 8.1 00  | 00<br>00<br>32       | 10 st. NE.† Dense fog. 0 10 st. SW.† 10 nim. 0 2 cir. cum. 5 st. E.†                     | 00                   | Dense fog. 0 00<br>10 st. 0 00<br>10 nim. 0 .02<br>10 st. E. † 00  | 10 nim. 0 .0.  |
| Aug. 19<br>Aug. 20<br>Aug. 21<br>Aug. 12<br>Aug. 23      | 10 nim. N.†. 9 st. ESE.† 10 nim. 0 9 st. NNE.† 10 st. WSW.†                             | .00<br>.01<br>.00<br>.00 | 10 nim. N.† — 9 st. E.† 00 10 nim. 0 0 01 9 st. NNE.† 0 10 st. SW.† 00   | 10 st. NNE. † 00<br>SW. * 00   | 00<br>00<br>00       | 10 st. SW.   | 00<br>01<br>00<br>00 | 10 st. NNW. † 00<br>10 st. E. * 00<br>10 nim. 0 .—<br>10 st. 0 00<br>10 st. SW.* 00                          | 10 nim. ENE.+.01<br>9 st. 0 00<br>Light haze. 9 st. 0 00 |
| Aug. 24<br>Aug. 25                                       |   | 00                       | Dense fog.   0   00   8 st.   NE. † 00   10 nim.   0   10   10 nim.   0   . —  | 8 cum. st. NE. † 00  | 00                   | 10 st. 0<br>10 nim. 0<br>10 st. <b>E</b> . †   | 00                   | 10 nim. 0 .08<br>10 st. 0 00   | 8 cum, st. SE.+ 10 nim.                                  |
| Means  | 7. 66   |                          | 6.70   | 7. 62  |                      | 7. 85  |                      | 7.70   | 7.03   |
| Date.  | 1 p. m.   | -                        | 2 p. m.  | 8 p. m.  | i                    | 4 p. m.  |                      | 5 p. m.  | 6 p. m.  |
| lug. 2   | 10 st. 0<br>10 st. 0<br>Dense fog. 0  | 00                       | 10 st. 0 00<br>9 st. E.* 00<br>10 st. E.* 00   | 10 st. 0 00 1 cir. 7 st. E.* 0 00 00 00 00 00 00 00 00 00 00 00 00   | 00<br>00<br>00       | 9 st. E.*  | 00                   | 10 at. 0 00<br>9 at. ESE.* 00<br>4 cir. cum. 4 st. E.† 00  | 6 at. SE.  |
| Autor. 5 3   | Dense fog. 0   10 st. NE.* Dense fog. 0   6 cir. cum. 3 st. SE.* 4 cir. cum. 1 st. SW.† | 00                       | 10 st, E.* 00<br>10 st, NNE.* Lt. fog, 00<br>10 cnse fog, 0 00<br>2 cir. cum. 7 st, SE.* 00<br>5 cir. cum. 1 st, SW.† 00           | 10 st. NNE.† 00<br>Dense fog. 0 00<br>3 cir. cum. 5 st. 8E.* 00  | 00                   | 10 st. NE.† Dense fog. 0 9 st. 0   |                      | 10 st, E.* 00<br>10 st. NE.t 00<br>10 st. 0 00<br>10 st. 0 00<br>3 cir. cum, 5 st. 0 00                      | Dense fog. 0 to 10 st.                                   |
| Aug. 12  | 8 st. 0 1 4 cir. cum. 5 cum. 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                      | 00                       | 8 cir. cum. 1 st. 0 00<br>1 cir. cum. 9 st. 0 00<br>10 st. Light fog. 0 00<br>5 cir. cum. 2 st. ESE.† 00<br>10 st. Light fog. 0 00 | 7 cir. cum. 1 st. 0 00<br>2 cir. cum. 7 st. 0 00<br>9 st. SE. 1 00<br>5 c r. cum. 3 st. SE. 1 00<br>9 st. 0 00 | 00                   | 3 cir. cum. 5 st. 0<br>8 st. SE f<br>8 st. SE.t  | 00                   | 7 cir. cum. 1 st. 0   00<br>10 nim. 0  <br>3 cir. 3 st. SE.f 00<br>2 cir. st. 6 st. SE.f 00<br>10 st. 0   00 | Dense fog. 0 3 cir. 2 st. 0 0                            |
| Lug. 16<br>Lug. 17<br>Lug. 18                            | 3 cir. cum. 7 st. E.† Deuse fog. 0 9 st. Light fog. 0 9 st. W.* 5 cir. cum. 3 st. N.†   | 00a<br>00<br>00<br>00    | 10 st. E,† 00<br>10 st. 0   00<br>10 st. 0   00<br>8 st. 0   00<br>10 st. N.† 00   | 10 st,   ESE.† 00   10 nim.   0 .01   10 st.   0 00   8 st.   SW.* 06   10 st.   N.† 00                        | 00<br>00<br>00<br>01 | 2 st. 8.*<br>10 st. 0  | 00<br>00<br>00       | 3 st. 8.* 00<br>10 nim. 0 . —  | 8 st, S.* (Dense fog. 0 4 st. S.* 10 nim. 0.             |
| Aug. 20   1<br>Aug. 21   1<br>Aug. 22   1<br>Aug. 23   1 | 9 st. N.†1 10 st. 0 10 st. 0 10 st. W.* 10 st. W.*                                      | 00<br>00<br>00           | 9 st.   N,†<br>  10 st.   E.* 00<br>  10 st.   NE.* 00<br>  10 nim.   W.*<br>  10 st.   W,† 00                                     | 10 nim. N,† .— 10 st. E.* 00 10 st. NE.* 0 10 nim. W.* .— 10 st. W.† 00  | 00                   |  | 00                   | 10 at. 8W.* 00   | 10 at.<br>8 at. SW.                                      |
| Aug. 24 1  | 16 st. WNW.* Lt. fog 1 cir. cum. 9 st. SSE.*  | 01                       | 10 st. NW.* Lt. fog. 00<br>1 cir. 9 st. S.* 00<br>9 st. W.* 00   | 10 st. NW.* Lt. fog. 00<br>5 cir. 3 st. SSE.* 00<br>9 st. W.* 00   | 00                   | 10 nim.<br>1 cir. 9 st.<br>9 st.<br>10 nim.<br>0<br>SSE.*                                | 00                   | 10 st.   NNE.*   SSE.*   00   WNW.*   00   | 10 st. NNE.<br>2 ci. cum. 6 st. SSE.<br>9 st. NW.        |
| ng. 25 '<br>ng. 26   1                                   | 10 st. 0  |                          | 9 st. W.* 00<br>10 st. 0 00  | 9 st. W.* 90<br>10 nim. 0 .—   | -                    | 10 nim. 0 .  | ,-                   | 10 st. 0   | 10 at.   |

\*Station abandoned August 27, 1883.

## character of precipitation, at Uglaamie, from October, 1881, to August, 1883—Continued.

Daily means of amount of clouds on the right below; amount of precipitation on the right above.]

| 7 a. m.  | S a. m.  | 9 a. m.   | 10 a. m.   | 11 a. m.   | 12 m.  | ргезрі  |
|--|--|---|--|--|--|---|
| Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.   | Amount, kind, and direction of clouds.  | Amount, kind, and direction of clouds.  Precipitation  | Amount, kind, and direction of clouds.   | Amount kind, and direction of clouds.  | Amount of pre-<br>tation.   |
| 10 st. Light fog. 0<br>10 st. Light fog. 0<br>4cu. 5 st. ESE.† Lt. f'g. 00   | 10 st. 0<br>Dense fog. 0<br>3 cum, 5 st. ESE. †  | 60 Dense fog. 0   | on Dense for a no  | Dense for. 0 : 00  | 10 at. 0 00<br>Dense fog. 0 00<br>10 st. ESE.† Lt. fog. 00   | . 0   |
| Dense fog. 0 00 Dense fog. 0 00 Uc cum. Lt. fog. 0 00 Uc st  | Dense fog.   0   10 st.   0   10 st.   0   10 st.   0   10 st.   S. †  | 00 Dense fog. 0<br>00 fost. 0<br>00 10 st. ESE. Lt. fog   | 00 10 st. Light fog. 0 0.1<br>00 10 st. Light fog. 0 00<br>00 10 st. 0 0<br>00 10 st. ESE.* Lt. fog. 0<br>00 5 cir. cum. 4 st. 0 00  | 10 st. Light fog. 0 00<br>10 st. Light fog. 0 00<br>10 st. SE. * 00  | 10 st. ESE.* Lt. fog. 00<br>10 st. 0 00<br>10 st. 0 00<br>6 cum. 1 st. SE.† 00<br>5 cir cum. 0 00  | . i<br>. 1<br>. 1<br>. 1  |
| 2 cir. st. 2 st. 0 00<br>1 cmr. 3 st. 0 00<br>Dense fog. 0 00<br>0 st. 0 00  | 4 st. SSW.† 2 cum. 3 st. ( 2 ci.s.5s. SW.† L. f'g. 10 nim. 0 10 st. RSE.†  | 00 1 6 cam. 1 st. 0<br>00 Dense fog. 0<br>.01 10 nm. 0  | 00 3 cum. 0 0)<br>00 Dense fog. 0 00<br>. = 10 nm. 0 .01   | 1 cir. 1 cum. 0 00<br>Den-e fog. 0 00<br>10 nim. SE, 1 06  | 10 st. SSE.f 00<br>1 (ir. cum. 2 st. 0 00<br>Dense fog. 0 00<br>10 st. ESE.f. 02<br>10 st. Light fog. 0 00   |   |
| 0 at. 0 00 Dense fog. SSW, † 00 10 nim. 0 1.01 U nim. E, † .01   | 10 st. Light fog. 0<br>3 st. Light fog. 0<br>3 cu. 6 cu. st. SSW.†<br>10 nim. 0<br>10 nim. 0   | . 01 10 nim. 0 '  | 00   | 9 cum. Light fog. 00<br>10 st. W. 00   | 3 cir. cum. 6 st. E.† 00<br>Dense fog. 0 00<br>9 cum. Light fog. 0 00<br>9 st. W.* 00<br>4 ci. cu. 4 st. NNE.†. —  |   |
| 0 st. 0 st. 0 00 00 NE. 0 00 00 NSt. 0 00 00 WSW. 1 00   | 10 nim. N.†. 10 nim. 0 10 st. 0 10 cum. st. NW.†. 10 st. WSW.†.  | . — 10 at. 0 ,<br>(0 10 st. 0 0 ,<br>00 3 clr. 3 st. WNW. t   | .— 10 nim.   | 10 at. 0 69<br>10 at. 0 00<br>2 cir. 3 at. WNW.† 00  | 10 st. W. Lt. fog. '00   |   |
| Dense fog. 0 00<br>SE. † 00  | 10 cum. st. SE. i  | 00 10 nim. 0<br>00 10 st. SSE, f<br>10 Dense fog. 0<br>00 1 cir. 4 st. ESE, f   | . — Dense fog. 0 00  | 10 st. SSE. † 00<br>Dense fog. 0 00  | 10 at. 0 00  | :   |
|  |  | 00 1 111, 7 50. 43.743.1  | 00 10 mm. E.S.E. 1   | 1 cir. 8 at. ESE.*   | 10 st. ESE.† 00  |   |
| 7. 59  | 7. 25  | 6. 88   | 7. 96  | 7.07   | 8.35   |   |
| 7, 59<br>7 p. m.   |  | 6. 88   |  |  |  | Daily   |
| 7 p. m.  | 7. 25  S p. m.  10 st. 0 8 at. ENE.*   | 6. 88<br>   | 7. 96 19 p. m.  00 10 st. E. 1000  | 7. 07  11 p. m.  10 st. ENE. 1 00  8 st. ENE. 2 00   | 8.35<br>12 p. m.<br>10 st. E. + 00   | Daily mean  |
| 7 p. m.  0 84. 8 E.* 90 0 10 ir. un. 4 st. E.† 90 0 st. NE.† 0) 0 peps fog. 0 00   | 7. 25  S p. m.  10 at.   | 0.88  9 p. m.  00 10 a*. 0  00 1 cir.6 at. E.*  00 1 2 cir.cum.6 at. E.†  00 10 at. E.†  00 10 at. E.†  00 10 at. E.†  00 10 at. E.†  | 7. 96  | 7.07  11 p. m.  10 st. ENE. 1 00 9 st. E. 2 00 9 st. E. 2 00 10 st. ENE. 00 10 st. E. 2 00 10 st. E. 2 00 2 cir. cum. 6 st. E. 1 00  | 8, 35  12 p. m.  10 st. E.† 00 7 st. E. 03 9 st. E.NE 00 9 st. ENE 01 9 st. ESE 100  | 1. Daily means 10. 6. 7. 5. 8. 6. 8.  |
| 7 p. m.  0 st. 0 00 6 st. SE.* 00 6 st. E.* 00 6 st. E.* 00 6 st. 0 0 00  | 7, 25  S p. m.  10 st. 0.8 st. ENE.* 3 cir. cum. 3 st. E. f 10 st. NE.† 10 st. NE.† 10 st. NE.† 0 st. O. 0 2 cir. cum. 1 st. 0 2 cir. 0  | 0.88  9 p. m.  00 10 a*. 0  00 1 1 cir.6 st. E.*  00 10 at. E.!  00 10 st. NE!  00 10 st. E.1  00 10 st. E.1  00 10 st. E.1  00 10 st. E.1  00 10 st. E.1  00 10 st. E.1  | 7. 96  19 p. m.  19 p. m.  100 10 st. E. 00  100 1 cir. cum. 4 st. E. 4 00  100 10 st. NE. 100  100 10 st. ENE. 100  100 10 st. E. 00  100 | 7.07  11 p. m.  10 st. ENE.1 00 st. E. 20 9 st. E. 20 10  | 8.35  12 p.m.  10 st. E.! 60 7 st. E. 50 9 st. ENE! 60 10 st. ENE! 60 2 cir. cnm. 4 st. 9 1 cir. cnm. 2 st. 0 00 1 at. 0 1 cir. cnm. 2 st. 0 00 1 onim. 0 00 1 onim. 0 0.22  | 1. Daily mean-  |
| 7 p. m.  6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 8E.* 00 6 st. 9E.* 00 6 st. 00 6 st. 00 6 s | 7. 25  S p. m.  10 st. 0. 8 st. ENE 3 cir. cum. 3 st. E. t 10 st. NE t 10 st. NE t 10 st. NE t 10 st. NE t 10 st. 0 2 cir. cum. 1 st. 0 5 cir. st. 3 st. 0 5 cir. st. 3 st. 0 10 st. 0 8 st. 0 10 st. 0 9 st. 0  | 0.88  9 p.m.  10 10 a*. 0  11 cir. 6 at. E.*  10 2 cir. cum. 6 at. E.†  10 10 at. NE.†  10 10 at. NE.†  10 10 at. NE.†  10 1 cir. cum. 5 at. E.†  10 1 at. Sat. 0  10 1 at. E.†  10 1 at. E.†  10 1 at. E.†  10 1 at. 0  10 1 at. 0  10 1 at. 0  10 1 at. 0  10 1 at. 0  10 1 at. 0  10 1 at. 0  10 at. NNE.†  10 10 at. 0  10 at. NNE.†  10 10 at. 0  10 | 7. 96  19 p. m.  19 p. m.  10 10 st. E. 100  10 10 st. E. 100  10 11 st. E. 100  10 10 st. E. 100  10 10 st. E. 100  10 10 st. E. 100  10 10 st. E. 100  10 10 st. E. 100  10 10 st. 0 00  1 st. 0 00  | 7.07  11 p. m.  11 p. m.  10 st. ENE. 1 90 st. E. 2 90 st. E. 90 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. NE. 90 lost. 1 lost. 1 lost. NE. 90 lost. 1 lost. 1 lost. NE. 90 lost. 1 | 8.35  10 st. E.t 00 7 st. E. 03 9 st. E.E 00 10 st. E.E 00 10 st. E.E 00 11 st. E.E 00 11 st. E.E 00 11 st. E.E 00 11 st. E.E 00 12 st. E.E 00 13 st. E.E 00 14 st. 0 00 15 st. 0 00 15 st. NNE1 00 15 st. NNE1 00 15 st. 0 00 | 1. Daily mean 10. 6. 6. 7. 5. 8. 6. 8. 6. 8. 8. 6. 8. 8. 6. 8. 8. 6. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. |
| 7 p. m.  10 st. 0 00 6 st. 8E.* 00 6 st. E.* 00 10 st. 0 00 10 st. | 7. 25  S p. m.  10 at.   | 0.88  9 p.m.  00 10 a*. 0 00 1 cir. 6 at. E.* 00 12 cir. cum. 6 at. E.t. 00 12 cir. cum. 6 at. E.t. 00 10 at. NE.t. 00 10 at. E.j. 00 10 at. E.j. 00 10 at. E.j. 00 10 at. E.j. 00 10 at. NE.t. 00 10 at. NNE.t. 01 10 at. NNE.t. 02 10 at. NNE.t. 03 10 at. NNE.t. 04 10 at. NNE.t. 05 10 at. NNE.t. 06 10 at. NNE.t. 07 10 nim. 0 09 0 at. NNE.t. 09 10 at. NNE.t.   | 7. 96  19 p. m.  19 p. m.  10 st. E.   00   00 9 st. E.   00   00 10 st. E.   00   00 10 st. E.   00   00 10 st. NE   00   | 7.07  11 p. m.  11 p. m.  10 st. ENE.1 00 sst. E.* 00 9st. E.* 00 lost. NE.1 00 lost.  | 8.35  10 st. E.t 00 7 st. E. 00 9 st. ENE.t 00 10 st. ENE.t 00 10 st. ENE.t 00 2 cir. cum. 4 st. 0 1 cir. cum. 2 st. 0 00 Dense fog. 0 00 10 nim. 0 0.20 10 cir. NNE t 00 0 1 cir. st. NNE t 00 0 9 st. NNE t 00 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. st. NNE t 00 0 1 cir. NNE t 00 0 0 cir. NNE t 00 0 0 cir. NNE t 00 0 0 cir. NNE t 00 0 cir. NN | 1. Daily mean  10. 6. 7. 5. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.  |
| 7 p. m.  19 st   | 7. 25  Sp. m.  10 st. ENE.* 3 cir. cum. 3 st. E.t. 10 st. NE.† 10 st. NE.† 10 st. NE.† 10 st. O 5 cir. cum. 1 st. O 2 cir. cum. 2 st. O 10 st. O 10 st. O 10 st. O 10 st. O 10 st. Sw. O 10 | 0.88  9 p. m.  00 10 at. 0. 00 1 cir. 6 at. E.* 00 12 cir. cum. 6 at. E.† 00 12 cir. cum. 6 at. E.† 00 10 at. NE.† 00 10 at. NE.† 00 11 cir. cum. 5 at. E.† 00 10 at. NE.† 01 at. NE.† 01 at. NE.† 02 10 at. NE.† 03 at. NE.† 04 10 at. NE.† 05 10 at. NE.† 06 10 at. NE.† 07 at. NE.† 08 10 at. NE.† 09 at. NE.† 09 at. NE.† 09 at. NE.† 00 10 at. NE.† 00 10 at. NE.† 01 at. NE.† 01 at. NE.† 01 at. NE.†   | 7. 96  19 p. m.  19 p. m.  10 10 st. E. 100  10 10 st. E. 200  10 10 st. E. 200  10 10 st. E. 400  10 10 st. 0 00  | 7.07  11 p.m.  11 p.m.  11 p.m.  10 st. ENE.! 00 9 st. E.* 00 9 st. E.* 00 10 st. NE! 00 10 st. NE! 00 10 st. ENE.! 00 10 st. ENE.! 00 10 st. ENE.! 00 10 st. NE! 00 10 st. NE! 00 10 st. NE! 00 10 st. ENE.!  | 8.35  10 st. E. 00 7 st. E. 00 9 st. ESE 00 10 st. ESE 00 10 st. ESE 00 10 st. ESE 00 10 st. ESE 00 10 st. St. 6 1 cir. cum. 2 st. 0 1 | 1. Daily mean-10. 10. 10. 10. 10. 10. 10. 10. 10. 10.   |

10 st. E.\*
10 st. XE.!
10 st. XE.!
10 st. 0
10 st. 0
10 st. 0
5 cir. 1 st. 0
Dense log. 0
3 cir. 2 st. 0
9 st. 0
10 st. 0
10 st. 0
10 st. 8 st. 0
4 st. S.\*
10 ntm. 0

ls, and amount and

given in inches. In this

6 a. m.

Amount, kind, and direction of clouds,

10 st. E. \* Lt. fog. 69 3 cum. 5 st. ESE, † 68

0 00 0 00 SW, † 00 0 02 E, † , –

> SE. + \*\*\* 0 . 04 E. - 00

Dense fog. Dense fog. Dense fog. 10 cum. 10 nim.

1 cir. st. 2 st. 3 st. Dense fog. 10 st. 10 st.

10 st. Dense fog. 10 st. 10 nim. 10 nim.

Dense fog. 8 cum. st. 10 nim. 10 st.

10 st. NNW. † 10 10 st. 0 (0 10 nim. ENE † 01 9 st. 0 00 Light haze. 9 st. 0 00

> 7. 03 6 p. m.

 $\begin{array}{cccc} \textbf{10 st.} & & 0 & 60 \\ \textbf{6 st.} & & \textbf{SE.} & 0 \\ \textbf{3 cir. cum.} & \textbf{5 st.} & & \textbf{E.} & \textbf{0} \end{array}$ 

8 st. 0 10 nim. E.\* 10 st. 0 8 st. 8W: 10 st. NNE: 2 ci, cum. 6 st. SSE! 9 st. NW:

9. 85

Precipitation-Lainfall or melted snow, in inches.

|           |       | Mor   | ith. | 1881.   1 | 882. 1883.    |
|-----------|-------|-------|------|-----------|---------------|
| January . |       |       |      | <br>(*)   | 0.44   0.14   |
|           |       |       |      | <br>(*)   | 0. 04   1. 02 |
|           |       |       |      |           | 0. 51 0. 14   |
|           |       |       |      | <br>(*)   | 0. 39   0. 55 |
|           |       |       |      |           | 0.44 0.31     |
|           |       |       |      | <br>(*)   | 0, 61 0, 30   |
|           |       |       |      | <br>(*)   | 1.39   1.04   |
|           |       |       |      |           | 1, 46 1, 66   |
|           |       |       |      |           | 1. 10 (*)     |
| October   |       |       |      | <br>(*)   | 1.05 (*)      |
|           |       |       |      | <br>0.73  | 0.84 (*)      |
|           |       |       |      |           | 0, 24 (*)     |
| Who       | le pe | eriod |      | <br>1, 17 | 8. 01 5. 16   |

\* Not measured

#### SOLAR RADIATION.

Observations on solar radiation were made with a pair of maximum thermometers, one black and one bright bulbed, in vacuo, exposed horizontally on a post 4 feet high on the knoll southwest of the station. They were mounted side by side in a movable frame so that they could be brought into the house in stormy weather. These thermometers were exposed for a short time on November 13 and 14, 1882, just before the departure of the sun, but the latter was too near the horizon to produce any sensible effect. On the return of the sun, January 29, 1883, they were exposed every day not stormy from sunrise to sunset, the indices being set and read at sunrise and read again at sunset, till February 19, and about midnight, Washington time, until May 14th, when, the sun being continually above the horizon, they were set at local midnight and read at Washington midnight. This was continued till the closing of the station.

Statement showing the solar radiation at Uglaamie from February, 1883, to August, 1883.

[A pair of maximum thermometers, one black and one bright bulbed, exposed for solar radiation. Washington time. Correction to reduce to mean local time, —5 \* 17 \*\*.]

| Date.   | Time of Bla  | ick Bright<br>ib. bulb.                               |                                    | Time.   | Black<br>bulb.                            | Bright<br>bulb.  | Differ-<br>ence.                         | Weather.   |
|---|--|---|------------------------------------|---|---|--|--|--|
| 1883.<br>Feb. 1<br>Feb. 2<br>Feb. 3<br>Feb. 4<br>Feb. 5 | 3.00 p.m   | 5. 2 — 6. 2<br>(*)<br>6. 0 5. 8                       | 0, 0<br>1, 0<br>(*)<br>0, 2<br>(*) | 8.00 p. m<br>7.30 p. m<br>(*)<br>8.30 p. m.<br>(*)            | 13. 8<br>5. 2<br>(*)<br>14. 2<br>(*)      | - 2. 5<br>2. 2<br>(*)<br>11. 0                                     | 16. 3<br>3. 0<br>(*)<br>3. 2             | Clear.<br>Fair.<br>Light snow.<br>Cloudy.<br>Light snow.     |
| Feb. 6<br>Feb. 7<br>Feb. 8<br>Feb. 9<br>Feb. 10         | 5.45 p. m 3<br>3.00 p. m 3<br>3.00 p. m 3                                | 2.6 32.4  |                                    | 19.00 p.m.<br>7.00 p.m<br>8.00 p.m.<br>6.00 p.m.<br>8.15 p.m. | 20, 5<br>47, 8<br>6, 2<br>60, 0<br>1, 4   | 4. 0<br>30. 4<br>4. 5<br>45. 0<br>—10. 8                           | 16. 5<br>17. 4<br>1. 7<br>15. 0<br>12. 2 | Fair.<br>Fair.<br>Light snow.<br>Cloudy.<br>Fair.            |
| Feb. 11<br>Feb. 12<br>Feb. 13<br>Feb. 14<br>Feb. 15     | 2.30 p. m —1<br>(*) (*)<br>2.00 p. m — —<br>2.45 p. m — —<br>3.00 p. m — | (*)<br>4. 0 —13. 2<br>4. 6 —10. 8                     | 6. 2                               | 9.00 p. m<br>(*)<br>10.00 p. m.<br>10.00 p. m.<br>10.15 p. m. | 25. 6<br>(*)<br>19. 7<br>31. 7<br>17. 8   | $ \begin{array}{c} 0.0 \\ (*) \\ -3.4 \\ 0.8 \\ -1.7 \end{array} $ | (*)<br>23. 1<br>30. 9                    | Clear.<br>Light snow.<br>Fair.<br>Cloudy.<br>Cloudy.         |
| Feb. 16<br>Feb. 17<br>Feb. 18<br>Feb. 19<br>Feb. 20     | 1 45 p. m —1<br>2 00 p. m — :<br>1.15 p. m —<br>1.15 p. m — :            | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 0.6                                | 9.10 p.m.<br>9.00 p.m<br>11.00 p.m<br>11.00 p.m<br>12 m       | 11. 4<br>48. 5<br>17. 0<br>21. 8<br>7. 8  | $\begin{array}{c} -6.0 \\ 9.6 \\ 11.7 \\ 10.4 \\ -6.0 \end{array}$ | 5.3                                      | Fair.<br>Clear.<br>Cloudy.<br>Cloudy.<br>Fair.               |
| Feb. 23 .<br>Feb. 24                                    |  | 8.6 -34.5   | 2. 6<br>2. 1<br>5. 9               | 12 m<br>12 m<br>12 m<br>12 m<br>12 m                          | - 1. 2<br>41. 6<br>3. 5<br>39. 8<br>49. 4 | 7.5  | 4.8<br>34.1<br>8.0<br>39.5<br>42.0       | Cloudy and light snow<br>Clear.<br>Fair.<br>Clear.<br>Clear. |
| Feb. 26<br>Feb. 27                                      | 12.25 p. m   | 6.8 -40.0   | 1.4                                | 12 m<br>12 m<br>12 m  | 40, 8<br>42, 0<br>49, 6                   | - 2.4<br>3.0<br>21.4   | 43. 2<br>39. 0<br>28. 2                  | Fair.<br>Cloudy.<br>Cloudy.                                  |

Not exposed.

Statement showing the solar radiation at Uglaamie from February, 1883, to August, 1883-Continued.

| Date.   | Time of observation.  | Black<br>butb  | Bright<br>bulb.                                | Differ-<br>ence.                       | Time.                                | Black<br>bulb.                             | Bright<br>bulb.                           | Differ-<br>ence.                          | Weather.  |
|---|---|--|--|--|--------------------------------------|--|---|---|---|
| 1883.<br>Mar. 1<br>Mar. 2<br>Mar. 3<br>Mar. 4<br>Mar. 5       | 12, 10 p. m<br>12 m<br>12 m<br>11, 15 a. m<br>12, 10 p. m               | -27, 9<br>-37, 5<br>-28, 5<br>-20, 5<br>-3, 0                      | -29, 1 $-37, 5$ $-29, 5$ $-20, 5$ $-3, 2$      | 1, 2<br>0, 0<br>1, 0<br>0, 2<br>0, 0   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 55. 6<br>44. 6<br>49. 8<br>52. 3<br>49. 7  | 10.7                                      | 43. 6<br>42. 6<br>41. 8<br>41. 6<br>36. 7 | Clear.<br>Fair.<br>Clear.<br>Clear.<br>Cloudy                                   |
| Mar. 6 .<br>Mar. 7 .<br>Mar. 8 .<br>M r. 9 .<br>Mar. 10 .     | 11, 50 a. m   | -32. 0<br>-35. 0<br>-29. 5<br>-40. 0<br>-41. 0                     | -32, 0<br>-36, 0<br>-30, 0<br>-50, 0<br>-55, 0 | 0. 0<br>1. 0<br>0. 5<br>10. 0<br>14. 0 | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 42, 2<br>45, 5<br>50, 0<br>51, 6           | - 1.8<br>1.3<br>4.0                       | 42. 3<br>35. 4<br>47. 3<br>48. 7<br>47. 6 | Clear.<br>Fair.<br>Clear.<br>Clear.<br>Clear.                                   |
| Mar. 11<br>Mar. 12<br>Mar. 13<br>Mar. 14<br>Mar. 15           | . 11 55 a.m<br>10 55 a.m<br>11 15 a.m<br>11 20 a.m                      | -38. 0<br>-21. 2<br>-29. 0<br>-34. 6<br>- 33. 5                    | 10, 0<br>22, 0<br>30, 0<br>35, 6<br>34, 0      | 2. 0<br>0. 8<br>1. 0<br>1. 0<br>0. 5   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 56. 2<br>30. 2<br>63. 8<br>61. 5<br>55. 8  | 19. 3<br>18. 5                            | 48. 8<br>27. 2<br>44. 0<br>43. 0<br>44. 6 | Clear.<br>Fair.<br>Clear.<br>Clear.<br>Fair.                                    |
|   | 11, 25 a. m<br>10, 48 a. m<br>10, 48 a. m<br>10, 48 a. m<br>10, 50 a. m |  |  |  |                                      | 69. 2                                      | 24. 0<br>19. 4<br>25. 0<br>12. 8<br>19. 8 | 45, 2<br>48, 9<br>45, 4<br>40, 4<br>46, 5 | Clear.<br>Clear.<br>Clear.<br>Clear.<br>Fair.                                   |
| Mar. 21 .<br>Mar. 22 .<br>Mar. 23 .<br>Mar. 24<br>Mar. 25 .   | 10. 48 a. m (†)<br>10. 25 a. m  | -16.5 $-6.5$ $(t)$ $-0.5$ $18.3$                                   | -17.0 $-7.5$ $(t)$ $-1.0$ $18.0$               | 0. 5<br>1. 0<br>(t)<br>0. 5<br>6. 3    | 12 m                                 |  | 8. 8<br>(†)<br>35, 2                      | 25. 1<br>19. 0<br>(†)<br>46. 3<br>46. 5   | Cloudy.<br>Cloudy.<br>Cloudy.<br>Fair.  |
| Mar. 26 .<br>Mar. 27 .<br>Mar. 28 .<br>Mar. 29 .<br>Mar. 30 . | 10. 25 a. m<br>10. 25 a. m<br>10. 25 a. m<br>10. 25 a. m<br>10. 25 a. m | $\begin{array}{c} 7.8 \\ 20.0 \\ -9.8 \\ 14.8 \\ -3.5 \end{array}$ | 7. 3<br>20. 0<br>-10 0<br>14. 5<br>- 4. 0      | 0.5<br>0 0<br>0.2.<br>0.3<br>0.5       | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 48. 5<br>67. 1<br>51. 3<br>107. 0<br>92. 0 |   | 15. 3<br>27. 4<br>27. 9<br>45. 6<br>50. 7 | Cloudy,<br>Cloudy,<br>Cloudy,<br>Cloue, .<br>Fair.                              |
|   |   |  |  |  |                                      |  |   |   |   |
| 1999  | 10.15 a. m<br>9.55 a. m<br>9.45 a. m<br>9 48 a. m<br>9 48 a. m          |  |  | 0, 5<br>0, 5<br>0, 0<br>0, 0<br>0, 5   | 12 m<br>12 m<br>12 m                 | 78. 4<br>65. 0<br>79. 8<br>71. 7           | 27. 4<br>25. 1<br>31. 4<br>25. 8<br>15. 8 | 51, 0<br>39, 9<br>48, 4<br>45, 9<br>23, 2 | Clear.<br>Clear.<br>Clear.<br>Clear.<br>Cloudy.                                 |
| Apr. 6  | 9.50 a. m 9.48 a. m 9.40 a. m 9.20 a. m 9.20 a. m                       | - 8.0<br>-14.7<br>-24.7  |  | 0, 5<br>0, 3<br>0, 3<br>1, 0<br>0, 0   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 72.5                                       | 15, 8<br>23, 5<br>30, 7<br>28, 2<br>34, 2 | 36. 2<br>49. 0<br>40. 1<br>44. 5<br>49. 2 | Cloudy.<br>Fair.<br>Fair.<br>Fair.<br>Fair.                                     |
| Apr. 11<br>Apr. 12<br>Apr. 13<br>Apr. 14<br>Apr. 15           | 9.25 a, m<br>9.25 a, m<br>9.25 a, m<br>9.25 a, m<br>9.17 a, m           | - 6. 0<br>- 6. 0<br>-10. 0<br>- 6. 0<br>- 3. 5                     | - 6.0<br>- 7.0<br>-10.5<br>- 6.0<br>- 4.0      | 0, 0<br>1, 0<br>0, 5<br>0, 0<br>0, 5   | 12 m                                 | 73, 8                                      | 20. 0<br>36. 0<br>34. 6                   | 31. 1<br>24. 0<br>42. 7<br>39. 2<br>50. 3 | Cloudy.<br>Cloudy and light snow.<br>Fair.<br>Cloudy and light snow.<br>Fair.   |
| Apr. 16<br>Apr. 17<br>Apr. 18<br>Apr. 19<br>Apr. 20           | 8.30 a. m 8.30 a. m 8.30 a. m 8.30 a. m 8.30 a. m 8.50 a. m             | -21.6 $-25.8$ $-29.0$ $-9.0$ $4.2$                                 | -22. 0<br>-26. 0<br>-29. 5<br>- 9. 5<br>4. 0   | 0, 2<br>0, 5<br>0, 5<br>0, 2           | 12 m                                 | 85, 2<br>41, 8<br>42, 7<br>67, 6           | 35, 2                                     | 53, 6<br>50, 0<br>31, 8<br>23, 0<br>35, 0 | Clear.<br>Clear.<br>Cloudy and light snow.<br>Cloudy,<br>Cloudy and light snow. |
| Apr. 21<br>Apr. 22<br>Apr. 23<br>Apr. 24<br>Apr. 25           | 8.30 a. m<br>8.30 a. m<br>8.30 a. m<br>8.30 a. m<br>8.30 a. m           | 9.0<br>- 3.0<br>- 8.8<br>0.5<br>9.0                                | - 8, 8<br>- 9, 0<br>0, 0<br>9, 0               | 0, 2<br>0, 0<br>0, 2<br>0, 5<br>0, 0   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 99. 6<br>92. 7<br>86. 2<br>67. 0<br>52. 3  | 43. 3<br>41. 1<br>33. 9                   | 49. 4<br>45. 1<br>33. 1                   | Cloudy and light snow.<br>Cloudy.<br>Fair.<br>Cloudy.<br>Light snow.            |
| Apr. 26<br>Apr. 27<br>Apr. 28<br>Apr. 29<br>Apr. 30           | 8.30 a. m<br>8.30 a. m<br>7.42 a. m<br>7.42 a. m<br>7.42 a. m           | 9. 2<br>3. 0<br>7. 0<br>6. 2<br>4. 0                               | 9. 1<br>2. 8<br>6. 8<br>6. 0<br>3. 5           | 0. 1<br>0. 2<br>0. 2<br>0. 2<br>0. 5   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 78. 0<br>93. 9<br>109. 0<br>54. 2<br>94. 4 | 45. 7<br>57. 4                            | 48. 2<br>51. 4<br>24. 2                   | Cloudy and light snow.<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.              |

<sup>\*</sup>Approximated. Mercury apparently frozen.

black and thwest of brought in Novemnorizon to sed every end again in, the sun gton mid-

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tion to reduce

l Disturbed by natives.

Statement showing the solar radiation at Uylaamie from February, 1883, to August, 1883-Continued.

| Date.   | Time of observation.  | Black<br>bulb.                            | Bright<br>bulb.                               | Differ-<br>ence.                       | Time.                                | Black<br>bulb.                                | Bright<br>bulb.                           | Differ-<br>ence.                          | Weather.  |
|---|---|---|---|--|--------------------------------------|---|---|---|---|
| 1883.<br>May 1<br>May 2<br>May 3<br>May 4<br>May 5  | 7.20 a. m   | - 8.5<br>- 4.5<br>- 1.0                   | -12, 2<br>- 8, 5<br>- 4, 5<br>- 1, 0<br>16, 0 | 0. 2<br>0. 0<br>0. 0<br>0. 0<br>0. 0   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 96. 6<br>101. 2                               | 44. 0<br>49. 6<br>48. 5<br>51. 5<br>71. 2 | 40. 0<br>47. 0<br>52. 7<br>48. 2<br>48. 6 | Clear,<br>Fair.<br>Clear.<br>Fair.<br>Cloudy.   |
| May 6<br>May 7<br>May 8<br>May 9<br>May 10          | 8 40 a m  | 28. 1<br>14. 8<br>18. 5<br>22. 0<br>18. 6 | 28. 0<br>14. 8<br>18. 4<br>21. 8<br>18. 5     | 0, 1<br>0, 0<br>0, 1<br>0, 2<br>0, 1   | 12 m                                 | 100. 9<br>65. 5<br>115. 1<br>66. 0<br>109. 2  | 56. 0<br>39. 8<br>72. 8<br>44. 8<br>63. 3 | 44. 9<br>25. 7<br>82. 8<br>21. 2<br>45. 9 | Cloudy. Cloudy & heavy snow Clear. Cloudy. Cloudy.  |
| May 11<br>May 12<br>May 13<br>May 14<br>May 15      | 5.25 a. m   | 25. 0<br>22. 0<br>23. 5<br>23. 6<br>22. 6 | 25. 0<br>22. 0<br>22. 5<br>23. 5<br>22. 5     | 0. 0<br>0. 0<br>1. 0<br>0. 1<br>0. 1   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 102. 7<br>72. 8<br>120. 4                     | 63. 6<br>62. 7<br>44. 1<br>73. 6<br>56. 6 | 41. 8<br>40. 0<br>28. 7<br>46. 8<br>42. 7 | Cloudy.<br>Cloudy.<br>Cloudy and light snov<br>Heavy snow & cloudy<br>Cloudy and light snov |
| May 16<br>May 17<br>May 18<br>May 19<br>May 20      | 5.17 a. m<br>5.17 a. m<br>5.17 a. m                           | 27. 0<br>27. 0<br>22. 0<br>12. 2<br>16. 5 | 27. 0<br>27. 0<br>22. 0<br>11. 2<br>16. 6     | 0, 0<br>0, 0<br>0, 0<br>1, 0<br>0, 5   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 83. 3   | 47. 9<br>62. 0<br>39. 9<br>49. 7<br>69. 6 | 22. 8<br>44. 7<br>22. 4<br>33. 6<br>39. 9 | Cloudy and light snow<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Clear.                            |
| May 21<br>May 22<br>May 23<br>May 24<br>May 25      | 5.17 a. m<br>5.17 a. m  | 20, 0<br>24, 0<br>24, 0<br>31, 5<br>32, 4 | 19. 8<br>23. 8<br>23. 6<br>31. 0<br>31. 9     | 0, 2<br>0, 2<br>0, 4<br>0, 5<br>0, 5   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 60, 7<br>98, 7<br>89, 0<br>78, 0<br>96, 3     | 35, 6<br>58, 7<br>56, 8<br>55, 4<br>61, 7 | 25. 1<br>40. 0<br>32. 2<br>22. 6<br>34. 6 | Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.   |
| May 26<br>May 27<br>May 28<br>May 29<br>May 30      | 5.17 a. m<br>5.17 a. m<br>5.17 a. m                           | 28, 8<br>29, 8<br>30, 2<br>41, 2<br>29, 6 | 28. 0<br>28. 5<br>28. 0<br>34. 0<br>29. 2     | 0. 8<br>1. 3<br>2. 2<br>10. 2<br>0. 4  | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 109, 2<br>119, 6<br>87, 3<br>112, 7<br>105, 0 | 68. 7<br>85. 6<br>57. 4<br>71. 8<br>69. 9 | 40, 5<br>34, 0<br>29, 9<br>40, 9<br>35, 1 | Fair and light snow.<br>Fair.<br>Cloudy.<br>Fair.<br>Cloudy.                                |
| May 31  | 5.17 a. m   | 31. 2                                     | 30, 0   | 1.2                                    | 12 m                                 | 103, 7  | 63. 8                                     | 39. 9                                     | Cloudy.   |
| June 3.   | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 31. 2<br>30. 0<br>27. 0<br>20. 2<br>24. 8 | 30. 0<br>29. 2<br>26. 5<br>19. 9<br>24. 5     | 1. 2<br>0. 8<br>0. 5<br>0. 3<br>0. 3   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 103, 7<br>78, 3<br>87, 0<br>99, 6<br>79, 4    | 63. 8<br>50. 8<br>49. 7<br>50. 3<br>47. 7 | 39. 9<br>22. 5<br>37. 3<br>34. 8<br>31. 7 | Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Foggy.  |
| June 7<br>June 8<br>June 9                          | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 49, 5<br>45, 0<br>80, 2<br>80, 2<br>48, 4 | 37. 0<br>36. 2<br>29. 0<br>28. 0<br>33. 8     | 12. 5<br>8. 8<br>1, 2<br>2, 2<br>14. 6 | 12 m                                 | 112. 9<br>90. 8<br>95. 0<br>112. 3<br>110. 6  | 76. 6<br>61. 3<br>60. 0<br>69. 9<br>73. 6 | 36, 3<br>29, 0<br>35, 0<br>42, 4<br>37, 0 | Clear. Foggy. Cloudy. Fair. Cloudy.   |
| June 13<br>June 14                                  | 5,17 a. m 6,17 a. m   | 27. 5<br>30. 0<br>32. 6<br>32. 5<br>31. 5 | 26 2<br>29. 5<br>32. 0<br>31. 8<br>31. 0      | 1. 3<br>0. 5<br>0. 6<br>0. 7<br>0. 5   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 109. 8<br>103. 4<br>109. 7<br>70. 9<br>73. 5  | 72. 8<br>69. 0<br>70. 2<br>49. 5<br>50. 4 | 37. 0<br>34. 4<br>39. 5<br>21. 4<br>23. 1 | Fair. Cloudy. Cloudy and light snow Cloudy. Cloudy.   |
| June 17<br>June 18<br>June 19                       | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 32. 8<br>29. 8<br>30. 4<br>31. 6<br>29. 6 | 30. 6<br>26. 5<br>29. 5<br>30. 0<br>28. 0     | 2. 2<br>3. 3<br>0. 9<br>1. 6<br>1. 6   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 114. 2<br>109. 2<br>97. 3<br>107. 2<br>112. 5 | 73. 7<br>71. 5<br>64. 0<br>71. 8<br>77. 3 | 40. 5<br>37. 7<br>38. 3<br>35. 9<br>35. 2 | Cloudy.<br>Fair.<br>Cloudy.<br>Cloudy.<br>Clear.  |
| June 21<br>June 22<br>June 23<br>June 24<br>June 25 | 5.17 a. m   | 30. 2<br>28. 8<br>31. 4<br>34. 2<br>36. 0 | 29. 4<br>27. 2<br>30. 6<br>33. 8<br>33. 0     | 0. 8<br>1. 6<br>0. 8<br>0. 4<br>3. 0   | 12 m<br>12 m<br>12 m                 | 108. 0<br>64. 7<br>67. 6<br>108. 2<br>107. 1  | 73. 0<br>46. 7<br>48. 7<br>70. 5<br>68. 6 | 35. 0<br>18. 0<br>18. 9<br>37. 7<br>38. 5 | Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.   |
| June 26<br>June 27                                  | 5.17 a. m   | 50. 2<br>34. 5<br>35. 8<br>64. 2<br>40. 8 | 40. 5<br>33. 8<br>35. 2<br>49. 0<br>39. 6     | 9. 7<br>0. 7<br>0. 6<br>15. 2<br>1. 2  | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 59. 7<br>85. 3<br>119 7<br>118. 7<br>112. 3   | 58.0                                      | 19. 2<br>27. 3<br>33. 5<br>34. 0<br>43. 1 | Cloudy. Foggy. Fair. Cloudy. Cloudy.  |

Statement showing the solar radiation at Uglaamie from February, 1883, to August, 1883-Continued.

ntinued.

| Date.   | Time of observation.  | Black<br>bulb.                            | Bright<br>bulb.                           | Differ-<br>ence.                       | Time.                                | Black<br>bulb.                                | Bright<br>bulb.                           | Differ-<br>once.                          | Weather.  |
|---|---|---|---|--|--------------------------------------|---|---|---|---|
| 1868. July 1 July 2 July 3 July 4 July 5              | 5.17 a. m 5.17 a. m 5.17 a. m                                 | 33. 5<br>84. 5<br>35. 8<br>36. 5<br>33. 6 | 38, 0<br>34, 0<br>35, 0<br>35, 8<br>38, 0 | 0, 8<br>0, 6<br>0, 8<br>0, 7<br>0, 6   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 63, 4<br>51, 4<br>108, 8<br>99, 0<br>96, 8    | 48, 3<br>42, 7<br>73, 8<br>67, 8<br>65, 6 | 15. 1<br>8. 7<br>35. 0<br>31. 7<br>31. 2  | Cloudy.<br>Cloudy and light rain.<br>Cloudy.<br>Cloudy and light rain.<br>Cloudy.           |
| July 6<br>July 7<br>July 8<br>July 9<br>July 10       | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 34. 5<br>38. 8<br>47. 5<br>57. 2<br>30. 8 | 38, 5<br>38, 0<br>46, 8<br>44, 0<br>29, 8 | 1. 0<br>0. 8<br>0. 7<br>13. 2<br>1. 0  | 12 m<br>13 m<br>12 m<br>12 m<br>12 m | 104. 8<br>78. 0<br>102. 5<br>112. 4<br>105. 7 | 73. 0<br>60. 2<br>66. 5<br>74. 0<br>71. 6 | 81, 3<br>17, 8<br>86, 0<br>38, 4<br>31, 1 | Cloudy and light rain.<br>Cloudy.<br>Cloudy.<br>Fair.<br>Fair.                              |
| nly 12  | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 56, 0<br>34, 5<br>34, 0<br>87, 2<br>85, 7 | 44. 2<br>84. 0<br>83. 5<br>33. 3<br>34. 7 | 11. 8<br>0. 5<br>0. 5<br>3. 9<br>1. 0  | 13 m<br>12 m<br>12 m<br>12 m<br>12 m | 109. 1<br>56. 5<br>91. 3<br>114. 1<br>66. 5   | 74. 2<br>45. 3<br>60. 2<br>79. 5<br>50. 7 | 84. 9<br>11. 2<br>81. 1<br>84. 6<br>15. 8 | Clear. Cloudy. Foggy. Cloudy. Cloudy.   |
| uly 16<br>uly 17<br>uly 18<br>uly 19<br>uly 20        | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 33. 5<br>29. 6<br>55 5<br>57. 0<br>85. 8  | 33. 0<br>28. 5<br>42. 0<br>43. 8<br>35. 5 | 0. 5<br>1. 1<br>13. 5<br>13. 2<br>0. 3 | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 59. 0<br>110. 5<br>118. 6<br>118. 2<br>94. 3  | 47. 2<br>75. 4<br>90, 0<br>80, 8<br>63. 0 | 11. 8<br>35. 1<br>28. 6<br>87. 4<br>81. 3 | Cloudy.<br>Fair.<br>Clear.<br>Fair.<br>Cloudy.  |
| Tuly 21<br>Tuly 22<br>Tuly 23<br>Tuly 24<br>Tuly 25   | 5.17 a. m   | 32, 8<br>31, 2<br>30, 4<br>30, 4<br>50, 0 | 32. 0<br>31. 0<br>29, 8<br>30. 0<br>42. 8 | 0. 8<br>0. 2<br>0. 6<br>0. 4<br>7. 2   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 64. 0<br>100. 5<br>110. 8<br>110. 0<br>112. 5 | 48. 5<br>66. 4<br>78. 7<br>75. 7<br>81. 4 | 15. 5<br>34. 1<br>82. 1<br>35. 3<br>31. 1 | Cloudy.<br>Cloudy.<br>Clear.<br>Fair.<br>Clear.   |
| fulv 27   | 5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m<br>5.17 a. m | 81, 5<br>41, 5<br>84, 0<br>80, 5<br>29, 8 | 31, 0<br>36, 0<br>33, 6<br>30, 2<br>29, 6 | 0, 5<br>5, 5<br>0, 4<br>0, 3<br>0, 2   | 12 m                                 | 109, 3<br>111, 0<br>109, 3<br>79, 0<br>108, 4 | 75, 0<br>74, 4<br>72, 3<br>54, 0<br>68, 6 | 34. 8<br>86. 6<br>37. 0<br>25. 0<br>89. 8 | Clear. Fair. Fair. Cloudy. Fair and light snow.   |
|   | 5.17 a. m   | 29. 6                                     | 29. 0                                     | 0.6                                    | 12 m                                 |   | 72. 2                                     | 39, 9                                     | Cloudy.   |
| 1883,<br>Aug. 1<br>Aug. 2<br>Aug. 3<br>Aug. 4         | 5.30 a. m<br>5.30 a. m  | 33, 2<br>83, 5<br>84, 5<br>35, 2<br>33, 0 | 33, 2<br>33, 2<br>34, 2<br>35, 0<br>32, 8 | 0. 0<br>0. 3<br>0. 3<br>0. 2<br>0 2    | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 73. 5<br>108. 0<br>96. 0<br>57. 7<br>61. 4    | 65, 9<br>45, 1                            | 20, 8<br>35, 7<br>30, 1<br>12, 6<br>15, 4 | Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.<br>Cloudy.   |
| Aug. 6<br>Aug. 7<br>Aug. 8<br>Aug. 0<br>Aug. 10       | 5.30 a. m   | 33, 8<br>33, 2<br>44, 0<br>43, 0<br>37, 6 | 83. 7<br>33. 0<br>44. 0<br>43. 0<br>87. 6 | 0. 1<br>0. 2<br>0. 0<br>0. 0<br>0. 0   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 67. 4<br>89. 8<br>116. 2<br>130. 4<br>98. 8   | 49, 5<br>65, 0<br>84, 3<br>94, 8<br>71, 5 | 17. 9<br>24. 8<br>31. 9<br>35. 6<br>27. 3 | Foggy.<br>Cloudy.<br>Fair.<br>Cloudy.<br>Cloudy.  |
| Aug. 11 .<br>Aug. 12<br>Aug. 13<br>Aug. 14<br>Aug. 15 | 6.30 a. m<br>6.30 a. m  | 40, 7<br>43, 8<br>40, 4<br>33, 7<br>33, 5 | 40, 6<br>43, 6<br>40, 4<br>83, 7<br>33, 4 | 0. 1<br>0. 2<br>0. 0<br>0. 0<br>0. 1   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 111.0<br>98.2<br>64.6                         | 84. 3<br>81. 6<br>63. 9<br>49. 4<br>73. 0 | 34. 7<br>29. 4<br>34. 3<br>15. 2<br>27. 0 | Foggy. Cloudy. Cloudy. Cloudy. Cloudy.  |
|   | 6.45 a. m<br>6.50 a. m<br>6.50 a. m<br>6.50 a. m<br>6.50 a. m | 42. 5<br>36. 2<br>38. 0<br>28. 1<br>29. 8 | 42. 3<br>36. 0<br>37. 8<br>27. 9<br>29. 7 | 0, 2<br>0, 2<br>0, 2<br>0, 2<br>0, 2   | 12 m                                 | 113. 0<br>87. 2                               | 48, 8<br>78, 5<br>56, 5<br>62, 1<br>35, 0 | 17. 0<br>85. 5<br>30. 7<br>34. 9<br>6. 0  | Cloudy and light rain<br>Fair.<br>Cloudy and light snow<br>Cloudy.<br>Cloudy and light snow |
| Aug. 21<br>Aug. 22<br>Aug. 23<br>Aug. 24<br>Aug. 25   | 6.50 a. m<br>6.50 a. m<br>6.50 a. m<br>6.50 a. m<br>7.25 a. m | 27. 0<br>24. 1<br>34. 8<br>39. 1<br>26. 9 | 27. 0<br>24. 1<br>34. 7<br>39. 0<br>26. 8 | 0. 0<br>0. 0<br>0. 1<br>0. 1<br>0. 1   | 12 m<br>12 m<br>12 m<br>12 m<br>12 m | 62. 9<br>77. 5<br>95. 4<br>71. 6<br>6 8       | 44 2<br>53.2<br>67.0<br>48.4<br>45.0      | 18. 7<br>24. 3<br>28. 4<br>23. 2<br>16. 8 | Cloudy.<br>Cloudy and light snow<br>Cloudy.<br>Cloudy.<br>Cloudy.                           |
|   | 7.10 a. m<br>7.20 a. m  | 39. 9<br>28. 2                            | 39. 8<br>28. 2                            | 0. 1                                   | 12 m<br>12 m                         | 91. 8<br>67. 6                                | 60. 0<br>47. 4                            | 31. 8<br>20. 2                            | Cloudy.<br>Cloudy.  |

#### TERRESTRIAL RADIATION.

A minimum thermometer was exposed for terrestrial radiation from November 16, 1882, to the closing of the station, and read every day at Washington midnight. It was laid upon a board securely fixed upon the surface of the ground, and a box was provided with which it could be covered during snow storms, to prevent injury to the thermometer in digging it out of a snow-drift. Snow storms or drift of snow of course prevented observations with this thermometer.

On January 14, 1883, the Yale special minimum thermometer, No. 7 (carbon disulphide), was exposed beside this in its case, but was destroyed on January 25th by the Eskimo dogs, which gnawed off the end containing the bulb, attracted probably by the varnish on the case.

Statement showing the terrestrial radiation at Uglaamie from November, 1882, to March, 1883.

[Washington time. Correction to reduce to mean local time, - 8th 17th. Special minimum, CSs, No. 7, exposed for terrestrial radiation January 14, 1883; destroyed by Eskimo dogs January 25, 1883. Terrestrial minimum and air minimum read at 12 midnight, Washington time.

|                                  | Novemb   | er, 1882,                                      | Decembe   | r, 1882.   | Januar   | y, 1863.   | Vobrua   | ry, 1883.                                      | March  | , 1849.  |
|----------------------------------|--|--|---|--|--|--|--|--|--|--|
| Day of month.                    | Terres-<br>trial.                              | Air.   | Torres. i   | Air.   | Torres-  | Air.   | Terres-<br>trial.                              | Ain  | Terres-  | Air.   |
| 3                                |  |  | -22, 2<br>-25, 2<br>-29, 6<br>-30, 0<br>-30, 9        | -12.7<br>-15.4<br>-16.3<br>-16.4<br>-19.0                | (*)<br>-10, 6<br>-11, 6<br>-15, 2                        | -18.2<br>- 9.3<br>- 8.2<br>-10.2<br>-15.3                | -22. 6<br>-16. 4<br>- 5. 8<br>(*)<br>3. 6      | -15, 1<br>-12, 3<br>- 1, 9<br>5, 0<br>0, 2     | -33. 2<br>-42. 2<br>-28. 4<br>-27. 0<br>-21. 7 | -37. 2<br>-45. 2<br>-32. 2<br>-28. 3<br>-23. 2 |
| 6<br>7<br>8<br>9                 |  |  | -28.5<br>-34.8<br>-38.0<br>-35.8<br>-34.5             | -16. 2<br>-26. 8<br>-26. 6<br>-25. 5<br>-25. 0           | -26. 2<br>-18. 0<br>-22. 2<br>-35. 7<br>-30. 8           | -20, 7<br>-22, 0<br>-21, 2<br>-25, 2<br>-24, 2           | -11. 0<br>-7. 2<br>(*)<br>(*)                  | + 9.9<br>- 8.2<br>- 4.8<br>- 5.2<br>-21.8      | -34. 8<br>-36. 8<br>-39. 2<br>-47. 4<br>-47. 8 | -36, 7<br>-38, 3<br>-43, 6<br>-51, 4<br>-46, 7 |
| 13                               |  |  | -37. 8<br>-39. 5<br>-32. 1<br>-34. 2<br>-36. 0        | -20, 3<br>-28, 0<br>-26, 2<br>-26, 4<br>-29, 2           | -33.8<br>-39.4<br>-39.4<br>(*)<br>-40.8                  | -30. 3<br>-36. 8<br>-39. 2<br>-36. 2<br>-41. 8           | -25. 2<br>-21. 4<br>-15. 3<br>-25. 0<br>-27. 3 | -20, 6<br>-19, 2<br>-13, 8<br>-17, 7<br>-17, 9 | -41.6<br>-27.4<br>-33.6<br>-38.4<br>-35.4      | -43, 4<br>-30, 1<br>-32, 7<br>-34, 7<br>-39, 7 |
| 16                               | (*)<br>(*)<br>(*)                              | -24. 0<br>-16. 5<br>-14. 5<br>-14. 2<br>-12. 0 | -36. 5<br>-31. 8<br>(*)<br>-43. 5<br>-38. 5           | -30, 5<br>-25, 1<br>-29, 5<br>-29, 2<br>-25, 2           | -40.4   (*)   -17.2   -32.4   -31.7                      | -40. 6<br>- 8. 7<br>-18. 7<br>-26. 5<br>-30. 0           | -27. 4<br>-17. 2<br>-16. 4<br>- 2. 8<br>-18. 4 | -22. 6<br>-15. 6<br>-14. 9<br>-0. 8<br>-17. 1  | -24.4<br>-23.4<br>-28.4<br>-29.7<br>-30.8      | -26. 0<br>-21. 1<br>-27. 7<br>-27. 8<br>-32. 2 |
| 21<br>22<br>23<br>24<br>25       | (*)  | - 9.5<br>- 4.8<br>-18.4<br>-21.5<br>-16.6      | -44, 0<br>-44, 9<br>-50, 8<br>-55, 2<br>-53, 8        | -26, 3<br>-31, 8<br>-32, 2<br>-39, 0<br>-36, 7           | -31, 7 (*) (*) -20, 4 -28, 2                             | - 22. 0<br>13. 2<br>4. 3<br>10. 8<br>28. 4               | -20. 8<br>-31. 6<br>-33. 2<br>-64. 2<br>-40. 0 | -17. 4<br>-25. 2<br>-25. 1<br>-27. 5<br>-27. 4 | -21. 8<br>- 6. 0<br>-15. 0<br>-15. 7<br>8. 6   | -24. 1<br>- 9. 3<br>-15. 9<br>- 8. 0<br>9. 6   |
| 26<br>27<br>28<br>29<br>30<br>31 | -33. 0<br>-34. 0<br>-25. 5<br>-21. 0<br>-21. 4 | -24.1<br>-16.6<br>-18.2<br>-14.8<br>-12.8      | -33, 5<br>-48, 2<br>-43, 8<br>-49, 8<br>-51, 2<br>(*) | -22. 0<br>-23. 8<br>-23. 1<br>-32. 7<br>-42. 0<br>-26. 2 | -36, 2<br>-36, 7<br>-37, 4<br>-40, 5<br>-43, 5<br>-87, 4 | -31. 2<br>-36. 0<br>-36. 2<br>-32. 9<br>-38. 7<br>-35. 2 |  | -34, 3<br>-25, 0<br>-18, 6                     | - 4.0  | 0.7 $4.0$ $-10.8$ $12.2$ $-3.2$ $-3.2$         |

\* Not exposed on account of drifting snow.

| Day of                     | April,                                       | 1883.  | May,   | 1883.  | June,                                     | 1883.                                     | July,  | 1883.  | Augusi                                    | , 1883.                         |
|----------------------------|--|--|--|--|---|---|--|--|---|---------------------------------|
| month.                     | Terres-<br>trial.                            | Air.   | Terres-<br>trial.                                | Air.   | Terres-<br>trial.                         | Air.                                      | Terres-<br>trial.                                  | Air.   | Terres-<br>trial.                         | Air.                            |
| 1<br>2<br>3<br>4<br>5      | 22. 0<br>31. 0<br>34. 0<br>33. 0<br>11. 4    | -21. 9<br>-24. 8<br>-23. 0<br>-20. 7<br>-14. 3 | -13. 2<br>-10. 7<br>- 6. 5<br>- 2. 0<br>9. 8     | -14. 0<br>-10. 8<br>- 6. 5<br>- 2. 2<br>13. 5      | 24. 3<br>(*)<br>18. 0<br>14. 2<br>16. 2   | 27. 9<br>24. 5<br>20. 9<br>18. 2<br>22. 7 | 31. 0<br>32. 0<br>34. 0<br>34. 0<br>31. 5          | 31. 4<br>31. 9<br>33. 4<br>33. 8<br>32. 0          | 30. 6<br>30. 0<br>30. 5<br>82. 0<br>30. 0 | 32.<br>32.<br>32.<br>33.        |
| 6<br>7<br>8<br>9<br>10     | -13. 0<br>-27. 0<br>-29. 5<br>-22. 0<br>(†)  | -11. 3<br>-23. 0<br>-29. 0<br>-20. 4<br>- 9. 9 | 19. 1<br>16. 2<br>15. 5<br>22. 2<br>21. 8        | 12. 9<br>19. 2                                     | (*)                                       | 28. 2<br>26. 2<br>27. 0<br>24. 2<br>25. 7 | 32, 2<br>36, 2<br>33, 0<br>27, 2<br>28, 5          | 00, 0  | 31. 4<br>30. 6<br>86. 5<br>37. 2<br>33. 2 | 32.<br>32.<br>38.<br>40.<br>36. |
| 11<br>12<br>13<br>14       | - 8.0<br>-16.0<br>-14.2<br>-12.8<br>- 9.5    | - 9. 0<br>-13. 6<br>-10. 6<br>-10. 9<br>- 9. 7 | 24. 5<br>22. 6<br>23. 8<br>27. 3<br>24. 7        | 22. 2<br>18. 3<br>18. 6<br>21. 8<br>18. 5          | 18.3<br>23.9<br>26.5<br>26.6<br>24.5      | 24. 7<br>27. 5<br>30. 8<br>30. 5<br>29. 8 | 32. 3<br>32. 8<br>34. 6<br>19. 0<br>38. 5          | 33. 7<br>32. 5<br>32. 5<br>30. 4<br>32. 3          | 33. 5<br>37. 8<br>33. 8<br>28. 9<br>25. 5 | 36.<br>37.<br>33.<br>31.        |
| 16<br>17<br>18<br>19<br>20 | -26. 2<br>-34. 0<br>-35. 2<br>- 9. 8<br>1. 0 | -27. 7<br>-28. 9<br>-35. 0<br>-11. 8<br>2. 8   | 30. 4<br>28. 5<br>25. 5<br>11. 0<br>43. 0        | 24. 7<br>22. 4<br>19. 5<br>7. 6<br>11. 5           | 23. 7<br>18. 5<br>23. 5<br>24. 0<br>20, 7 | 28. 3<br>23. 6<br>27. 3<br>26. 5<br>25. 6 | 32. 0<br>25. 2<br>29. 0<br>30. 6<br>33. 5          | 31. 9<br>28. 0<br>34. 2<br>34. 8<br>34. 0          | 34. 0<br>30. 0<br>29 0<br>19. 0<br>24. 0  | 35,<br>31,<br>30,<br>26,<br>27, |
| 21                         | - 3, 5<br>-12, 0<br>0, 0<br>7, 0             | - 3.4<br>- 5.5<br>- 10.1<br>- 2.5<br>- 6.6     | 17. 8<br>25. 5<br>30. 0<br>25. 0<br>33. 8        | 11. 5<br>19. 2<br>22. 8<br>18. 9<br>28. 7          | 22. 0<br>21, 5<br>(*)<br>(*)<br>(*)       | 25. 7<br>25. 4<br>26. 0<br>30. 1<br>30. 0 | 30. 5<br>28. 0<br>(1)<br>27. 5<br>25. 2            | 31. 0<br>29. 4<br>27. 4<br>27. 7<br>30. 8          | 23, 5<br>19, 8<br>30, 8<br>25, 8<br>20, 2 | 24.<br>22.<br>32.<br>26.<br>25. |
| 26                         | 1.0<br>4.0<br>(;)                            | - 2.3<br>3.9<br>5.0<br>- 0.8                   | (*)<br>19. 7<br>28. 5<br>21. 4<br>23. 2<br>22. 7 | 28. 6<br>23. 7<br>24. 5<br>26. 2<br>28. 3<br>27. 0 | 31. 2<br>32. 1<br>33. 7<br>35. 1<br>32. 5 | 32. 0<br>32. 5<br>33. 2<br>35. 5<br>34. 6 | 27, 5<br>28, 7<br>30, 0<br>27, 0<br>26, 5<br>25, 6 | 29. 8<br>32. 3<br>31. 8<br>27. 9<br>27. 3<br>27. 7 | 27. 2<br>24. 0                            | 28.<br>27.                      |

<sup>\*</sup>Column broken.

<sup>†</sup> Not exposed; drifting snow.

<sup>;</sup> Thermometer disturbed.

#### SEA-ICE TEMPERATURE.

On November 13, 1882, a wooden box, about 6 inches square on the bottom, with a sliding cover, was placed in an excavation about 4 inches deep made in the sea-ice about 50 yards from the shore. In this a spirit thermometer (No. 684) was set upright, and the bottom of the box filled with sea-water, which immediately froze, so as to inclose the bulb of the thermometer in ice.

A break in the ice near the shore occurred on the night of Nevember 20, and the ice moved away, carrying the thermometer with it. Spirit thermometer No. 713 was exposed in a similar box on December 19, 1882, and was kept in place till June 6, 1883, when the ice was beginning to melt on the surface. These thermometers were read every day about local noon.

The ice formed to the depth of  $5\frac{1}{14}$  feet, and while the temperature of the water immediately beneath it continued practically constant at about 29° F., the ice showed considerable variation. When the temperature of the air was low, the temperature of the ice was, as a rule, higher than that of the air. The reverse was true, as a rule, when the weather grew warmer.

#### TEMPERATURE OF THE SEA.

From November 11, 1881, till May 7, 1883, the temperature of the sea-water was observed once a day, from 12 m. to 2 p. m., local time, and hourly from May 7 to the end of the voyage home. It was taken at the surface and bottom in 17 feet of water, about 100 yards from the shore, through a hole in the ice in the winter, and by rowing out in a small boat when the water was open. The surface temperature only was taken from the vessel.

The temperature of the water in the various fresh and brackish lagoons was taken from time to time during the winter, and although ice was formed upwards of  $6_b^*$  feet thick, leaving scarcely any water underneath it, unfrozen mud was found at the bottom.

Statement showing the sea-ice temperature at Uglaamie from November, 1882, to June, 1883.

Observations taken at noon, local time; water temperature taken on bottom, 17 feet deep, one-eighth mile from shore.

| Day of | Nov  | vembe         | r, 1882.                                |                |  | Decemb   | er, 1882.                                 |   |                            | Januar,  | y, 1883.                                  |   |   | Februa                                     | ry, 1883,                                 |                                 |
|--------|--|---------------|---|----------------|--|--|---|---|----------------------------|--|---|---|---|--|---|---------------------------------|
|        | eo. A  | ir.           | Diff.                                   | Water.         | Ice.   | Air.   | Diff.                                     | Water.                                    | Ico.                       | Air.   | Diff.                                     | Water.                                    | Ice.                                      | Air.                                       | Diff.                                     | Water                           |
|        |  |               |   |                |  |  |   |   | 1.1                        | - 10.2<br>- 3.4<br>- 4.7<br>- 4.4<br>- 7.8     | 5, 7<br>3, 0<br>5, 8<br>5, 5<br>6, 6      | 29. 5<br>29. 4<br>29. 5<br>29. 5<br>29. 3 | = 3, 5<br>= 0, 8<br>5, 7<br>6, 7<br>11, 9 | -10, 4<br>4, 2<br>6, 2<br>6, 4<br>16, 6    | 3.4<br>0.5<br>0.3                         |                                 |
|        |  |               |   |                |  |  |   |   | $\frac{-1.7}{-4.5}$        | -15, 6<br>-17, 7<br>-12, 0<br>-20, 5<br>-15, 7 | 12. 1<br>14. 7<br>10. 3<br>16. 0<br>12. 2 | 29, 3<br>29, 4<br>29, 3<br>29, 5<br>29, 4 | 8, 5<br>11, 4<br>6, 7<br>(')<br>2, 9      | -4.2<br>19.6<br>3.2<br>17.2<br>16.9        | 12. 7<br>7. 6<br>3. 5                     | 29,<br>29,                      |
|        | 25, 0 2  | S3. 8<br>9. 0 | 1. 2<br>12, 1<br>5, 6                   | 29. 0<br>29. 1 |  |  |   |   | - 9.1<br>-11.0<br>-11.6    | -24.5 $-29.5$ $-30.4$ $-28.1$ $-34.7$          | 16, 8<br>20, 4<br>19, 4<br>16, 5<br>21, 3 | 29, 2<br>29, 1<br>29, 1<br>29, 1<br>29, 1 | - 1.7<br>3.8<br>2.0<br>1.1                | - 8.2<br>-10.4                             | 15, 1<br>5, 9<br>10, 2<br>11, 5<br>12, 1  |                                 |
| 3 ·-   | 10, 01<br>1, 0<br>2, 0 : -<br>3, 0 : -<br>6, 0 | 9, 8<br>9, 5  | 7, 8<br>10, 9<br>11, 8<br>12, 5<br>9, 2 | 29, 0<br>29, 1 |  |  | 18.5                                      |   | - 2.2                      | - 5, 3<br>- 0, 8<br>-12, 8<br>-19, 6<br>-19, 4 | 1. 8<br>0. 2<br>10. 6<br>12. 4<br>12. 6   | 29, 3<br>29, 4<br>29, 0<br>29, 2<br>29, 2 | 1. 1<br>5. 7<br>7. 6                      | -15. 0<br>-10. 4<br>3. 7<br>6. 9<br>-12. 3 | 18.8<br>11.5<br>2.0<br>0.7<br>14.3        | 29<br>29<br>29<br>29            |
|        | d)   |               |   |                | 0, 4<br>0, 6<br>1, 1                                       | -24.9<br>-23.1<br>-30.5                            | 17. 9<br>24. 5<br>22. 5<br>29. 4<br>18. 5 | 29, 5<br>29, 4                            |                            | - 4.3  |   | 29. 0<br>29. 2<br>29. 3<br>29. 2<br>20. 2 | - 1.7<br>- 2.6<br>- 6.3                   | -7.8<br>-19.7<br>-15.2<br>-21.6<br>-18.7   | 10. 7<br>18. 0<br>12. 6<br>15. 3<br>12. 4 | 29.<br>29.<br>29.<br>29.<br>20. |
| )<br>9 |  |               |   |                | $-10.1$ $\begin{array}{r} 7.2 \\ -7.7 \\ 11.0 \end{array}$ | -14.3<br>-10.8<br>-11.7<br>-22.9<br>-25.5<br>-12.6 | 6, 6<br>0, 7<br>0, 5<br>15, 2<br>14, 5    | 29. 4<br>29. 3<br>20. 2<br>29. 6<br>29. 5 | - 9. 1<br>-10. 1<br>-12. 9 | 30, 3  |   | 29. 2                                     | - 5. 4<br>0. 1                            | -25.7<br>-15.2<br>- 2.4                    |   |                                 |

<sup>\*</sup> Impracticable.
The thornometer carried off by the ice moving from shore November 21; impracticable to place anoth 2 thermometer until December 20, H. Bx. 44-----43

Statement showing the scalice temperature at Unhamie from November, 1882, to June, 1883—Continued.

|                            |  | March  | 1983  |  | April.  | 1883.                                    |  |  | May, 18  | 83.  |   | 1   | June, i                          | laso.                                | -  |
|----------------------------|--|--|---|--|---|--|--|--|--|--|---|---|----------------------------------|--------------------------------------|--|
| Day of month.              |  |  |   |  | Ire. Air.   |  |  |  |  |  |   |   |                                  |                                      |  |
|                            | Ice.   | Air.   | Diff.   | Water  | Ice. Air.   | Diff.                                    | Water  | Ice.   | Air  | Diff.  | Water.                                    | ice.                                      | Air.                             | Diff.                                | Water,                                       |
| 1<br>2<br>4                | $-\frac{10.1}{7.2}$<br>$-\frac{7.2}{5.1}$        | +27. 5<br>+28. 2<br>+20. 5<br>+32. 3<br>+10. 2                           | 18, 1<br>13, 3<br>16, 9<br>7, 6               | 29, 1<br>29, 1<br>19, 1<br>29, 2<br>29, 2          | $\begin{array}{cccc} 5.7 & -12.7 \\ 3.8 & -10.0 \\ 2.9 & -11.2 \\ 1.1 & -11.4 \\ 4.8 & -0.9 \end{array}$      | 18, 4<br>13, 8<br>14, 1<br>12, 1<br>5, 7 | 20, 0<br>29, 1<br>29, 0<br>29, 1<br>29, 1          | 10, 4<br>11, 4<br>12, 3<br>12, 3<br>22, 5          | 2. 7<br>8. 2<br>5. 1<br>12. 0<br>33. 6             | 7. 7<br>3. 2<br>7. 2<br>0. 3<br>11. 1        | 29, 1<br>29, 1<br>29, 0<br>29, 1<br>29, 1 | 31. 2<br>32. 2<br>30. 3<br>31. 2<br>32. 2 | 30, 3<br>27, 4<br>26, 1<br>35, 6 | 2. 0<br>1. 3<br>2. 9<br>5. 1<br>3. 4 | 29 2<br>29 2<br>29 2<br>29 2<br>29 2<br>29 2 |
| 6<br>7<br>8<br>9<br>10     | 5. 1<br>10. 1<br>12 9                            | -10.0<br>-18.2<br>-36.7<br>-34.9<br>-23.7                                | 12. 8<br>26. 6<br>22. 0<br>21. 8              | 29. 1<br>29. 1<br>29. 1<br>9. 1<br>20. 1           | $\begin{array}{rrrr} 4.8 & = 3.1 \\ 2.0 & = 7.6 \\ 2.9 & = 6.0 \\ 2.9 & = 4.7 \\ 3.8 & = 1.6 \end{array}$     | 7. 9<br>9. 6<br>8. 9<br>7. 6<br>5. 4     | 29. 1<br>29. 1<br>29. 1<br>29. 1<br>29. 1          | 20, 5<br>20, 5<br>21, 5<br>21, 5<br>21, 5<br>25, 4 | 20, 1 1<br>25, 2 1<br>23, 9<br>25, 3 1<br>27, 4    | 0.4<br>4.7<br>1.5<br>3.8<br>2.0              | 29, 0<br>29, 0<br>29, 0<br>29, 0<br>29, 0 |   |                                  | 0.4                                  | 29. 3  |
| 11<br>12<br>13<br>14<br>15 | = 7.3<br>= 9.1<br>= 9.1                          | $\begin{array}{c} -32.1 \\ -14.9 \\ -29.9 \\ -25.5 \\ -2.06 \end{array}$ | 19. 2<br>7. 7<br>10. 8<br>14. 1<br>14. 5      | 29, 2<br>29, 1<br>29, 1<br>29, 1<br>29, 1          | $\begin{array}{cccc} 5,7 & :=& 1,2 \\ 5,7 & 5,5 \\ 6,7 & 3,8 \\ 7,6 & 0,3 \\ 6,7 & :=& 0,2 \\ \end{array}$    | 6, 9<br>0, 2<br>2, 9<br>1, 3<br>6, 9     | 29. 1<br>29. 0<br>29. 1<br>29. 1<br>29. 1<br>29. 1 | 25, 4<br>24, 9<br>23, 5<br>24, 4<br>25, 5          | 26, 2<br>21, 7<br>24, 9<br>31, 5<br>26, 8          | 0. 8<br>3. 2<br>1. 4<br>7. 1<br>3. 3         | 29, 0<br>29, 1<br>29, 1                   |   |                                  |                                      |  |
| 16<br>17<br>18<br>19<br>20 | - 5.1  | 10, 4<br>12, 7<br>11, 5<br>16, 6<br>14, 6                                | 4. 1<br>7. 8<br>5. 1<br>9. 4<br>7. 4          | 29. 1<br>29. 0<br>29. 1<br>29. 1<br>29. 1<br>19. 0 | 2 0 -13.8<br>2.0 -6.7<br>4.8 1.3<br>8.5 12.5  | 16.7<br>15.1<br>8.7<br>3.5<br>4.0        | 29, 0 1<br>29, 1<br>29, 1<br>29, 1<br>29, 1        | 20, 5<br>23, 5<br>22, 5<br>23, 5<br>23, 5<br>25, 3 | 33. 9 1<br>28. 4<br>28. 4 1<br>30. 8<br>27. 1      | 11.4<br>4.9<br>5.9<br>7.3<br>1.8             | 29, 2<br>29, 2                            |   |                                  |                                      |  |
| 91<br>99<br>99             | 17   | = 5.4<br>= 1.6<br>= 1.8<br>= 1.6   | 3, 9<br>2, 9<br>7, 0<br>6, 9<br>13, 1         | 19. 1<br>20. 0<br>19. 1<br>20. 1<br>20. 1          | $\begin{array}{cccc} 9.5 & & 0.5 \\ 10.4 & & 4.4 \\ 10.4 & & 7.4 \\ 11.4 & & 8.9 \\ 13.3 & & 1.6 \end{array}$ | 10. 0<br>6. 0<br>3. 0<br>2. 5<br>2. 3    | 29. 1   29. 1   29. 0   29. 1                      | 25. 4<br>25. 4<br>27. 3<br>28. 3<br>30 3           | 26. 4<br>25. 9<br>33. 2<br>35. 4<br>37. 8          | 1, 0<br>0, 5<br>5, 9<br>7, 1<br>7, 5         | 29. 2                                     |   |                                  |                                      |  |
| 26<br>27<br>28<br>29<br>30 | 9. 5<br>12. 9<br>9. 5<br>13. 3<br>11. 4<br>11. 2 | 22. 5<br>18. 1<br>1 2.5 5<br>10. 6<br>3. 9                               | 13. 0<br>5. 8<br>0 8<br>12. 2<br>0. 8<br>7. 3 | 20.1<br>20.2<br>20.4<br>23.1<br>20.1<br>20.1       | 12.3 8.5<br>14.3 14.4<br>15.4 13.7<br>14.3 13.6<br>11.4 5.3   | 3.8<br>0.1<br>1.7<br>0.7<br>6.1          | 29, 1 1  | 30. 3<br>61. 2<br>31. 2<br>31. 2<br>31. 2<br>31. 2 | 32. 5<br>33. 2<br>32. 5<br>32. 5<br>34. 4<br>34. 9 | 2. 2<br>2. 0<br>1. 3<br>1. 3<br>3. 2<br>3. 7 | 29. 2                                     |   |                                  |                                      |  |

<sup>\*</sup> Discontinued; surface of ice melting.

#### Temperature of sea-water at Uglaamie, Alaska.

From daily observations.

|              |                  | Surfa            | ce.   |              |         | Bottom, | 17 feet.       |                |
|--------------|------------------|------------------|-------|--------------|---------|---------|----------------|----------------|
| Month.       | Mean.            | Мах.             | Min.  | Range.       | Mean.   | Max.    | Min.           | Range.         |
| 1882.        |                  |                  |       |              |         |         |                |                |
| January      | 28, 65           | 28. 9 (<br>29. 1 | 27. 9 | 1.0          | 28. 79  | 29. 2   | 28. 2          | 1.0            |
| March        | 28, 87           | 29.1             | 28, 8 | 0.3          | 29, 64  | 29.4    | 28.9           | 0, 5           |
| April        | 28, 97           | 29, 8            | 28.8  | 1.0          | 29, 00  | 29, 8   | 28. 8<br>28. 9 | 1.0            |
| June         | 20.65            | 33.0             | 28.9  | 4.1          | 30, 16  | 32.0    | 28, 9          | 3.1            |
| August       | 37. 35<br>42. 47 | 49, 4 1          | 34. 2 | 18.7         | 42.34   | 49.1    | 29. 0<br>32. 5 | 19. 2<br>16. 6 |
| September    | 33.31            | 37.6             | 29. 8 | 7.8          | 33, 40  | 37. 0   | 30.0           | 7.0            |
| November     | 29, 20           | 32. 0            | 28. 0 | 4. 0<br>0. 4 | 29, 43  | 32, 4   | 28. 9<br>28. 9 | 3.5            |
| December     | 29, 69           | 29. 5            | 28. 9 | 0.6          | 29, 22  | 29. 6   | 28, 9          | 0.7            |
| Whole period | 31.270           | 49.4             | 27. 9 | 21.5         | 01. 359 | 49.1    | 28, 2          | 20.0           |

May 2, temperature at "lead" of open water 2 miles from shore off station: surface, 29 .24 bottom, 78 feet, 29 .2.

#### TEMPERATURE OF THE EARTH.

A shaft was opened in the frozen earth for the observation of earth temperatures December 8, 1881, and continued down to a depth of 37 feet 6 inches. A thermometer protected by a wooden case was buried at the bottom of the shaft by the workman every night and read on beginning work the next morning. From May 28, 1882, to April 23, 1883, a thermometer was kept suspended in the meat cellar at a depth of 13 feet below the surface and read once a day. From April 23, 1883, to the closing of the station the thermometer was let down by a cord to the bottom of the shaft and drawn up and read once a day. At this level the temperature remained constant at + 12° F.

Temperature of the earth at Uglaamie, Alaska, from December 8, 1881, to February 17, 1883.

|                      | Тетре                   | rature.           |                   |                                  | r of<br>neter.         | 1        |  |
|----------------------|-------------------------|-------------------|-------------------|----------------------------------|------------------------|----------|--|
| Date.                | Earta.                  | Λir.              | Depth.            | Permation.                       | Number of thermometer. | Observer | Remarks.   |
| 1-81.                | Fahr.                   | · Fahr.           | Ft. In.           |                                  |                        |          |  |
| Dec. 8               | - 3.0<br>- 4.0<br>- 3.0 | -18.0 $-18.0$     | Surface .         | Turf and clay<br>Clay and gravel | 752                    | Little   | Two feet of snow.<br>Tundin covered with ice when the snow fell.<br>Tenacions and very hard. Black; when melted resembled mudtaken   |
| Dec. 13              | 2.0                     | -23, 0            | . 3               | du                               | 752                    | . do     | from docks.<br>Tenacious and very hard. Large pieces of pure fresh-water ice, with   |
| Dec. 11              | 1.5                     | -24.0             | 5                 | do                               | 752                    | do       | gravel.<br>Tenacious and very hard. Put in blast, which blew out without   |
| Dec. 17              | 4.1                     | — 6, 6            | 6                 |                                  |                        |          | woving any earth. Work suspended shaft covered.  |
| Apr. 15              | 7.1                     | 6. 2              | - 4               | do                               |                        | do       |  |
| Ant. br              | 7. 2                    | - 6.2             | 6 6               | do                               |                        | 1do      |  |
| Apr. 21              | 7. 9                    | -12.0             | 9 2               | Clay and gravel                  | 752                    | do       | Very hard and tenacions. Temperature taken as before, in the shaft;  |
| Apr. 20              | 7. 2                    | 12. 0             | 11                | do                               | 752                    | do       | thermometer buried each time over night.   |
| Vpr. 23              | 8,3                     | 8, 3<br>18, 0     | 12                | Graveldo                         | $\frac{752}{752}$      |          | Dry, and easily worked   |
| Xpr. 24<br>Nov. 13   | 17.5                    | - 5, 0            | 15                | Clay                             |                        |          | Exeavate from for meat,<br>Quite dry, but firmly frozen. Resumed work November 23, sinking<br>two feet. Temperature of store cellur for meat, 416°, 2, on same<br>level of bottom of shaft.  |
| Nov. 24              | 17.5                    | -13.0             | 16 6              | do                               | 752                    | do       | Dry black clay.  |
| Nov. 1a<br>Doc. 1    | 17. 5<br>14. 5          | -15.0<br>-5.0     | 18<br>19 8        | (0                               | 732                    | do       | Strongly impregnated with eldorine.  Quite dry. Containing sufficient water to firmly solidify it when frozen.   |
| Hec. 4               | 14.5                    | 11.0              | 20 8              | do                               | 7.53                   | i do     |  |
| Dec. 5               | 14. 5                   | ~-1°.0            | 21 4              | do                               |                        |          | Dry and very hard. Containing sufficient water to firmly solidify it when frozen.  |
| Dec. 7               | 14.5                    | 20, 0<br>12, 5    | 23                | do                               |                        | do       |  |
| Dec. 8<br>Dec. 9     | 14. 2                   | -20.5             | 23 8              | Sand!                            | 752                    |          |  |
| Dec. 11              | 12.5                    | -17.0             | 23 4              | Clay                             |                        | do       |  |
| Dec. 12 1            | 12.5                    | -27.0<br>-10.0    | 25<br>25 8        | do                               | 7.02                   | do       |  |
| Dec. 14              | * 2. 0                  | -22.0             | 26 4              | Sand                             | 752                    | do       | Sand and fine gravel. Layers dip to SSW.45°. A pair of wooden goggles found, also fragments of claus-shells, at 27 feet 3 inches. Scopped work on the 14th. On the morning of the 18th found water and mad in bottom of shaft, with temperature of earth [44°; water |
| Dic. 18              | 14.0                    | —2° θ             | 27 3              | do                               | 752                    | do       | very sait; stood at 150 F, when brought to the surface.<br>Suspended work.   |
| 1883<br>Jan. 19      | 14.0                    | -17.0             | 28                | do                               | 752                    | do       | Resumed work after bailing out one toot of water. No more came in.   |
| dans 21              | 13.0                    | - 9, 0<br>- 35, 0 | 30                | do                               | 752                    | do       |  |
| Jan. 27 .<br>Feb. 3  | 11.0                    | . 0               | : 31              | do                               | 752<br>755             |          | •  |
| Leb. G               | 12.0                    | 7.0               | . 32 8            | do                               | 755                    | 10       | •  |
| Teb. 12 -<br>Teb. 14 | 12. 0                   |                   | 34                | do                               | 755<br>755             | do       |  |
| Feb. 15 ·            | 12.2                    | 13. 6             | 35                | do                               | 755                    | do       |  |
| Peb. 16<br>Peb. 171  | 12.2                    | -18.4 $-13.0$     | 36<br>37 <b>6</b> | do                               | 755<br>755             |          |  |
| 4 + 4/2   1 + 1      |                         | 10.0              | ., 0              |                                  | 100                    |          |  |

Five feet of snow was removed from over the shaft. The thermometer was buried in bottom, same as on December 17, when the temperature was taken.

From this date until the closing of the station the temperature was observed daily at this depth, and found to be constant at 12°. If a temperature was observed daily at this depth, and found to be constant at 12°.

#### METEOROLOGY OF MEADE RIVER RECONNAISSANCE.

These observations were taken by Lieut. P. H. Ray, and Mr. A. C. Dark, during the sledge journey towards the headwaters of Meade River, from March 28 to April 7, 1883, inclusive. The instruments used were one aneroid barometer, and two ordinary spirit-thermometers, protected by tubular wooden cases open at the bottom, and exposed by hanging them to the mast of the sled, four feet from the ground. The velocity of the wind was estimated, and its direction indicated by a fly of bunting at the masthead.

eember 8, a wooden beginning uspended April 23, om of the constant

itinued.

Meteorological record of the reconnaissance to Meade River, Alaska.

[Washington time ]

|                             |                            |  |  |  |  |  |  | Wine                                       | 1.                                  | Срр                   | er elu   | uds.                        | Low  | er elo                      | uds.                           |            | 11 01<br>0W. | . DO.  |  |
|-----------------------------|----------------------------|--|--|--|--|--|--|--|-------------------------------------|-----------------------|--|-----------------------------|--|-----------------------------|--------------------------------|------------|--------------|--|--|
| Day and date of observation | Time of observation.       |  |  | Thermometer (exposed).                                       | Corrected larometer.   | Latitude north.  | Longitude west.  | Direction.                                 | Velocity per hour.                  | Kind.                 | Amount in tenths.                                  | Direction (moving from -).  | Kind.  | Amount in tenths.           | Direction (moving from).       | Cosmenced. | Ended.       | Amount of rain or melted snow inches and hundredths. | State of Weather.  |
| 1883.<br>Mar. 28            | 3 p<br>7 p<br>11 p         | . 111.<br>1, 111.<br>1, 111.                                   | 29, 780<br>29, 735<br>29, 715                                  | 6.8<br>17.7<br>24.3  | 29, 860<br>20, 810<br>29, 790                                  | 71 00 1<br>70 51 00<br>70 47 00  | 157 00<br>157 15<br>157 12   | E.<br>E.<br>E.                             | 12s<br>9s<br>8s                     | Cir.<br>H<br>Cir.     | : 2<br>idde:<br>1                                  | n. 1                        | Strat.<br>Strat.<br>Strat.                               | 3<br>10<br>10               | 0                              |            |              | Gel<br>Ber<br>Eer                                    | Particles of Charles   |
| Mar. 29                     | 7 a<br>11 a                | . 111.   | 29, 720<br>29, 769<br>29, 800<br>29, 820<br>19, 910<br>29, 910 | 16. 0<br>17. 7<br>16. 4<br>29. 2<br>27. 1<br>3. 4            | 29, 800<br>29, 840<br>29, 880<br>29, 900<br>30, 000<br>29, 990 | 70 47 00<br>70 47 00<br>70 47 00<br>70 37 00<br>70 30 00<br>70 28 00             | 157 12<br>157 12<br>157 12<br>157 11<br>157 11<br>157 17           | SE.<br>SW.<br>W.<br>NW.<br>SW.             | 2s<br>4s<br>5s<br>10s<br>8s<br>2s   | 11                    | Iaze<br>idde<br>idde<br>0                          | n                           | Strat.<br>Strat.<br>Nimb.<br>Strat.<br>Strat.<br>Strat.  | 7<br>5<br>10<br>3<br>1      | 0 0 0 0                        | a. m.      | p. nı.       | 00<br>   | Cloudy,<br>Cloudy,<br>Hay show,<br>Cloudy,<br>Cloud,<br>Cloud, |
| Mar bi                      | 2 a<br>7 a<br>11 a         | . 100<br>- 100<br>- 100<br>- 100<br>- 100                      | 19, 565<br>29, 540<br>19, 500<br>29, 500<br>29, 870<br>29, 889 | -2.0 $-6.4$ $17.3$ $20.0$ $27.0$ $19.3$                      | 30, 020<br>30, 020<br>29, 080<br>19, 550<br>19, 950<br>29, 960 | 70 28 00<br>70 28 00<br>70 28 00<br>70 28 00<br>70 20 00<br>70 19 00<br>70 16 00 | 157 17<br>157 17<br>157 17<br>157 17<br>157 30<br>157 37<br>157 55 | S.<br>S.<br>SSE.<br>SSE.<br>S.             | 48<br>48<br>68<br>73                | Cir.                  |  | 6<br>Es<br>0<br>0           | Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat. | e-1<br>1<br>1<br>4<br>7     | 0<br>0<br>0<br>0<br>Es         |            |              | (iii)<br>(iii)<br>(iii)<br>(iii)<br>(iii)            | Hary<br>Clear F<br>Creat,<br>F F<br>Fair                       |
| 21nn.01                     | 3 a<br>7 a<br>11 a<br>3 p  | . m<br>. m.<br>. m.  | 20 88<br>19 88<br>29 89<br>29 91<br>29 99<br>50 68             | 11. 5<br>6. 3<br>3. 5<br>16. 9<br>9. 2<br>0, 5               | 29, 96<br>29, 96<br>29, 97<br>29, 99<br>20, 97<br>30, 15       | 70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00             | 137 55<br>157 55<br>157 55<br>157 55<br>157 55<br>157 55<br>157 55 | 8.<br>SSE.<br>W.<br>W.<br>N.W.             | 48<br>68<br>38<br>108<br>128<br>148 | Cir.                  | idde<br>laze<br>5<br>0<br>0                        | n.<br>0<br>, 0<br>i 0       | Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat. | 10<br>4<br>4<br>8<br>5<br>4 | 0<br>0<br>0<br>0<br>NWs<br>NWs |            |              | 00<br>00<br>00<br>00<br>00<br>00                     | Cloudy,<br>Haze<br>Cloudy,<br>Cloud,<br>Fair,<br>Unit.         |
| Арг. 1                      | 7 a<br>11 a<br>3 p         | . 105<br>. 105<br>. 10<br>. 10                                 | 30, 10<br>30, 11<br>30, 10<br>50, 20<br>30, 15<br>50, 24       | - 5.0<br>- 9.6<br>-11.3<br>-14.6<br>-13.8<br>-11.7           | 30, 18<br>30, 19<br>50 17<br>30, 34<br>50, 53<br>50, 52        | 70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00             | 157 55<br>157 55<br>157 55<br>157 55<br>157 55<br>157 55           | W.<br>NNW.<br>N.<br>N.<br>N.<br>N.         | 88<br>48<br>58<br>68<br>48<br>58    | , Cir.                | 0<br>idde<br>0<br>0                                | . 0<br>n.<br>Xs<br>. 0<br>0 | Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat. | 10<br>4<br>3<br>2           | 0<br>0<br>0<br>0               |            |              | 60<br>(0<br>(0<br>(0<br>(0                           | Lat<br>Claudy,<br>Cloudy,<br>Fair<br>Clear,<br>Clear,          |
| Apr. ?                      | 11 0                       | i, bii,<br>i, liii,<br>i, liii,<br>i, liii,<br>i, liii,        | 00, 00<br>00, 25<br>00, 48<br>10, 80<br>11,00<br>28, 85        | - 25 8<br>-11.8<br>-2.1<br>- 0.8<br>-2.0<br>1.7              | 80, 58<br>30, 63<br>30, 23<br>10, 28<br>13, 98<br>1, 54        | 70 16 00<br>70 16 00<br>70 16 00<br>70 13 00<br>69 55 00<br>69 55 00             | 157 55<br>157 55<br>157 55<br>157 52<br>157 40<br>157 40           | Cali<br>Cali<br>Cali<br>Cali<br>Cali<br>S. | 11.<br>31.<br>11.                   | 0<br>0<br>0<br>0<br>0 | 0 0 0  | 0 0 0                       | Strat.<br>Strat.<br>Strat.                               | : 1<br>0<br>1<br>0<br>2     | 0 0                            |            |              | 60<br>60<br>60<br>60<br>60<br>60                     | Char<br>Object<br>Chart,<br>Chart,<br>Chart,<br>Chart,         |
| Apr. 3                      | 7 :<br>11 :<br>11 :<br>7 1 | t. 101<br>t. 101.<br>t. 111.<br>t. 111.<br>t. 111.             | 18 87<br>28 87<br>28 87<br>28 87<br>28 87<br>28 87<br>28 87    | - 23.2<br>- 31.6<br>- 34.7<br>- 17.6<br>- 7.3<br>- 12.5      | 30, 51<br>30, 51<br>30, 51<br>30, 51<br>30, 64<br>50, 69       | 69 55 00<br>69 55 00<br>69 55 00<br>69 58 00<br>74 10 09<br>70 16 00             | 157 40<br>157 10<br>157 40<br>157 40<br>157 49<br>157 52           | S.<br>N.<br>Cali<br>N.<br>E.<br>E.         | 0a<br>2a<br>01.<br>4a<br>4a<br>03   | 0<br>0<br>Cir         | Haze<br>0<br>0<br>0<br>2                           | 0 0 0 0                     | Strat.<br>Strat.<br>0<br>Strat.<br>Strat.<br>0           | 2<br>0<br>1<br>1            | . 0<br>0<br>0<br>0<br>0        |            |              | 1 60   | Char.<br>Char.<br>Char.<br>Char.<br>Char.                      |
| <b>A</b> pr. 4              | 11:                        | 1, 101,<br>1, 111,<br>1, 111,<br>1, 111,<br>1, 111,<br>1, 111, | 15 45  | 01.2<br>-07.8<br>- 26.0<br>-0.1<br>-8.3<br>-2.4              | 30, 13<br>50, 19<br>50, 09<br>50, 97<br>28, 85<br>50, 63       | 70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00<br>70 16 00             | 157 52<br>157 52<br>157 52<br>157 52<br>157 52<br>157 52           | Cal.<br>Cal.<br>Cal.<br>Cal.<br>Cal.<br>W. | m.<br>m.<br>m.                      | 0<br>0<br>0<br>0      | 0<br>0<br>0<br>0<br>0                              | 0 0 0 0 0                   | Strat.   | . 0                         | 0<br>0<br>0<br>0<br>0          |            |              | 0.0  | Char<br>Char<br>Char<br>Char<br>Char<br>Char<br>Char           |
| Apr. 5                      | 11 :<br>3 1<br>7 1         | 1. 101<br>1. 101<br>1. 111<br>1. 111<br>1. 111.<br>1. 111.     | 15, 17   | - 52. 2<br>- 26. 5<br>- 15. 5<br>- 3. 6<br>- 7. 7<br>- 10. 6 | 20, 95<br>20, 04<br>10, 01<br>20, 51<br>20, 85<br>20, 84       | 70 16 00<br>70 16 00<br>70 16 00<br>70 21 00<br>70 27 00<br>70 28 00             | 157 52<br>157 52<br>157 52<br>157 45<br>157 25<br>157 17           | S.<br>S.<br>W.<br>Cal                      | 2)<br>2)<br>10)<br>10)              |                       | iiddi<br>Iiddi<br>Iiddi<br>Iiddi<br>Iiddi<br>Iiddi | en.                         | Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat. | 10                          | 0<br>0<br>0<br>0<br>0          |            |              | 00<br>00<br>01                                       | Clear<br>Cloudy,<br>Cloudy,<br>Cloudy,<br>Condy,<br>Part       |
| Apr. 6                      | 7 :<br>3 ;<br>7 ;          | 1. 10.<br>1. 10.<br>1. 10.<br>1. 11.<br>1. 11.<br>1. 11.       | 28, 61<br>28, 61<br>28, 61<br>28, 60                           | 13.4<br>-14.8<br>-13.4<br>-24.0<br>3.2<br>9.8                | 29, 74<br>29, 74<br>29, 65<br>29, 65<br>29, 64<br>29, 64       | 70 28 00<br>70 28 00<br>70 28 00<br>70 28 00<br>70 33 00<br>70 42 00<br>70 47 00 | 157 17<br>157 17<br>157 17<br>157 17<br>157 15<br>157 10<br>157 12 | Cal<br>Cal<br>Cal<br>Cal<br>S.<br>Cal      | m.<br>m.<br>m.                      | (°ir                  | ficials<br>ficials<br>ficials<br>ficials           | PH.<br>PH.<br>0             | Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat.<br>Strat. | 10<br>10<br>5<br>10         | 0<br>0<br>0<br>0<br>0          |            |              |  | Chairs<br>Cleary,<br>Claudy<br>Choudy,<br>Cloudy,<br>Fact.     |
| Apr. 7                      | 11 :                       | 1, 111,<br>4, 111,<br>1, 111,<br>1, 111,<br>1, 111,            | 28, 10   | -27, 7<br>- 29, 9<br>- 29, 3<br>- 10, 4<br>- 8, 8            | 29, 74<br>29, 79<br>29, 70<br>29, 63<br>29, 64                 | 70 47 00<br>70 47 00<br>70 47 00<br>70 47 00<br>70 57 00<br>71 00 00             |  | Cal<br>Cal<br>Cal<br>ESE.<br>ESE.          | m.                                  | Cit                   | Fidds  | 0<br>0<br>0<br>0            | Strat.<br>Strat.<br>Strat.<br>Strat.                     | 1 10                        | 0<br>0<br>0<br>0               |            |              | , (0)  | Latt<br>Choody,<br>Fair,<br>Choudy,<br>Chear                   |

Parhelion at 3.30 p. m.: also at 11 p. m. — I Aurora E. & NE., altitude 25%. — (Aurora in 8.— (Aurora in 8. & SW Correction for harometer, April 7. § 1.6) by comparison upon return to station; applied from 3 a. m. April 3.—Number of harometer used during trip, Anerold No. 165.—Instrumental error. § 3.56.

# METEOROLOGY OF THE VOYAGE FROM POINT BARROW TO SAN FRANCISCO.

These observations are the direct continuation of the regular meteorological work of the station, and were taken as above described.

Meteorological record of the coyage of the schooner Leo from Point Barrow, Alaska, to San Francisco, California.

AUGUST 28, 1880.

[Washington time. Correction to reduce to local time, +5 hours 17 minutes. Italic x significs slow : x signifies rapid. Schooner abreast of station, Uglaamlo, Alaska, latitude 719 17 [N., longitude 1509 23] W.]

|  |  |  |  |                                   | Macrost C Man                                       |       |  | rue 11-         | 11 .4., 101  | Errinic                      | 1.30 - 6                      | u ***;     |        |                             |                                  |  | A 1919         |
|--|--|--|--|-----------------------------------|---|-------|--|-----------------|--|------------------------------|-------------------------------|------------|--------|-----------------------------|----------------------------------|--|----------------|
| on.  | ler.   |  | ometer<br>acted).                                  |                                   | Wind.   | Մրր   | er clou  | ils.            | 1.owe  | r clou                       | el«.                          | Rain       | 285    | 10                          |                                  |  |                |
| Time of observation                              | Corrected barometer.   | Day bulb.  | Wet bulb.  | Relative humidity                 | Direction.  | Kind. | Amount in 10ths.   | Direction (mov- | Kind   | Amount in 10ths.             | Direction (mov-<br>ing from-) | Commenced. | Ended. | Amount of rain melted snow. | Surface water.                   | State of weather.                              | Obentrur.      |
|  |  |  |  | P. ct.                            | ]<br>[  |       |  |                 |  |                              |                               |            |        | Inch                        |                                  |  |                |
| *La. 6<br>*2 a. 66<br>*3 a. 66                   |  |  |  |                                   | · · · · · · · · · · · · · · · · · · ·               |       |  |                 |  |                              |                               |            |        |                             |                                  |  |                |
|  |  |  |  |                                   | SE. Fresh   |       |  |                 |  | i                            | SW.#                          |            |        | 10                          |                                  | Čloudy   | .: D.          |
| lo a. m. l<br>lo a. m. l                         | 29, 670<br>29, 670<br>29, 670                                  | 42.5<br>42.0<br>41.0<br>42.6<br>43.5<br>44.0       | 42.5<br>42.1<br>49.8<br>42.5<br>43.7<br>44.0       | 98<br>,99                         | SSE. Fresh.<br>SSE. Fresh.                          |       | 6 4 :  | 0               | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus           | -4                           | SW.#<br>SW.#<br>SW.#<br>SW.#  |            |        | 00<br>00<br>00<br>00        | 33.8<br>33.2<br>33.5<br>56.1     | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy | C.<br>C.<br>G. |
| 2 p. m. 3<br>4 p. m. 3<br>4 p. m. 3<br>5 p. m. 3 | 29, 630<br>29, 635<br>29, 645<br>29, 635<br>29, 640<br>29, £10 | 44. 3<br>48. 4<br>50. 5<br>52. 3<br>53. 0<br>55. 0 | 44. 0<br>48. 0<br>50. 0<br>52. 2<br>50. 0<br>51. 0 | 97<br>28<br>96<br>99<br>80<br>76  | SSE. Fresh. S. Fresh. S. Light. S. Light. S. Light. |       | . 2<br>lidden.<br>lidden.<br>lidden.<br>lidden.<br>lidden. | 0               | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus           | 10<br>10<br>10               | 5. 5 5 5 5 0 0 0              |            |        | 00<br>00<br>00              | 36. 2<br>36. 5<br>36. 7<br>36. 8 | Fair   | M.<br>M.<br>M. |
| 8 p. m.<br>9 p. m.<br>10 p. m.                   | 29, 650<br>29, 660<br>29, 665<br>29, 675<br>29, 685<br>29, 675 | 52. 0<br>42. 1<br>45. 0<br>48. 2<br>47. 5<br>40. 6 | 49, 5<br>42, 1<br>44, 6<br>47, 8<br>46, 4<br>46, 0 | 83<br>160<br>96<br>97<br>92<br>93 | S. Light W. Light Calm.  E. Light ESE. Light Light  | 0     | Iidden.<br>Iidden.<br>0<br>9<br>Iidden.<br>Iidden.         | 0 5             | Stratus<br>Numbus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus | 10<br>9<br>5<br>3<br>3<br>10 | 0<br>0<br>0<br>0<br>0<br>S.s  | *****      | 9. 20  | .00                         | 36, 7<br>36, 0<br>36, 2<br>36, 5 | Cloudy Light rain Cloudy Cloudy Cloudy Cloudy  | M.<br>A.<br>A. |

AUGUST 29, 1883.

[From Uglaamie, Alaska, to Scahorse Islands, latitude 70° 51° N., longitude 158° 25° W.]

| 1a.m.   29.689   43.0   41.5   88   SW.   Light.   0   0   0   Stratus   0   SW.s   00   36.2   Cloudy   S.   2a.m.   29.685   41.6   46.6   91   SW.   Light.   0   0   0   Stratus   8   SW.s   00   36.2   Cloudy   S.   4a.m.   29.680   42.4   43.9   35   E.   Light.   0   0   0   Stratus   8   SW.s   00   36.2   Cloudy   S.   4a.m.   29.680   44.5   40.0   91   SW.   Light.   0   0   0   Stratus   8   SW.s   00   36.2   Cloudy   S.   5a.m.   29.680   44.5   40.0   91   SW.   Gentle.   Gir. cu.   2   0   Stratus   7   SE.s   0   0   36.3   Cloudy   S.   6a.m.   29.685   40.3   30.0   96   E.   Light.   0   0   0   Stratus   5   E.   0   36.0   Cloudy   B.   7a.m.   29.685   40.3   30.0   96   E. E.   Gentle.   0   0   0   Stratus   5   E.   0   35.8   Cloudy   B.   8a.m.   29.685   40.3   30.0   96   E. E.   E.   Light.   0   0   0   Stratus   5   E.   0   0   35.8   Cloudy   B.   9a.m.   29.685   40.3   30.0   96   E. E.   E.   Light.   0   0   0   Stratus   0   E.   0   0   35.8   Cloudy   B.   9a.m.   29.685   40.3   30.0   96   E.   E.   E.   E.   0   0   0   Stratus   0   E.   0   0   35.8   Cloudy   B.   9a.m.   29.685   40.3   30.1   96   E.   E.   E.   E.   0   0   Stratus   0   E.   E.   0   0   35.8   Cloudy   B.   9a.m.   29.685   40.3   40.0   30.5   95   E.   E.   E.   E.   E.   0   0   36.0   Cloudy   E.   9a.m.   29.685   40.3   40.0   98   E.   Fresh   Clir. cu.   2   0   Stratus   0   E.   0   36.0   Cloudy   E.   11a.m.   29.685   40.3   40.0   98   E.   E.   E.   E.   E.   0   0   36.0   Cloudy   E.   12a.m.   29.685   40.3   40.0   98   S. E.   E.   E.   E.   E.   E.   E. |  |  |  |  |                  |   |        | ·  |                |
|--|--|--|--|--|------------------|---|--------|--|----------------|
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 2 a. m. 29, 685 41, 6<br>3 a. m. 29, 680 42, 2<br>4 a. m. 29, 680 41, 3<br>5 a. m. 29, 680 40, 5                   | 40.6 91<br>41.3 93<br>40.8 96<br>40.0 98               | SW. Light.<br>E. Light.<br>SE. Gentle.<br>ESE. Gentle. | 0 0 0<br>Cir. cu 2<br>Cir. cu 3                    | 0<br>0<br>0<br>0 | Stratus   8   SW<br>  Stratus   8   0<br>  Stratus   7   SE<br>  Stratus   6   SE                         | A      | 00 36.2 Cloudy<br>00 36 0 Cloudy<br>00 35.8 Cloudy<br>03 26.0 Cloudy           | S.<br>S.<br>S. |
| 2 p. m.   29,595   44,2   44,2   100   88 E. Goutle   Hidden   Nimbus   10   0   0,01   30,0   Light rain   6,   | 8 a. m.   29, 650   40, 0<br>9 a. m.   29, 630   38, 5<br>10 a. m.   20, 625   39, 0<br>11 a. m.   29, 615   40, 8 | 39.5 95<br>38.1 96<br>38.7 97<br>40.6 98               | E. Light<br>ENE. Light<br>ENE. Gentle<br>E. Fresh      | 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0            | 0                | Stratus   9   E.   Stratus   6   E.   Stratus   7   E.   Stratus   5   0                                  | 8<br>8 | 00   35,7 Cloudy<br>00   36,0 Cloudy<br>00   30,4 Fair<br>03   36,5 Cloudy     | D.<br>A.<br>A. |
| Sp. no. 29, 570   50, 0   49, 9   80   SE.   Fresh   Circus   2   0   Stratus   5   0   00   33, 0   Cloudy   C.   | 2 p. m.   29, 595   43, 2<br>3 p. m.   29, 580   43, 0<br>4 p. m.   29, 570   44, 0<br>5 p. m.   29, 570   47, 0   | 43. 2   100<br>43. 0   100<br>44. 2   96<br>44. 9   85 | NE. Gentle.<br>NE. Gentle.<br>NE. Fresh.<br>E. Fresh ( | Hidden.<br>Hidden.<br>Hidden.<br>Cirrus 3 (        | 0 0              | Nimbus   10   0   | 2.30   | .01 36.0 Light rain<br>27.0 Cloudy<br>50 38.5 Cloudy<br>00 38.5 Cloudy         | G.<br>G.<br>C. |
| Prop. m. 29, 698 46, 0 44, 2 85 W. Light Cirrus 2 0 Stratus 4 0  | 8 p. m. 29, 570 50, 0<br>9 p. m. 20, 580 50, 2<br>10 p. m. (20, 493 48, 0<br>11 p. m. 29, 608 46, 0                | 49. 9 80 49. 6 75 45. 6 81 44. 2 85 1                  | SE. Fresh.  SE. Fresh.  WSW. Light.  W. Light.         | Cir. cu 2 { Cumulus 2 } Cirrus 1 Cirrus 1 Cirrus 2 | 0                | Stratus   5   0   Cumulus   2   0   Stratus   3   0   Cumulus   2   0   Stratus   2   0   Stratus   4   0 | }      | 00   39.0   Cloudy<br>00   42.0   Fair<br>00   42.0   Fair<br>(0   42.0   Fair | С.<br>М.<br>М. |

<sup>\*</sup>Observations interrupted while moving instruments from shelter to the schooner. Afteroid barometer used until 10 p. m. August 29th, Marine barometer used at and after this observation.

ew. arometer pred

#### Meteorological record of the voyage of the schooner Leo, &c .- Continued.

#### AUGUST 20, 1882

[Washington time.] Italic s signifies slow: r signifies rapid. Schooner off Scahorse Islands, latitude 76–51; N., longitude 1585/25; W.1

| 4   | 를  |  | ometer<br>scted).                                  |   | \/                                    | ind.  | τ.                           | рист слоп  | ds.                           | Lowe   | er elo           | uds.                                    | Rain or<br>snow.           | 10                             |                                  |  |       |
|---|--|--|--|---|---------------------------------------|---|------------------------------|--|-------------------------------|--|------------------|---|----------------------------|--------------------------------|----------------------------------|--|-------|
| Time of observation.  | Comerce baroneter.   | Dry bulb.  | Wet onlb.  | Relative lumidity                                     | Direction.                            | Kind.   | Kind                         | Amount in let bs.  | Direction (mov-<br>ing from-) | Kind.  | Amount in 10ths. | Direction mov-                          | Commenced.<br>Unded.       | Amount of rain melted snow.    | Surface water.                   | S' de of weather.  |       |
| 1 n. m.<br>a. m.<br>a n. m.<br>4 n. m.<br>5 a. m.<br>6 a. m.      | 29, 568<br>29, 586<br>29, 500<br>29, 621                       | : 44.6   | 431.8  | P. c <sup>2</sup><br>90<br>90<br>95<br>98<br>93<br>94 | SW.<br>SW.<br>SW.<br>W.               | Light<br>Fresh<br>Gentle<br>Fresh<br>High                 | Citrus<br>Cir. et<br>Cir. et | 1 1  |                               | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .            | 8 7              | 0<br>SW.r<br>S.r<br>SW.r<br>W.r         | 5 15 0 45                  | 00                             | 41.6<br>41.4<br>41.2<br>41.6     | Pair<br>Pair<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy     | 11111 |
| 7 a. m<br>8 a. m. l<br>9 a. m.<br>10 a. m<br>11 a. m.<br>12 m     | 19,747   | 04. 8<br>† 35. 0<br>53. 5<br>**3. 6<br>54. 0<br>5. 5 | 331, 8<br>34, 3<br>361, 4<br>32, 9<br>33, 9        | 95<br>93<br>99<br>99<br>99<br>95                      | . W.                                  | High<br>Gentle :<br>Brisk<br>Brisk<br>Brisk               | 0<br>Cumu                    | Hidden.<br>: 0 '<br>Hidden.<br>Hidden.<br>Hidden.<br>lus 5 |                               | Stratus<br>Stratus<br>: Nimbus,<br>Nimbus,<br>Nimbus,<br>Stratus         | 10<br>10         | 0 | 8, 20<br>11, 10            | :=                             | 40. 6<br>40. 5<br>40. 8          | Light snow   |       |
| 1 p. m.<br>2 p. m.<br>3 p. m.<br>4 p. m.<br>5 p. m.<br>6 p. t     | 20,859<br>29,865<br>19,879<br>29,868                           | 40.0   | 05. 9<br>06. 5<br>06. 7<br>09. 5<br>09. 4          | 85<br>91<br>91<br>87<br>87                            | SW.<br>SSW.<br>SSW.<br>SW.<br>SW.     | Fresh<br>Fresh<br>Fresh<br>Fresh                          | 0                            | 1 1<br>0<br>0<br>0<br>0<br>Hidden.                         | 0<br>0<br>0<br>0              | Stratus .<br>Cumulus<br>Cumulus<br>Cumulus<br>Cu. str<br>Cu. str         | 6 4 .            | SSW.8<br>SW.8<br>SW.8                   | 4, 20 4, 45<br>5, 10 5, 20 | 00                             | 41, 1<br>42, 1<br>42, 0<br>42, 0 | Cloudy<br>Fair<br>Fair<br>Cloudy                         | - (   |
| 7 p. m.<br>8 p. m.<br>9 p. m.<br>10 p. m.<br>11 p. m.<br>12 p. m. | 29, 925<br>29, 925<br>29, 948<br>29, 948                       | 1.9, 8   | 37, 9<br>37, 9<br>57, 8<br>37, 5<br>37, 5<br>39, 6 |   | W.                                    | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh                 | 0<br>0<br>0<br>0             | Hidden,  | 0<br>0<br>0<br>0              | Nimbus<br>Cu. str<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 6                | SW.8                                    | 6.45                       | 00                             | 42.5<br>42.2<br>40.0             | Light ram<br>Fair<br>Fair<br>Cloudy<br>Cloudy<br>Cloudy  |       |
| -   |  |  |  |   |                                       |   |                              | AUGU   | ST 31                         | , 1883.  |                  |   |                            |                                |                                  |  |       |
|   |  |  |  | Fro   | n Seaho                               | rse Island  | s to Po                      | int Belch  | er, lat                       | itude 76 47  | N.,              | longitud                                | e 155   30° W.;            |                                |                                  |  |       |
| 2 a. m<br>3 a. m<br>4 a. m<br>5 a. m.                             | 29, 956<br>20, 968<br>20, 962<br>29, 956<br>29, 950<br>29, 944 | 39, 8<br>39, 5<br>38, 0<br>38, 8<br>39, 4<br>39, 4   | 39, 0<br>37, 6                                     | 92<br>87<br>91<br>89<br>91<br>90                      | WSW.<br>W.<br>SW.<br>S.<br>S.<br>SSE. | G ntle :<br>Gentle :<br>Light . :<br>Gentle :<br>Gentle : | 0<br>0<br>0<br>Cir st        | 0<br>0<br>0<br>2<br>Hidden.                                | 0<br>0<br>0                   | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus | 9<br>8<br>6      | WSW.8<br>W.8<br>0<br>0<br>0             |                            | (ir)<br>(i)<br>(i)             | 42.3<br>42.2<br>42.0<br>42.0     | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy | ,     |
| 5 a. m<br>9 a. m.<br>0 a. m.<br>1 a. m.                           |  | 38.8 (   | 38, 4  | 90<br>91<br>95<br>96<br>94                            | SE.<br>ESE.                           | Light   | 0                            | Hödden.<br>0<br>Hadden.<br>Hidden.<br>Hidden.<br>Hidden.   | 0                             | Stratus . Stratus . Stratus . Stratus . Stratus . Stratus . Stratus .    | 7<br>10<br>10    | 0<br>0<br>0<br>0<br>0                   |                            | 00<br>(9)<br>(9)<br>(0)<br>(0) | \$2.0<br>\$1.5<br>\$1.9<br>\$2.0 | Cloudy<br>Fair<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy   |       |
|   |  |  |  |   |                                       | **  |                              |  |                               | 311 1  | 1 10             |   |                            |                                |                                  | * * * * * *  |       |

Hidden, Hidden, Hidden, Hidden, Hidden, Hidden,

37, 4 37, 6 37, 7 37, 0 36, 4 34, 3

Nimbus, 10 Nimbus, 10 Nimbus, 10 Nimbus, 10 Nimbus, 10 Nimbus, 10

| Nimbus | 10 | Nimbus | 9 | Stratus | 10 | Stratus | 10 | Stratus | 10 | Stratus | 10 

# Meteorological record of the voyage of the schooner Lev, ${\rm d} v.{\rm (Continued)}$

#### SEPTEMBER 1, 1883

 $\{ \textbf{Washington time}, \ \ \textbf{Italic s. signifies slow} \ ; \ \textbf{r. signifies ropid}, \ \ \textbf{Latitude 70-29} \ \textbf{N} \ , \ \textbf{longitude 462-25-W} \ \}$ 

| Ę.  |  | Hygre  | ometer   |  |  | ind.   |         | pper clou  |                              | tpiat. Latii<br>Lowe   | r clou                                   |                                | Rain           | n or                                | 1   | **   |  |                      |
|---|--|--|--|--|--|--|---------|--|------------------------------|--|--|--------------------------------|----------------|-------------------------------------|---|--|--|----------------------|
| Time of observation.  | Corrected barometer.   | Dry bulb.  | Wet bulb.  | Relative humidity.                     | Direction.                               | Kind.  | Kind.   | Amount in 10ths  | Direction (mov-<br>ing from) | Kind.  | Amount in Julys.                         | Direction (mov.<br>ing from—), | Commenced.     | Ended.                              | Amount of tain melted snow.                     | Surface water.                                     | State of weather.  | Observer.            |
| 2 a. m.<br>3 a. m.<br>4 a. m.<br>5 a. m.                                | 29, 774<br>29, 794   | 54, 6<br>54, 0<br>55, 5<br>50, 0<br>50, 0<br>51, 2 | 34. 2<br>35. 7<br>33. 5<br>32. 4<br>50. 1<br>31. 0 | P. et. 96 97 98 99                     | NW.<br>NW.<br>NW.<br>NW.<br>N.           | Light .<br>Gentle<br>Light<br>Light<br>Light                   | ('irras | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden       |                              | 14:1   | 2<br>10<br>ase for<br>ase for<br>ase for | 14                             |                |                                     | Inch.<br>00<br>00<br>00<br>00<br>00<br>00<br>00 | 41. 8<br>42. 2<br>42. 5<br>12. 5                   | Fair<br>Clondy<br>Forgy<br>Forgy<br>Forgy                                    | S.<br>S.<br>D.       |
| 7 a m<br>8 a m.<br>49 a m.<br>10 a m<br>11 a m<br>12 m                  | 29, 815<br>29, 822<br>29, 825<br>29, 826<br>29, 826<br>29, 822     | 30, 5  | 30, 5<br>30, 2<br>29, 9<br>20, 9<br>30, 5<br>52, 1 | 97<br>97<br>99<br>99<br>100<br>99      | N.<br>N.<br>N.<br>N.W.<br>N.             | Light<br>Light<br>Light<br>Gentle<br>Gentle<br>Gentle          |         | Hidden,<br>Hidden,<br>Hulden,<br>Hidden,<br>Hidden,            |                              | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 10<br>10<br>10<br>10<br>10               | 0<br>0<br>0<br>0               |                |                                     | (11)  | 13.1<br>12.8<br>12.6<br>41.2                       | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy                               | D A A.               |
| 1 p no<br>2 p no<br>5 p no<br>4 p no<br>5 p no<br>t p no                | 20, 884<br>19,791<br>10,795<br>10,770<br>29,761<br>10,724          | 33, 9<br>33, 1<br>35, 1<br>36, 3<br>37, 5<br>38, 3 | 97, 9<br>94, 8<br>95, 5<br>96, 2<br>97, 0<br>98, 0 | 100<br>99<br>95<br>98                  | ENE.<br>ENE.<br>ENE.<br>ENE.<br>E.       | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh                      |         | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                              | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Nucleus | 10<br>10<br>10<br>10<br>10<br>10         | 0<br>0<br>0<br>0<br>0          |                |                                     | 00<br>00<br>00                                  | 39, 9<br>49, 1<br>49, 7<br>41, 1<br>41, 2<br>13, 8 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Light rain                 | G.<br>G.<br>G.<br>C. |
| 7 p. 6<br>8 p. 6<br>19 p. 6<br>10 p. 6<br>11 p. 6<br>12 p. 6            | 9, 723<br>19, 694<br>19, 676<br>19, 633<br>29, 628<br>29, 620      | 10.2<br>. 11.0<br>. 41.1                           | 39 0<br>40, 1<br>40, 8<br>11, 0<br>13, 1<br>14, 5  | 99<br>98<br>99<br>100                  | E.<br>E.N.E.<br>E.N.E.<br>E.N.E.<br>S.   | Fresh<br>Brisk<br>Brisk<br>Brisk<br>Brisk<br>Gentle            |         | Hidden<br>Hidder<br>Hid ion<br>Hidden<br>Hidden<br>Hidden      |                              | Ninchus<br>Nucles<br>Stratus<br>Nuclus<br>Nacions              | 10<br>10<br>10<br>10<br>10               | 0<br>0<br>0<br>0<br>0<br>0     | 9 : ò          | 8.30                                | : 01  | 43.9<br>45.0<br>45.8<br>44.5                       | Light rain<br>Light rain<br>Cloudy<br>Light rain<br>Light rain<br>Light rain | М.<br>М.<br>М.       |
| <b>~</b>  |  |  |  |  |  |  |         | SEPTE:   | MBER                         | 2, 1883  |  |                                |                |                                     |   |  |  |                      |
| · ·   |  |  |  |  |  | (L   | atitude | 6s (6s) N  | t., long                     | itude 164 - 5  | 9° W.                                    | Ŧ                              |                |                                     |   |  | -  |                      |
| Tactor<br>Tactor<br>Tactor<br>Acctor<br>Acctor<br>Tactor                | 29, 599<br>29, 608<br>19, 634<br>29, 677<br>29, 720<br>23, 741     | 45.0<br>44.5<br>14.5<br>11.5<br>12.5<br>10.0       | 45.0<br>41.0<br>45.3<br>43.7<br>41.0<br>11.0       | 100<br>100<br>98<br>96<br>96<br>100    | 1.11                                     | Light<br>Light<br>Light<br>Light<br>Gentle<br>Fresh            |         | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden                 |                              | Stratus<br>Nimbus<br>Stratus<br>Stratus<br>Stratus<br>Stratus  | 10<br>10<br>10                           | 0<br>0<br>0<br>0<br>0          | 1.10           | 12, 50<br>[2, 50<br>[2, 50<br>[11]] | . 02  | 45.2<br>45.2<br>45.3<br>15.5                       | Cloudy<br>Light rain<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy                 | S                    |
| 7 a, 5 a<br>8 2 do<br>9 a do<br>10 a do<br>11 2 do<br>12 do.            | 29, 777<br>29, 862<br>29, 863<br>20, 861<br>29, 89<br>29, 891      | 38, 9<br>59, 1<br>30, 2<br>39, 2<br>29, 5<br>49, 0 | 35 8<br>39 1<br>53 0<br>39 4<br>39 7               | 99<br>99<br>99<br>98<br>99<br>97       | NNT.<br>NNT.<br>NW.<br>NW.<br>NW.<br>NW. | Gentle<br>Gentle<br>Gentle<br>Gentle :<br>Light ::<br>Light :: |         | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden       |                              | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 10<br>10<br>10<br>10<br>10               | 0<br>0<br>0<br>0<br>0<br>0     |                |                                     | (10)  | 45.2<br>45.5<br>45.5<br>45.6<br>45.6<br>45.6       | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy                               | D.<br>A.<br>A.       |
| Fig. 10<br>2 p. 10<br>3 p. 1a.<br>3 p. 1a.<br>5 p. 10<br>6 p. 10        | 29 932<br>29 944<br>29 944<br>29 944<br>29 994<br>29 994<br>30 923 | 40, 2<br>10, 3<br>41, 3<br>10, 8<br>40, 8<br>40, 5 | 40, 2<br>40, 2<br>41, 0<br>40, 6<br>49, 5<br>49, 6 | 100<br>99<br>97<br>98<br>97<br>95      | N.V.                                     | Light<br>Light<br>Light<br>Light<br>Presh<br>Brisk             |         | Hadden<br>Hidden<br>Hidden<br>Hidden<br>Hudden                 |                              | Stratus<br>Stratus<br>Stratus<br>Nimbus<br>Numbus<br>Stratus   | 10<br>10<br>10<br>10<br>10               | 0<br>U<br>0<br>0<br>0          | 2, 10<br>3, 75 | 2.40                                |   | 45 1<br>45 1<br>45 1<br>45 0<br>45 2               | Cloudy<br>Cloudy<br>Coudy<br>Light rain<br>Light rain<br>Cloudy              | . G.<br>. G.<br>. G. |
| 7 p. ta.<br>8 p. ta.<br>9 p. ta.<br>10 p. ta.<br>11 p. ta.<br>12 p. ta. | 30, 041<br>30, 672<br>30, 081<br>30, 100<br>30, 105<br>30, 121     | 40, 0<br>39, 4<br>39, 5<br>39, 8<br>39, 6<br>39, 0 | 39, 2<br>35, 7<br>35, 0<br>37, 8<br>37, 6<br>37, 0 | 54<br>54<br>53<br>52<br>82<br>82<br>82 | NNW.<br>NNW.<br>NNE.<br>NNE.<br>NNE.     | Brisk .<br>Brisk .<br>Brisk .<br>Brisk .                       |         | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden       |                              | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 10<br>. 10<br>. 10<br>10<br>10           | 0<br>0<br>0<br>0<br>N.s<br>N.s |                |                                     | . 00  | 45, 8<br>45, 0<br>45, 6<br>45, 8                   | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy                     | . C.<br>M.<br>M.     |

## Meteorological record of the royage of the schooner Leo, ${\rm d} v.{\rm --Continued}.$

#### SEPTEMBER 3, 1883.

(Washington time. Italic s signifies slow) r signifies rapid. Latitude 65: 59 N., longitude 168:  $22^{p}$  W.)

| ·                             | er.  | Hygre  | meter<br>cted). (                                  | .   | //-                                 | ind.                                      | v <sub>1</sub> | oper cloud   | ds.                           | Lowe   | er clo                           | uds.                                      |            | n or   | 10 T                        |                                  | - ,   |                            |
|-------------------------------|--|--|--|---|-------------------------------------|---|----------------|--|-------------------------------|--|----------------------------------|---|------------|--------|-----------------------------|----------------------------------|---|----------------------------|
| Time of observation.          | Corrected barometer  | Dry builb.   | Wet bulb.  | Relative humidity                         | Direction.                          | Kind.                                     | Kind.          | Amount in 10ths.   | Direction (mov-<br>ing from-) | Kind.  | Amount in 10ths.                 | Direction (mov-<br>ing from-)             | Commenced. | Ended. | Amount of rain melted snow. | Surface water.                   | State of weather.   | Observet.                  |
| 2 a. m.<br>3 a. m.<br>4 a. m. | 30, 163<br>30, 177<br>30, 177                                  | 37, 2<br>38, 0<br>37, 7<br>37, 3<br>37, 9<br>37, 6 |  | P. at<br>90<br>88<br>85<br>82<br>82<br>81 | NE.<br>NE.<br>N.<br>N.<br>N.        | Brisk<br>Brisk<br>Brisk<br>Brisk<br>Brisk |                | Hidden.<br>Hidden.<br>Hidden.<br>- 2  <br>Hidden.              | 0                             | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus . | 10<br>10<br>6<br>7               | NE.8<br>NE.8<br>0<br>0<br>0               |            |        | 00 00 00 00 00 00           | 45. 0<br>45. 0<br>44. 2<br>43. 8 |   | 27.7.7.2.2.                |
| 9 a. m.<br>10 a. m.           | 30, 208<br>30, 209<br>30, 197                                  | 36, 4<br>36, 4<br>37, 0<br>37, 0<br>36, 8<br>37, 0 | 35, 9<br>35, 9<br>35, 9<br>35, 9<br>35, 6<br>35, 9 | 86<br>89<br>89<br>89<br>88                | NNE.<br>N.<br>N.<br>N.<br>N.        | Brisk<br>Brisk<br>Brisk<br>Brisk<br>Brisk | v              | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,            | 0                             | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus . | 10<br>10<br>10<br>10<br>10<br>10 | 0<br>0<br>0<br>N.r<br>N.r<br>N.r          |            |        | 00<br>00<br>00<br>00<br>00  | 37. 8<br>37. 9<br>37. 9<br>28. 2 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy      | 1)<br>D,<br>A,<br>A,<br>A, |
| 3 p. m.<br>4 p. m.<br>5 p. m. | 30, 209<br>30, 206<br>30, 191<br>30, 108<br>30, 150<br>30, 121 |  | 36, 8<br>37, 0<br>37, 8<br>39, 0<br>38, 9<br>39, 9 | 95<br>90<br>88<br>87<br>87<br>90          | NNE.<br>NNE.<br>NNE.<br>NNE.<br>NE. | Brisk<br>Brisk<br>Brisk<br>Brisk<br>High  | 0              | Hidden.<br>Hidden.<br>Hidden.<br>  0  <br>0  <br>Hidden.       | 0                             | Stratus .<br>Stratus .<br>Stratus .<br>Cumulus<br>Cumulus<br>Cum. st.      | 9                                | NNE.r<br>NNE.r<br>NNE.r<br>NNE.r<br>NNE.r |            |        | 00                          | 44.3<br>46.5<br>46.9<br>47.0     | Cloudy<br>Cloudy<br>Cloudy                                    | G. G. G. C. C.             |
|                               | 29, 983<br>20, 984   | 41. 0<br>42. 0<br>44. 5<br>43. 8<br>44. 8<br>46. 2 | 40, 0<br>41, 1<br>43, 0<br>42, 8<br>43, 8<br>45, 2 | 91<br>92<br>88<br>92<br>92<br>92          | NE.                                 | High<br>High<br>High<br>High<br>High      |                | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |                               | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Nimbus              | 10<br>10<br>10<br>10<br>10<br>10 | NE.r<br>NE.r<br>NE.r<br>ENE.r<br>E.s      | 11.40      |        | 00<br>60<br>00<br>00<br>00  | 46, 0<br>17, 8<br>47, 8<br>17, 9 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Light rain. | C.<br>M.<br>M.<br>M.<br>M. |

#### SEPTEMBER 4, 1883.

[Latitude 75  $^{\circ}$  15/ 30/ N., longitude 157/ 30/ W.]

| 5 a. m. 29, 975 50, 2   48, 3   87   | NW. Light<br>NW. Light<br>NW. Light<br>Calm.                 | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. | Stratus   10   0   |                  | .— 48.0 Cloudy. 8.<br>00 48.4 Cloudy. 8.<br>00 48.1 Cloudy. 8.<br>00 48.5 Cloudy. 8.<br>00 48.5 Cloudy. 9.<br>00 48.5 Cloudy. 9.<br>48.0 Cloudy. 9.                           |
|--|--|--|--|------------------|---|
| 7 a. m. 29, 960 49, 7 48, 3 92<br>8 a. m. 29, 967 49, 5 48, 3 92<br>9 a. m. 29, 971 49, 0 48, 0 99<br>10 a. m. 29, 961 48, 5 48, 4 69<br>11 a. m. 29, 966 48, 8 48, 8 109<br>12 m. 29, 945 49, 0 49, 0 100 | E. Light ENE. Light E. Light ESE. Light                      | Hidden.  | Stratus   10   0       Stratus   10   0       Lt. fog               Stratus   10           Stratus   10             Pense fog                 Stratus   10 |                  | 48.0   Clendy   D   00   48.6   Clendy   D   00   48.1   Clendy   A   00   48.2   Clond   A   00   48.0   Foggy   A   00   47.5   Clond   A                                   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ENE. Light<br>E. Light<br>E. Fresh<br>ENE. Fresh             | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.            | Lt. fog  |                  | (0 47.8 Cloudy G.<br>00 47.9 Cloudy G.<br>00 48.1 Cloudy G.<br>04 48.0 Cloudy G.<br>09 49.2 Cloudy C.<br>00 49.0 Cloudy C.  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | ENE. Fresh. Cir. st<br>ENE. Fresh.<br>ENE. Light<br>E. Light |  | Stratus   5   0  | 8, 50 '<br>9, 15 | 00   49,0   Cloudy   C,<br>00   49,0   Cloudy   C,<br>01   48,7   L <sub>2</sub> ht ain   M,<br>01   48,7   Cloudy   M,<br>00   48,6   Cloudy   M,<br>00   48,9   Cloudy   M. |

<sup>\*</sup>Light showers between observations.

 ${\it Meteorological\ record\ of\ the\ royage\ of\ the\ schooner\ Leo,\ de.-} {\bf Continued.}$ 

#### SEPTEMBER 5, 1883.

 $[\textbf{Waskington time}, -\texttt{Italic} \textbf{\textit{s}} \text{ signifies } \textit{sheet}; r \text{ signifies } \textit{rapid}, -\texttt{Latitude} \textbf{\textit{G1-Te}} \textbf{\textit{N}}, \textbf{\textit{longitude}} \textbf{\textit{10}} \\ \land \texttt{\textit{17}} \textbf{\textit{W}}.]$ 

| ė .  | 1                 | Hygrei<br>(correc                         |   | i.                             | Wi                               | nd.                                       | υp    | per cloud   | 14.                           | Lowe  | r clos           | uls.                          | Rait       |       | 10                          |                           |  | 9              |
|--|-------------------|---|---|--------------------------------|----------------------------------|---|-------|---|-------------------------------|---|------------------|-------------------------------|------------|-------|-----------------------------|---------------------------|--|----------------|
| Time of plearestion.   | יפונבנונת מיוסחים | Dry builb.                                | Wet bulb.   | Relative humidity              | Direction.                       | Kind.                                     | Kind. | Amountin 10ths.                                     | Direction (mov-<br>ing from-) | Kipd.   | Amount in 10ths. | Direction (mov-<br>ing from—) | Commenced. | Ended | Amount of rain melted snow. | Sarface water.            | State of weat cr                                     | Obstrer.       |
| 1 n. m. 20.<br>2 a. m. 20.<br>3 a. m. 20.<br>4 a. m. 20.<br>5 a. m. 20.          | 791<br>781<br>770 | 47. 2<br>47. 0<br>40. 9                   | 49. 1<br>47. 2<br>47. 0   | 100                            | ESE.<br>ESE.<br>ESE.<br>ESE.     | Light<br>Gentle .<br>Brisk<br>Brisk       |       | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |                               | Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Stratus     | 10<br>10<br>10   | 0<br>0<br>0<br>0              | 12.45      |       | .02                         | 47. 3<br>45. 2            |  | 8.             |
| 6 n. m. 29.<br>7 n. m.: 20.<br>8 n. m. 29.<br>9 n. m. 29.<br>10 a m. 19.         | 700<br>698<br>698 | 45, 8<br>45, 1<br>48, 6<br>49, 0<br>49, 8 | 45. 1 · 48. 6 · 49. 0   | 98<br>100<br>100<br>100<br>100 | ESE.<br>ESE.<br>ESE.<br>ESE.     | Brisk<br>Brisk<br>Brisk<br>Brisk          |       | Hidden,<br>Nidden,<br>Lidden,<br>Lidden,<br>Hidden, |                               | Stratus<br>Nimbus<br>Nimbus<br>Nimbus<br>Nimbus     | 10<br>10<br>10   | 0<br>0<br>0<br>0<br>0         | 6. 10      |       | .01                         | 42, 8 -<br>43, 5<br>46, 8 | Light cam<br>Light rain<br>Light rain.               | D.<br>D.       |
| 11 a m 29,<br>12 m 19,<br>1 p.m. 29,<br>2 p.m. 20,<br>3 p.m. 20,                 | 673<br>677<br>681 | 50.0                                      | $\begin{array}{c} 48.4 \\ 47.1 \\ 48.2 \\ 49.7 \\ 50.2 \end{array}$ | 99<br>99<br>98<br>97<br>95     | SE.<br>ESE.<br>SE.<br>SE.<br>SE. | Prisk<br>Fresh<br>Fresh<br>Brisk<br>Brisk | Cumui | Hidden.<br>lus: 3<br>Hidden.<br>Hidden.<br>Hidden.  | 0                             | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus | 10               | SE.s<br>SE.s<br>SE.s          |            |       | 00                          | 45, 6<br>48, 1<br>48, 7   | Clendy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy       | G.             |
| 4 p m. 20.<br>6 p m. 20.<br>6 p m. 20.<br>7 p m. 20.<br>5 p m. 20.<br>5 p m. 20. | 706<br>701<br>686 | 49. 4<br>49. 7                            | 49, 3<br>48, 9<br>40, 4<br>43, 1<br>49, 5                           | 94<br>93<br>100<br>96<br>96    | SSE. SE. SE. SE.                 | Brisk<br>Brisk<br>Brisk<br>Brisk          |       | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                               | Stratus<br>Nimbus<br>Nimbus<br>Stratus<br>Stratus   | 10<br>10<br>10   | SE.r<br>SE.r<br>SE.r<br>SE.r  | 4,50       | 6.45  | 02                          | 49. 2<br>49. 2<br>49. 2   | Cloudy<br>Light win<br>Light win<br>Cloudy<br>Cloudy | C,<br>C,<br>C, |
| 11 jt. m. 19   | 667  <br>659      | 50, 3 .                                   | 49.0  | 91<br>91<br>91<br>93           | ESE.<br>SE.<br>SE.<br>SSE.       | Brisk<br>Brisk<br>Brisk<br>Fresh          |       | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.            |                               | Stratus<br>Stratus<br>Nimbus<br>Nimbus              | 10               | SE.r<br>SE.r<br>SE.s          | 10.35      |       | . 00                        | 49, 4                     | Cloudy<br>Cloudy<br>Light tain<br>Light rain         |                |

#### SEPTEMBER 6, 1883.

[Latitude 64] 39' N., longitude 166 [30] W.]

| *  |   |   |   |  |
|--|---|---|---|--|
| 1 a. m.         20, 662         50, 8         49, 7         92         88           2 a. m.         20, 669         50, 7         50, 1         96         88           3 a. m.         20, 688         49, 2         40, 2         100         88           4 a. m.         20, 628         49, 4         48, 4         100         88           5 a. m.         29, 623         46, 5         46, 8         100         88 | E. Fresh Hidde<br>E. Fresh Hidde<br>E. Gentle Hidde   | n. Nimbus 10<br>Nimbus 10<br>Nimbus 10<br>Nimbus 10     | 0   | + 49.4 Cloudy S,<br>49.2 Light ain S,<br>+ 48.7 Hight an S,<br>+ 47.0 Light an S,<br>+ 40.8 Light an D,                  |
| 6 a m. 29,611  | E. Light Hidde<br>E. Light Hidde<br>E. Gentlo Hidde   | n. Stratus 10<br>n. Stratus 10<br>n. Nimbus 10          | 0 6.20 .01<br>0 8.30                          | 40.0   Light ton   D.   45.5   Cloudy   D.   41.2   Cloudy   D.   Light train   A.   Light train   A.   Light train   A. |
| 11 i 1:   29.56;   47.8   47.6   98   81   12 i.e.   29.558   48.2   48.1   99   81   1 p.m.   29.576   48.7   48.0   99   81   2 p.m.   29.576   48.7   47.0   97   87   3 p.m.   29.576   47.3   47.0   97   88  | L. Fresh . Hidd<br>L. Fresh . Hidd<br>L. Fresh . Hidd | en. Nimbus   10<br>en. Stratus   10<br>en. Stratus   10 | 012.40<br>012.40                              | 48.2   Light ain   A.   48.8   Light ain   A.   49.5   Cloudy   G.   48.5   Cloudy   G.   48.1   Cloudy   G.             |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | L. Fresh. Hidd<br>L. Fresh. Hidd<br>E. Fresh. Hidd    | en. Stratus 10<br>en. Stratus 10<br>Nimbus 10           | 0 0 00 00 00                                  | 49.5   Clondy G.<br>49.5   Clondy C.<br>48.8   Clondy C.<br>46.0   Lightrain C.<br>41.7   Lightrait C.                   |
| 9 p. m. 29, 510 45, 9 45, 4 96 8<br>10 p. m. 29, 507 46, 2 45, 5 94 8<br>11 p. m. 29, 505 46, 2 45, 5 94 8<br>12 p. m. 29, 502 47, 0 45, 8 94 8  | E. Fresh Hidd<br>E. Fresh Hidd                        | en. Strafus 10  | SE s 8.45 01<br>SE s 00<br>SE s 00<br>SE s 00 | +44.7   Cloudy   M.   M.   Cloudy   M.   46.2   Cloudy   M.   49.1   Cloudy   M.   M.                                    |

<sup>\*</sup> Light shower of rain between observations

П. Ех. 44 ----44

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#### Meteorological record of the voyage of the schooner Leo, de.-Continued.

#### SEPTEMBER 7, 1883

 $[ Washington\ time,\ \ I(alic \times signifies\ alov :\ v\ signifies\ rapid,\ \ Latitude\ 65): 14^{\circ}N_{2},\ longitude\ 164^{\circ}\ 3a^{\prime}\ W_{2}]$ 

| -  |   |  |  |  |   |                                  |  |                  |  |                 |   |                          |  |              |        |                             |   |   |  |
|----|---|--|--|--|---|----------------------------------|--|------------------|--|-----------------|---|--------------------------|--|--------------|--------|-----------------------------|---|---|--|
|    | 9   | 10   |  | ometer<br>ected).                                  |   | - 1/                             | find.  | $U_{i}$          | pper closs   | ts.             | Lowe  | r clot                   | uls.                                   |              | OW,    | O                           |   |   |  |
|    | Tune of observation.                                      | Converted baremeters   | Dry buth   | Wer bulb.  | Relative lumidaty                       | Direction.                       | Kind.  | Kind.            | Amount in 10ths.   | Direction (mov- | Kind.   | Amount in leths.         | Direction mov-<br>ing from-)           | Commenced    | Ended. | Amount of 12in melted snow. | Surface water.  | State of weather.   | 11.61                                    |
|    | In r .<br>2 a m.<br>3 a. m.<br>4 a. m.<br>5 a. m.         | 29, 509<br>49, 549<br>29, 524<br>29, 529<br>29, 517<br>29, 509 | 36. 8<br>47. 0<br>47. 2<br>47. 0<br>46. 0<br>1 + 0   | 45, 7<br>40, 0<br>46, 3<br>16, 1<br>45, 3<br>45, 0 | 94                                      | SE.<br>88E.<br>88E.<br>88E.      | Fresh<br>Fresh<br>Brish<br>Gentle<br>Gentle      | Cirrus<br>n<br>u | . 1<br>Hulden.<br>Hidden.<br>0<br>Uidden.                | ()<br>()        | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Nimbu              | 10                       | 8E.s<br>0<br>0<br>0<br>0               |              |        | 00<br>00<br>00<br>00        | 49, 0<br>49, 0<br>48, 4<br>46, 0                                    | Cloudy<br>Clie de<br>Cloudy<br>Cloudy<br>Cloudy<br>Lughters | 71115                                    |
| 1: | 7 n. m<br>8 n. m.<br>9 d. m.<br>9 d. m.<br>1 n. m<br>2 m. | 19 489<br>19 466<br>29 466<br>10 448<br>11 163<br>21 461       | 45.0<br>44.0<br>44.0<br>44.0<br>44.8<br>14.8<br>45.0 |  | 100<br>98<br>98<br>98<br>92<br>92<br>98 | SSE.                             | Gentle.<br>Gentle.<br>Fresh.<br>Fresh.<br>Fresh. | 0                | Hidgen,<br>Hidden,<br>Hidden,<br>Hidden,<br>O<br>Hidden, | 0               |   | 10                       | 0<br>0<br>0<br>0<br>0<br>8.4           |              | 8.30   | 00                          | 41.8  | Li25t a<br>Li25t and<br>Cloud<br>Cloud,<br>Cloud,<br>Cloudy | D. D                                     |
| 1  | 1 p. m.<br>2 p. m<br>3 p. m<br>1 p. n<br>1 p. n<br>5 p. n | 29, 484<br>29, 491<br>9, 516<br>9, 524<br>23, 522<br>20, 528   | 45. 0<br>45. 1<br>45. 1<br>45. 5                     | 44.5<br>44.5<br>44.5<br>44.6<br>44.5<br>41.3       | 96<br>98<br>96<br>96<br>92<br>89        | 8.<br>88W.<br>88W.<br>8W.<br>8W. | Brisk<br>Brisk<br>Brisk .<br>Brisk .<br>Brisk    |                  | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden |                 | Stratus :<br>Stratus :<br>Stratus :<br>Nimbus :<br>Stratus :<br>Stratus : | 10<br>10<br>10<br>10     | S.a<br>SSW.r<br>SSW.r<br>SSW.r<br>SW.r | 3 55         | 4.20 ( | 00<br>00<br>                | 46. 1<br>46. 6<br>46. 7<br>47. 0                                    | Clouds<br>Clouds<br>Clouds<br>Light ran<br>Clouds<br>Clouds | G. G. G. G. G. G. G. G. G. G. G. G. G. G |
| 5  | i ja ma<br>Pp. tata                                       | 19, 545<br>19, 557<br>19, 574<br>29, 596                       | 46.5   | 45.0   | 91<br>89<br>86<br>25                    | 8W.<br>8W.<br>8W.                | Brisk<br>Brisk<br>Brisk<br>Fresh                 |                  | H.dden.<br>Hidden.<br>Hidden.<br>0 -                     | 0               | Cu. str<br>Cu. str<br>Stratus<br>Stratus                                  | 10  <br>10  <br>7  <br>2 | SW.8                                   | ······<br> } |        | . 00                        | $\begin{array}{c} 47.\ 5 \\ 48.\ 0 \\ 48.\ 8 \\ 49.\ 7 \end{array}$ | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy                        | C<br>M.<br>M.                            |
|    | рове<br>Пробес  | 29, 686<br>23, 681   |  |  |   |                                  | Fresh .<br>Fresh.                                | 0                | . 0  | 0               | Stratus<br>Cu. str<br>Stratus   | 22                       | WSW.8<br>WSW.8                         | 3            |        |                             |   | Cloudy<br>Cloudy  | M.                                       |

#### SEPTEMBER 8, 1883.

\_Latitude 63′ 28′ N., longitude 161° 37′ W.)

| -   |  |  |  |                                  |  |  |             |  |                      |  |                               |   |                            |   |  |                            |
|---|--|--|--|----------------------------------|--|--|-------------|--|----------------------|--|-------------------------------|---|----------------------------|---|--|----------------------------|
| 1 a. te.<br>2 a. te<br>3 a. te<br>4 a. m<br>5 a. m<br>6 a. m      | 19, 622<br>29, 633<br>29, 642<br>29, 651<br>29, 652<br>23, 652   | 47. 9<br>46. 7<br>16. 2<br>11. 2             | 45, 8<br>44, 8<br>44, 6<br>13, 9                   | 87<br>89<br>85<br>87<br>89<br>92 | W.<br>W.<br>W.<br>WSW.                     | Gentle.<br>Gentle.<br>Gentle.<br>Gentle.<br>Light<br>Gentle. | 0           | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.        | ()                   | Stratus 10<br>Stratus 10<br>Stratus 10<br>Stratus 10<br>Stratus 10<br>Stratus 9  | 0<br>0<br>0<br>0<br>0         |   | 00                         | 50.4  | Clends<br>Clouds<br>Clouds<br>Clouds<br>Clouds<br>Fan    | 477722                     |
| 7 (1.55)<br>8 a m<br>9 a b<br>10 a m<br>11 a m<br>12 m            | 19, 652<br>23, 651<br>29, 649<br>29, 664<br>19, 672<br>23, 662   | 15.0<br>44.8<br>44.0<br>40.5<br>43.8<br>44.0 | 43. 0<br>43. 7<br>43. 6<br>45. 0<br>42. 8<br>43. 3 | 92<br>91<br>96<br>95<br>92<br>94 | WSW.<br>WSW.<br>WSW.<br>WSW.<br>SW.<br>SW. | tientle :  | 0<br>0<br>0 | 0<br>0<br>0<br>Hidden,<br>Hidden,<br>lus 2                 | ()<br>()<br>()<br>() | Stratus   8  | 0<br>0<br>0<br>0<br>0<br>SW.s |   | 00<br>00<br>00<br>00<br>00 | 50, 4<br>50, 4<br>50, 5<br>50, 5<br>50, 2<br>50, 3<br>50, 8 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy | D. D. V. V. V.             |
| 1 p 2<br>2 p, to<br>5 p, to<br>4 p, to<br>5 p, to<br>6 p to       | 23 (73)<br>5 (85)<br>29 (66)<br>19 (694)<br>29 (768)<br>20 (716) | 45, 0<br>15, 8<br>47, 0<br>46, 0             | 43. 9<br>43. 8<br>45. 9<br>45. 5<br>44. 7<br>44. 7 | 99<br>91<br>93<br>98<br>90<br>84 | SW,<br>SW,<br>SW,<br>SW,<br>SW,            | Gentle.<br>Gentle.<br>Fresh.<br>Fresh.<br>Fresh.             | 0           | Hidden.<br>Hidden.<br>G  <br>Hidden.<br>Hidden.<br>Hidden. | Û                    | Nimbus. 10<br>Stratus 10<br>Stratus 10<br>Cumulus 6<br>N'+bus., 10<br>Str.tus 10 | SW.s<br>SW.s<br>SW.s          | 12, 26<br>712, 40<br>12, 40<br>1, 50<br>2, 10<br>2, 30<br>2, 30 | .01                        | 51. 0<br>51. 0<br>51. 1<br>50, 9                            | Cloudy<br>Cloud<br>Fair<br>Light ram                     | G<br>G<br>G                |
| 7 p. in<br>8 p. in<br>9 p. in<br>10 p. in<br>11 p. in<br>12 p. in | 24, 722<br>14, 729<br>79, 731<br>29, 742<br>29, 747<br>29, 755   | 15 B   | 45.0<br>44.0 1<br>44.5                             | 98<br>98<br>98<br>84             | SW.<br>SW.<br>SW.<br>SW.<br>SW.            | Fresh.<br>Fresh.<br>Fresh.<br>Fresh.<br>Light                | 0           | Hidden.<br>0<br>0<br>Hidden.<br>Hidden.<br>Hidden.         | 0                    | Stratus 10<br>Stratus 9<br>Cu. str. 6<br>Nimbus 10<br>Stratus 11<br>Stratus 10   | SW.s<br>SW.s<br>SW.s          | 9, 40 10, 15  | 00                         | 50, 5<br>50, 4<br>13, 6                                     | Cloudy   | M.<br>M.<br>M.<br>M.<br>M. |

Light showers at short intervals.

Meteorological record of the royage of the schooner Leo, &c.—Continued.

#### SUPTEMBER 9, 1880.

 $(\textbf{Washingfon time}, \textbf{--- Italic } s \textit{ signifies } slow, \textbf{-} r \textit{ signifies } rapid. \textbf{--- Latitude } 66-18 \text{--} \text{N.}, \textit{ longitude } 401^{\circ} 33^{\circ} \text{--} \text{W.})$ 

|  | ÷  | Hygre  | ometer   |  | W                                       | ind.   | ľ                | pper clou  | ds.                           | Lowe  | relo                            | nd«.                                    | Rai          | H OP    | Ε                                |  |   |                                 |
|--|--|--|--|--|---|--|------------------|--|-------------------------------|---|---------------------------------|---|--------------|---------|----------------------------------|--|---|---------------------------------|
| Lorentelementalism   | Corrected batemeter  | Dr. bulb.  | Wet bulb.  | Relative humidity.   | Direction.                              | Kind.  | Kind.            | Amount in leths  | Direction (mov-<br>ing from-) | Miss  | Amount in lattic-               | Phycetian moving them-                  | County meet. | Ensterd | Arount of min<br>melted snow     | Surface water.                                     | State of weather  | Chlistica.                      |
| 1 in the 2 in 1 in 1 in 1 in 1 in 1 in 1 in 1 in             | 19,759<br>29,762<br>29,769<br>29,769<br>29,769<br>29,769       | 44. 2<br>42. 6<br>42. 3<br>41. 1<br>40. 2<br>40. 8 | 12. 8<br>41. 8<br>41. 3<br>40. 3<br>50. 4<br>39. 8 | P. et.<br>87<br>93<br>91<br>92<br>92<br>91                                       | 88W.<br>88W.<br>88E.<br>88W.<br>88W.    | Light<br>Light<br>Cleatle<br>Ceutle<br>Light             | 0<br>0<br>0<br>0 | Hidden.<br>0<br>0<br>0<br>0<br>Hidden.                         | 0 0                           | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus                 | 10<br>10<br>10<br>5<br>5        | 0<br>0<br>0<br>0                        |              |         | Incl. (00 00) 00 00 00 00        | 50.1   | Cloudy<br>Fair<br>Fair<br>Fair<br>Cloudy                                  | <b>建设设设置</b>                    |
| 7. in (2.4), 10. (2.4), 10. (2.4), 11. (2.4), 12. (2.4)      | 29, 756<br>29, 896<br>29, 714<br>29, 689<br>29, 689<br>29, 659 | 40, 8<br>41, 0<br>42, 6<br>43, 0<br>43, 0<br>40, 1 | 39 8<br>10, 0<br>41, 3<br>41, 4<br>41, 3<br>41, 8  | 91<br>91<br>59<br>57<br>57<br>57   | E 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | Light<br>Gentle<br>Gentle<br>Gentle<br>Gentle.           | 0                | (t<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,      |                               | Stratus<br>Sindus<br>Shatus<br>Shatus<br>Shatus<br>Shatus<br>Shatus | 0<br>10<br>10<br>10<br>10<br>10 | 0<br>0<br>0<br>0<br>SSE.                |              |         | 00<br>10<br>10<br>10<br>10<br>10 | 50, 2<br>50, 0<br>50, 2<br>50, 6<br>50, 3<br>50, 1 | Fair Cloudy Cloudy Cloudy Cloudy Cloudy                                   | D.<br>D.<br>A.<br>A.<br>A.      |
| 1 p. m.<br>2 p. m.<br>4 p. m.<br>5 m. m.<br>6 p. m.          | 29, 630<br>29, 620<br>29, 589<br>29, 572<br>29, 544<br>29, 517 | 45, 0<br>45, 0<br>45, 2<br>45, 4<br>46, 0<br>46, 7 | \$2.0<br>43.1<br>43.2<br>44.0<br>44.0<br>15.7      | 81<br>84<br>89<br>81<br>92   | ST.<br>ST.<br>SE.<br>SE.<br>SE.         | Gentle<br>Gentle<br>Gentle<br>Fresh.,<br>Fresh.,         |                  | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.            |                               | Stratus<br>Nimbus<br>Nimbus<br>Nimbus<br>Stratus<br>Nimbus          | 10<br>10<br>10<br>10<br>10      | 0<br>0<br>0<br>8E r<br>>E r             | 1.20         | 4.20    | 01                               | 50, 1<br>50, 0<br>50, 2<br>50, 1<br>50, 1<br>50, 0 | Cloudy<br>Light tain,<br>Light tain<br>Light rain<br>Cloudy<br>Light tain | (),<br>(),<br>(),<br>(),<br>(), |
| 7 p   1<br>8 p   1<br>9 p   10 p   1<br>11 p   1<br>12 p   1 | 29, 484<br>29, 456<br>29, 416<br>29, 383<br>29, 370<br>29, 345 | 48.6   | 44, 5<br>44, 6<br>44, 6<br>45, 0<br>45, 0          | 81<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80<br>80 | 17 / 17 / 17 / 17 / 17 / 17 / 17 / 17 / | Fresh.<br>Fresh.<br>Fresh.<br>Brisk.<br>Fresh.<br>Fresh. |                  | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                               | Nimbus Nimbus Stratus Stratus Stratus Stratus                       |                                 | SE s<br>SE s<br>SSE s<br>SSE s<br>SSE s |              | 8.12    | . 01<br>                         | 50, 1<br>50, 1<br>50, 1<br>50, 0<br>50, 1<br>50, 1 | Light rain<br>Light rain<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy          | M.<br>M.<br>M.<br>M.<br>M.      |

Nort. 2.45 a. m. (we meteors observed massing from Cygnus to Lym

#### SEPTEMBER 10, 1883.

{Laritude 63 | 28 | N., longitude 161 | 30 | W.)]

|    | 2 a 10<br>3 a 10<br>4 a 10<br>5 a 10             |  | 47. 0<br>45. 0<br>45. 5<br>45. 5 | 44.8<br>44.8<br>44.3<br>44.3                       | 89<br>84<br>92<br>90<br>90<br>95 | ESE.<br>SEE.<br>SE.<br>SE.<br>SE. | Fresh<br>Fresh<br>High<br>Brisk<br>Brisk<br>Brisk    |        | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.            |     | Strains<br>Strains<br>tus<br>ains        | 10<br>10<br>10<br>10<br>10       | 0<br>0<br>0<br>0               | 2.20   | .01                  | 50, 9<br>50, 2<br>50, 1<br>49, 8 | Cloudy<br>Light rain<br>Cloudy                     | 1.<br>1.<br>1. |
|----|--|--|----------------------------------|--|----------------------------------|-----------------------------------|--|--------|--|-----|--|----------------------------------|--------------------------------|--------|----------------------|----------------------------------|--|----------------|
| 11 | 7 a m<br>8 a m<br>9 a m<br>0 a m<br>1 a m<br>2 m | 29, 110<br>29, 068<br>29, 052<br>29, 032<br>29, 005<br>28, 978 | 43. 5<br>43. 1<br>43. 8<br>45. 5 | 42. 6<br>42. 1<br>42. 3<br>43. 5                   | 96<br>93<br>92<br>88<br>84<br>84 |                                   | High<br>Brisk<br>Brisk<br>Brisk<br>Brisk             |        | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |     |  | 10<br>10<br>10<br>10<br>10<br>10 | 0<br>0<br>0<br>0<br>0<br>SSE.8 | 10.10  | . 02                 | 49, 6<br>49, 1<br>49, 0<br>48, 8 | Light rain.<br>Light rain.<br>Light rain<br>Cloudy | M.<br>M.<br>M. |
| :  | 2 ja na<br>3 p. na<br>4 p. na<br>5 j. na         | 28, 980<br>18, 980<br>18, 904<br>28, 904<br>28, 996<br>28, 996 | 47. 7<br>48. 0<br>48. 0<br>51. 0 | 45.5<br>46.3<br>46.3<br>48.6                       | 79<br>81<br>87<br>87<br>87<br>87 | SSE.<br>SSE.<br>SSE.              | Brisk<br>Brisk<br>Fresh<br>Fresh<br>Gentle<br>Gentle | {}     | Hidden,<br>Hidden,<br>Hidden,<br>U<br>Hidden,<br>Hidden,       | 0   | Stratus .                                | 10<br>10<br>8                    | SSEs<br>SSEs<br>SSEs           |        | 60<br>60<br>60<br>60 | 49, 2<br>49, 4<br>49, 5<br>49, 6 | Cloudy<br>Cloudy<br>Cloudy                         | M.<br>A.<br>A. |
| 1  | • p m<br>• p m.<br>• p m<br>I p m.               | 18, 995<br>28, 984<br>18, 981<br>18, 981<br>18, 990<br>28, 988 | 51. 0<br>51. 7<br>50. 8<br>49. 0 | 48. 1<br>49. 2<br>48. 0<br>48. 2<br>47. 5<br>46. 8 | 92                               | 8811.<br>8811.<br>8811.           | Gentle<br>Gentle<br>Gentle<br>Gentle<br>Light        | Cirrus | Hidden.  | 0 0 | Stratus<br>Cumulus<br>Stratus<br>Stratus | 10<br>7<br>10<br>9               | SSW.s<br>SSW.s<br>SSW.s        | tt. 50 | 00<br>00<br>00       | 48. 9<br>48. 6<br>48. 5<br>48. 7 | Cloudy<br>Cloudy<br>Cloudy                         | G.<br>G.<br>G. |
|    |  |  |                                  |  |                                  |                                   |  |        |  |     |  |                                  |                                |        |                      |                                  |  |                |

#### Meteorological record of the royage of the schooner Leo. dv.—Continued.

#### SUPTEMBER II 1883

(Washington tore. Italic s significs show) r significs rapid. Latitude Ca. 38 N. longitude 1617 33 W.)

|   | Hygion etc<br>activeful                            | 1                        | Wind.   | 1     | pper clon  | ıls.                      | Lower  | ******                             | Rai             | n or  | 120                         |                              |  |             |
|---|--|--------------------------|---|-------|--|---------------------------|--|------------------------------------|-----------------|-------|-----------------------------|------------------------------|--|-------------|
| Tine of chetration.   | Dry balls.   | Relative base days       | Dicer.or<br>Kirch   | Kind. | Amount in loths.   | Direction (nov. ing from- | Kind.  | Direction upos<br>ing from - i     | Commenced.      | Ended | Amount of rain melted snow. | Surface water.               | Stab of worther  | Obstact.    |
| 1 n. m. 29, 055<br>2 n. m. 29, 011<br>3 n. m. 29, 013<br>4 n. 29, 015<br>5 n. m. 29, 015<br>6 n. m. 29, 022           | 47.7 47.6<br>47.3 17.4<br>47.0 47.0<br>47.0 45.9   | 109<br>109<br>100<br>5-6 | SE. Light<br>SE. Light<br>ENE. Light<br>ENE. Light<br>Colm.<br>SE. Light.   | 0     | Hidden.<br>Huden.<br>Hidder.<br>Hidden.                        | 0                         | Nimbus 10<br>Nimbus 10<br>Nimbus 10<br>Nimbus 10<br>Nimbus 5<br>Nimbus 10          | 0                                  |                 |       | .01                         | 48.6<br>48.5<br>48.3<br>48.3 | Light on<br>Light on<br>Light on<br>Light on<br>Light on<br>Light on<br>Light on | 1. 1. 1. 7. |
| 7 a. m. 29, 638<br>8 a. m. 29, 053<br>9 a. m.   29, 08<br>10 a. m.   29, 085<br>11 a. m. 29, 104<br>12 m. 29, 131     | 45.0 45.0<br>45.0 45.0<br>46.0 45.9<br>46.2 16.1   | 100<br>100<br>59         | SSW. Light SW. Gentle SW. Gentle SW. Gentle SW. Fresh SW. Fresh             |       | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                           | Nimbus, 10<br>Nimbus, 10<br>Nimbus, 10<br>Stratus, 10<br>Nimbus, 10<br>Stratus, 10 | 6<br>0<br>8W s<br>8W r<br>8W r     | 10.40           | 9, 20 | . 01                        | 48.5<br>48.7                 | Light of<br>Light to be<br>Dulis to be<br>Cloude<br>Light of<br>Clouds           | G.          |
| 1 p. m. 29, 17 ;<br>2 p. m. 20, 193<br>6 p. m. 19 2 ;<br>4 p. m. 19, 7 %<br>5 p. m. 29, 267<br>6 p. m. 29, 280        | 4 0 15.5<br>1 0 14.7<br>10 2 15.2<br>45.2 41.5     | 96<br>97<br>98           | SW. Fresh<br>SW. Genth<br>SW. Gentle<br>WSW Light<br>WSW Fresh<br>WXW Fresh | 0     | Hidden.<br>Hulden.<br>0<br>Hidden.<br>Hidden.                  | (1                        | Nimbus 10<br>Nimbus 10<br>Stratus 6<br>Stratus 9<br>Nimbus 10<br>Nimbus 10         | SW r<br>SW r<br>SW r<br>W s<br>W s | 4. 45           | 2.40  | (90)                        | 49. 0<br>49. 0<br>49. 0      | Light - as   | D. 14. D.   |
| 7 p. m. 29, 275<br>8 p. m. 29, 330<br>9 p. m.; 29, 335<br>10 p. m.; 29, 350<br>11 p. m.; 29, 370<br>12 p. m.; 29, 383 | 45.0 41.5<br>,44.5 43.0<br>;44.7 40.7<br>44.8 13.1 | 5-6<br>8-8               | WSV Brisk<br>WSV Brisk<br>WSW Brisk<br>WSW Brisk<br>SW Brisk<br>SW Brisk    |       | Holden.<br>Holden.<br>Holden.<br>Hidden.<br>Hidder.            |                           | Cu. st 10 Cu. st 10 Nimbus 10 Stratus 10 Stratus 10 Stratus 10                     | W 8<br>W 8<br>0<br>WSW 8<br>SW 8   | 8, 45<br>10, 10 | 9, 20 | .00                         | 49.3<br>48.8<br>48.8<br>48.7 | Clead<br>Clouds .<br>Light in<br>Cloud .<br>Light ind<br>Cloud                   | M.          |

#### SEPTEMBER 12, 1883.

(Latity be 63) 48 N., longitude 161 - 12) W.

| 1 a m.<br>2 a, m.<br>3 a, m.<br>4 a, m.<br>5 a, m.<br>Ca, w     | 29 400<br>29 415<br>20 434<br>29 448     | 43. 6<br>44. 0<br>43. 7<br>42. 8 | 43.4<br>13.7<br>42.6<br>42.6     | 97<br>98<br>98<br>99<br>99 | SW.                             | Brisk<br>Brisk<br>High<br>High<br>High                 | Haden<br>Hidden<br>Hidden<br>H.den<br>Hidden<br>Hidden  |       |     | Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Nimbus              | 10<br>10<br>10<br>10 | ()<br>()<br>()<br>()<br>()<br>()   |   | . 01<br>. 02<br>. 04<br>. 03 | 48.7   Light<br>48.6   Light<br>48.6   Light<br>48.5   Light<br>48.5   Light<br>48.5   Light   | 1 16<br>1 16<br>1 1 16<br>1 1 16 | 7775                 |
|---|--|----------------------------------|----------------------------------|----------------------------|---------------------------------|--|---|-------|-----|---|----------------------|------------------------------------|---|------------------------------|--|----------------------------------|----------------------|
| 7 n. ta.<br>8 a. m.<br>9 a. m.<br>10 a. m.<br>11 a. m.<br>12 m. | 29, 4+0<br>29, 490<br>29, 516<br>29, 532 | 43. 0<br>44. 6<br>45. 0<br>45. 0 | 42.8<br>44.6<br>14.8<br>44.8     | 98<br>100<br>93<br>98      | SW.<br>SW.<br>SW.<br>WSW.       | High<br>Brisk .<br>Fresh<br>Fresh<br>Gentle .<br>Fresh | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.  |       |     | Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Stratus             | 10<br>10<br>10<br>10 | 0<br>0<br>0<br>0<br>W 8            |   | .01                          | 48.5 Light<br>48.4 Light<br>48.6 Light<br>48.8 Light<br>49.0 Light<br>48.6 Clend               | tain<br>1. h<br>1. db            | D.<br>A.<br>A.       |
| 1 p + 2 p 1 3 p m 4 p m 5 p m 6 p h                             | 10 600<br>10 6.1<br>29 628<br>29 650     | 45.3<br>45.3<br>45.3             | 11.7<br>11.1<br>42.1<br>44.0     | 51                         | NW.<br>NW.<br>NW.<br>NW.<br>NW. | Fresh.,<br>Fresh.,<br>Fresh.,<br>Fresh.                | Hidden. Cir. eu 1 Cir. cu. 2 Cir. eu. 1 Hidden. Cir. eu. 2  | 0 0   |     | Crimilus<br>Stratus<br>Stratus<br>Cir. st                             | 9<br>7<br>9<br>10    | NW.s<br>NW.s<br>NW.s               |   | (40<br>(57<br>(40<br>(52     | 45 6 Cloud<br>49 1 Cloud<br>49 0 Cloud<br>49 0 Cloud<br>49 0 Cloud<br>49 0 Cloud<br>49 4 Cloud |                                  | G.<br>G.<br>G.<br>F. |
| 8 p. m.<br>9 p. m.<br>10 p. m.<br>11 p. m.                      | 29, 671<br>29, 678<br>29, 6±4<br>29, 6±5 | 46, 0<br>46, 0<br>46, 0<br>45, 8 | 41. 0<br>43. 0<br>12. 7<br>42. 8 | 77                         | NW.<br>NW.<br>NW.               | Fresh<br>Fresh   | Cir. st .   1<br>Cir. eu .   1<br>Cir. st .   2<br>Cir. st .   2<br>Cir. st .   2<br>Cir. cu .   2<br>Cir. st   2 | 0 0 0 | 5.2 | Cu. st<br>Cu. st<br>Cu. st<br>Cu. st<br>Cu. st<br>Stratus j<br>Cu. st | 5 5                  | 0<br>0<br>0<br>0<br>0<br>0<br>NW * | } | 60<br>00<br>00               | 49.4 Fan<br>49.0 Feir<br>49.0   Pair   |                                  | 1<br>М.<br>М.        |
|   |  |                                  |                                  |                            |                                 |  |   |       |     |   |                      |                                    |   | _                            |  |                                  |                      |

## EXPEDITION TO POINT BARROW, ALASKA.

#### Meteorological record of the royage of the schooner Leo, de.-Continued.

SEPTEMBER 13, 1883.

[Washington time. Italic a significa slow; r significa rapid. Latitude 649 15' No, longitude 162 20' We]

| inte.  | Hygr<br>(corr   | ometer<br>ected).  | Wind.  | Upper clouds.                          |                  | Lower clouds. Rain or ' a g g g g g g g g g g g g g g g g g g  |
|--|---|--|--|--|------------------|--|
| Time of clustration.   | Dry bails.  | Wet builb.<br>Estative hunidity  | Direction.   | Kind. Amount in 10ths. Direction (mev- | ing from—)       | Kind.  Amount in Jühn.  Direction snov- ing from—)  Ended.  Amount of rain melled snov- Surface water.  Sinte of weather.  |
| 1 a. m.   29, 66<br>2 a. m.   29, 70<br>3 a. m.   29, 7<br>4 a. m.   20, 7<br>6 a. m.   20, 7<br>6 a. m.   20, 7 | 00   45, 3<br>  8   45, 2<br>  5   45, 1<br>  5   45, 1 | P. ct<br>42.8 84<br>42.8 80<br>42.8 80<br>42.7 80<br>42.7 80<br>42.7 80<br>42.6 80 | WNW. Fresh.<br>WNW. Fresh.<br>WNW. Gentle<br>WNW. Gentle<br>WSW. Gentle                    | Cir. st 4<br>Cir. cu 3<br>Cirrus 1     | 0<br>0<br>0<br>0 | Cat. & st.   6   0   |
| Ta. m. 29. 6<br>Est, m. 29. 6<br>Est, m. 29. 6<br>10 a. m. 29. 6<br>11 a. m. 20. 6<br>12 m. 29. 6                | 99   44, 5<br>(2   44, 0<br>57   43, 5<br>(2   40, 0    | 42.4   80<br>42.2   81<br>42.0   84<br>42.3   90<br>41.6   88<br>41.3   86         | WSW.   Light.   W.   Gentlo   WSW.   Gentlo   WSW.   Gentlo   WSW.   Fresh.   SW.   Gentlo | 0 0<br>0 0<br>Hidden                   | 0<br>0<br>0<br>0 | Stratus   6   0   6.50   01   40.3   Fair   D.   |
| 1 p. m. 29, 6;<br>2 p. m. 29, 6;<br>3 p. m. 29, 5;<br>4 p. m. 29, 5;<br>5 p. m. 29, 5;<br>6 p. m. 29, 5;         | 13 43, 0<br>07 42, 9<br>15 43, 0<br>15 43, 0            | 42. 8 90<br>41. 0 83<br>41. 5 88<br>41. 5 87<br>42. 0 92<br>42. 0 93               | SW. Fresh.<br>WSW. Fresh.<br>WSW. Fresh.<br>WSW. Fresh.<br>SSW. Gentle<br>SSW. Gentle      | Hidden.<br>Hidden.                     |                  | Nimbus   10  |
| 7 p. m. 29, 5;<br>8 p. m. 29, 4;<br>9 p. m. 29, 4;<br>10 p. m. 29, 4;  | 40 43.5<br>10 43.6                                      | 42.0 88  | SSW. Light.<br>SSE. Gentle<br>SSE. Light.  | 0 0                                    | 0 5              | Nimbus   9   S4W.#   |
| 14 p. m. 29, 41<br>12 p. m. 29, 41   | 1 43.8  | 41.8   84<br>40.5   88   | NE. Fresh.   | 0 0                                    | 0 }              | Stratus   6   NE   6   00   40.3   Cloudy   1.5     Cu, st.   3   0     00   49.2   Cloudy   M.     Stratus   6   NE   11.25   11.58   01   49.2   Cloudy   M.     Stratus   5   NNE   11.25   11.58   01   49.2   Cloudy   M. |

#### SEPTEMBER 11, 1880.

[Latitude 62: 57' N., longitude 168: 16' W.]

| 1 a. m. 29, 419 43, 0 42, 0<br>2 a. m. 29, 422 43, 2 42, 1<br>3 a. m. 29, 422 43, 0 41, 0<br>4 a. m. 29, 411 42, 3 39, 4<br>5 a. m. 29, 415 41, 1 39, 2<br>6 a. m. 29, 305 41, 1 39, 2                  | 92 N.E. Fresh.<br>91 NE, Fresh.<br>83 N.E. Brisk.<br>82 NNE, Brisk.<br>82 N. Brisk.<br>82 N.E. Brisk. | Cir. eu. 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0<br>0<br>0<br>0<br>0 | Nimbus   10   Stratus   7   Stratus   2   Stratus   1   Stratus   1   0   0 | NE.r 1.45   | .01 48.7<br>00 48.6<br>00 47.9<br>00 47.3        | Clear S.   |
|---|---|--|-----------------------|---|---|--|--|
| 7 a. m. 29 395   40, 3   38, 3   8 a. m. 29, 395   40, 5   38, 7   9 a. m. 29, 396   40, 2   38 0   10 a. m. 29, 396   40, 2   38, 0   11 a. m. 29, 394   39, 0   37, 3   12 m. 29, 394   39, 0   36, 8 | 81 NNE. Brisk.<br>81 NNE. Brisk.<br>81 NNE. Brisk.<br>84 NNW. Brisk.                                  | 0 0  | 0<br>0<br>0<br>0<br>0 | 0 0<br>0 0<br>Stratus : 3<br>Stratus : 5<br>Stratus : 5<br>Cumulus 4        | 0 '   | 00   46,3<br>00   45,8<br>00   42,5<br>00   41,0 | Clear D. Clear D. Clear A. Fair A. Fair A. Fair A. |
| 1 p. m 29, 386 39, 1 38, 5 2 p m 29, 391 38, 8 38, 4 p m, 29, 385 39, 0 38, 5 4 p m, 29, 385 39, 39, 3 28, 6 5 p. m, 20, 387 44, 0 40, 6 p m, 29, 377 40, 5 39, 0                                       | 96 NNW. Brisk.  | Hidden.  |                       | Stratus 10<br>Stratus 10<br>Stratus 5                                       | N N W , r<br>N N W , r<br>N N W , r<br>N N W , r<br>N N W , r<br>N N W , r  | 00   41.0<br>00   42.1<br>00   42.1<br>00   41.2 | Cloudy G.<br>Cloudy G.<br>Cloudy G.<br>Fair L.     |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 86 NNW. Brisk   | Cirrus 1                                       | 0<br>0<br>0           | Cu. st 9 Stratus . 6 Nimbus . 9 Cu. st 6                                    | NNW.8<br>NNW.8<br>NNW.8<br>8.45<br>NNW.8<br>9.50<br>NNW.8<br>10.15<br>NNW.8 | 00   42.0<br>  41.8<br>  42.1<br>  42.5          | Cloudy L. M. M. Light vain M. Fair M.              |

М.

## Meteorological record of the royage of the schooner Leo, &c.-Continued.

#### SEPTEMBER 15, 1883

 $[Washington\ time.\ \ It also x signifies\ xspid.\ \ Latitude\ 500\ W\ N., longitude\ 1690\ 35\ W.]$ 

| 6.  | Į.  |                              | ometer<br>scredu                        |                               | W                                      | imt.   | ¥)    | per closs  | ła.             | Lowe  | relo                 | isola.                      | Rui           |        | 11             |                              |   |                                  |
|---|---|------------------------------|---|-------------------------------|--|--|-------|--|-----------------|---|----------------------|-----------------------------|---------------|--------|----------------|------------------------------|---|----------------------------------|
| Tine of observation   | Controlletta letta Te   | Dry balls                    | Wet vide.                               | Relative boundity.            | Part or Cost.                          | Kind.  | Kınd. | Amount in Julia.   | Direction emer- | Kind.   | Amount in leibs.     | Prection mov-<br>ing from-) | Countries ed. | Ended. | Incust of tail | Saifae naire.                | State of weather  | Calvar vecto                     |
| 1 a m.<br>2 a. m.<br>3 a. m.<br>4 a. m.<br>5 a m.<br>6 a m. | 29,346<br>29,350<br>29,349<br>19,528                                | 30 0<br>30 7<br>90 5<br>36 4 | 1 6<br>1 7<br>1 5 6                     | P. et 89 87 90 92 91 92       | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | High .                                       | Cirro | Haiden.  | ()              | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus                 | 10<br>7<br>10<br>10  | NNW.P                       |               |        | 60<br>00       | 40.7<br>40.5<br>40.5         | Fair,<br>Cloudy<br>Cloudy<br>Clouds<br>Cloudy<br>Cloudy | 477755                           |
| 7 a. 6<br>8 a 6<br>9 a. 6<br>10 a. 6<br>11 a 6<br>12 m      |   | 4                            | 17 T 10 T 10 T 10 T 10 T 10 T 10 T 10 T | 94<br>91<br>115<br>155<br>168 | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | High<br>High<br>High<br>High                 |       | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |                 | Stratus .<br>Stratus .<br>Nindow<br>Stratus .<br>Stratus<br>Stratus | 10<br>10<br>10<br>10 | 41                          | 8, 30         | 6 55   | (10)           | 44. 1<br>41. 5<br>43. 5      | Ploody  | 11.                              |
| 1 1: 1:1  | 0 0 8 1<br>20 2 8 4<br>20 3 6 3<br>20 3 6 3<br>20 4 17<br>1 1 4 2 0 | ,00 = ,00 = ,7. No = 11      | 10.0                                    |                               | 1111                                   | High<br>High<br>Gale<br>Gale                 |       | Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                 | Strains<br>Strains<br>Nimbus<br>Strains<br>Cu. st                   | 10                   | NNWA                        | 2, 10         | 3. 10  | 1: =           | 43.1<br>43.1<br>43.0<br>42.5 | Cloudy<br>Light show<br>Cloudy<br>Cloudy                | 6,<br>1,<br>1,<br>1,<br>1,<br>1, |
| 7 p m<br>8 p m<br>9 p m<br>10 p m<br>11 p m                 | 29, 444<br>29, 457<br>29, 451<br>29, 481<br>29, 486                 | 3 0<br>3 5<br>8 3<br>2 7 0   | 37 8<br>37, 6<br>36 0                   | 91<br>91<br>91<br>*6<br>*1    | 2711.                                  | Gale<br>High<br>High<br>High<br>High<br>High |       | Hulden.<br>Hulden.<br>Hinden.<br>0                             | 0               | Nimbus  | 10                   | : NNW.r                     | 8.50          | , 9,66 |                | 42.9<br>42.3<br>41.8<br>41.6 | Cloudy  | L<br>M<br>M.<br>M.               |

#### SEPTEMBER 16, 1883.

 $_3$ Latitude 55: 50' N., longitude 167: 18  $\langle \mathbf{W}_{cr} \rangle$ 

| 1 a b<br>2 a, 10,<br>3 a 10,<br>4 c m,<br>5 a, m<br>6 a, 6      | 29, 147<br>19, 530<br>29, 543<br>29, 556                   | 1.7 9<br>2.7<br>2.7                        | 36. 2<br>36. 2<br>36. 7<br>35. 8 | 81 81                      | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | High .<br>High .<br>High .                          | 0 0 0 | ()<br>()<br>()<br>()<br>()<br>()<br>()                         | 0 0 0 0 | Stratus   9 NNW.r   10   11.8 Cloudy   8   Stratus   8   NNW.r   19   41.5 Cloudy   8   Stratus   9 NNW.r   60   11.6 Cloudy   5   Stratus   9 NNW.r   60   41.1 Cloudy   5   Stratus   9 NNW.r   60   41.7 Cloudy   9   NNW.r   60   41.7 Cloudy   9   Stratus   9 NNW.r   60   41.7 Cloudy   6   Stratus   9 NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   Stratus   6   NNW.r   60   41.7 Cloudy   6   NNW.r   6   NNW.r   60   41.7 Cloudy   6   NNW.r   6   NNW.r   60   41.7 Cloudy   6   NNW.r    |  |
|---|--|--|----------------------------------|----------------------------|---------------------------------------|---|-------|--|---------|--|--|
| 7 a to,<br>8 a to<br>5 a to<br>10 a ot,<br>11 a to<br>12 to     | 20, 57 c<br>90 7 51<br>2 c 7 61<br>1 d 7 60                | 35 (                                       | 36. 3<br>15. 9<br>5 0 9          | 7277                       | NIW.                                  | High.   | U     | u<br>Hadden<br>Hidden<br>Hidden<br>Hidden                      | 0       | Stratus   9   NNW.r   00   41 6   Cheady   D.     Stratus   9   NNW.r   (60   41.6   Cheady   D.     Stratus   10   NNW.r   (70   41.5   Cheady   V.     Stratus   10   NNW.r   (70   41.5   Cheady   V.     Stratus   10   NNW.r   (40   41.2   Cheady   V.     Nimbus   10   NNW.r   (40   41.2   Cheady   V.     Nimbus   10   NW.r   (40   41.2   Ch |  |
| 1 p to<br>1 p to<br>4 p to<br>5 p to                            | 20-603<br>-0.622<br>-0-617<br>-0-625<br>-20-625<br>-20-625 | 70 - 4<br>- 36 - 5<br>- 40 - 6<br>- 40 - 6 | .6.4<br>37.2<br>.7.2             | 80<br>71                   | \W.<br>\W.<br>\W.<br>\W.<br>\\W.      | High<br>Brisk -<br>Brisk -<br>Brisk -<br>Brisk      | ()    | Hidden,<br>Hidden,<br>0<br>Hidden,<br>Hidden,<br>Hidden,       | 0       | Stratus   10   NW. g   1   1   43.5   Cloudy   1   1   1   43.5   Cloudy   1   1   1   1   1   1   1   1   1   |  |
| 7 p m.<br>8 p m.<br>9 p. m.<br>10 p. m.<br>11 p. m.<br>12 p. m. | 29, 707<br>20, 702<br>29, 727<br>29, 746                   | 41. 6<br>41. 6<br>42. 0<br>42. 0           | 39, 3<br>38, 8<br>39, 0<br>30, 0 | 70<br>80<br>74<br>74<br>74 | NW.<br>NW.<br>NW.<br>NW.<br>NW.       | Brisk -<br>Brisk -<br>Brisk -<br>Brisk -<br>Brisk - |       | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |         | Cu. 8t.         10         NW r         40         15.7         Clouds           Cu. 8t.         10         NW r         00         45.8         Cloudy         M           Stratus         19         NW s         00         44.8         Cloudy         M           Cu. 8t.         10         NW.s         00         45.2         Clouds         W           Cu. 8t.         10         NW.s         00         45.2         Cloudy         W           Cu. 8t.         10         NW.s         00         44.8         Cloudy         W  |  |

Light snow at intervals

1 Snow squalls at intervals

### Meteorological record of the royage of the schooner Leo, de.—Continued.

#### SEPTEMBER 17, 1883.

 $\{ \textbf{Washington time}, -\textbf{Italic} \text{ $s$ signifies $slow$} \text{ } r \text{ signifies $rapid}, -\textbf{I.atitude 54}, 24, N \text{ , longitude 104}, 20, W \text{ } \textbf{ } \}$ 

| É   | I a)   | Hygre<br>(corre                                    | meter<br>cted).                                    |   | W                                  | iprat.  | U <sub>1</sub>         | oper closs   | da.             |   | Lower  | · 101                      | nte.                                 | Run        |         | · ·                                  |  | -  |                            |
|---|--|--|--|---|------------------------------------|---|------------------------|--|-----------------|---|--|----------------------------|--------------------------------------|------------|---------|--------------------------------------|--|--|----------------------------|
| I to a feel of seconds district                       | Corrected harmonies  | Iry balls.   | West balls.  | Relative humidity                               | Direction.                         | Millsoll.   | Kind.                  | Amount in 19ths.   | Direction (mov- |   | Kind.  | Amount in 10ths.           | Direction case.                      | Commerced. | Emiled. | norther snow.                        | Sarface water.                                     | State of weather   | Obsettv. F.                |
| 1 a 10<br>2 a 0<br>a 2 80<br>4 a 0<br>5 a 0<br>6 a 50 | 29, 773<br>29, 787<br>29, 808<br>20, 824<br>29, 823<br>19, 835 | 42. 2<br>42. 0<br>42. 0<br>41. 9<br>42. 0<br>41. 8 | 39, 1<br>30, 0<br>36, 9<br>38, 9<br>38, 9          | P. ct<br>74<br>74<br>73<br>73<br>74<br>73<br>74 | NW.<br>NW.<br>NW.<br>NW.           | Brisk<br>Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh              | 0                      | Hidden.<br>Hidden.<br>Hidden.<br>1 0<br>Hidden.<br>Hidden. | 0               |   | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 10<br>10<br>10<br>10<br>10 | NW.r<br>NW.r<br>NW.r<br>NW.r<br>NW.r |            |         | 100<br>00<br>00<br>00<br>00<br>00    | 41. 2<br>46. 3<br>46. 4<br>46. 4<br>44. 5<br>44. 5 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy | 53.632.<br>20.622.         |
| 7 a m<br>8 a m<br>9 a m<br>10 a m<br>12 m             | 29, 823<br>29, 818<br>29, 811<br>29, 783<br>29, 783<br>19, 775 | 41.8<br>41.6<br>41.5<br>41.0<br>41.0<br>41.2       | 38, 8<br>38, 6<br>39, 8<br>39, 1<br>39, 6          | 74 × 55 55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5        | NW.<br>NW.<br>NW.<br>NW.           | Fresh.<br>Fresh.<br>Fresh.<br>Gentle<br>Gentle<br>Light         | 0<br>0<br>0<br>Cir. er | Hidden.<br>Hidden.<br>9<br>0<br>0                          | 0 0             |   | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus            | 10<br>10<br>8<br>7<br>9    | 0<br>0<br>0<br>0<br>0<br>W s         |            |         | ()()<br>()()<br>()()<br>()()<br>()() | 44. 2<br>41. 0<br>41. 8<br>40. 8<br>44. 0<br>63. 7 | Cloudy<br>Cloudy<br>Cloudy<br>Part<br>Cloudy<br>Cloudy   | D.<br>D.<br>A.<br>A.<br>A. |
| 1 p m<br>2 p m<br>3 p m<br>4 p m<br>5 p m             | 29,785<br>29,778<br>29,775<br>20,765<br>19,742<br>29,757       | 42 2<br>42.6<br>43.0<br>43.0<br>43.5<br>44.0       | 40, 0<br>40, 1<br>40, 1<br>40, 0<br>42, 0<br>41, 5 | 80<br>77<br>75<br>87<br>76                      | NW.<br>NW.<br>NNW.<br>NNW.<br>NNW. | tientle<br>tientle.<br>Light .<br>Light .<br>Light .<br>Light . | Cir. ci<br>Cir. ci     | Hidden.<br>    3<br>  5 ;<br>  3                           | 0 0 0 0         | 4 | Stratus<br>Stratus<br>Stratus<br>Cumulus<br>Stratus<br>Cu, et. | 6<br>6<br>2<br>1<br>3      | 0<br>0<br>0<br>0 }<br>0 }<br>0 S     |            |         | 00<br>00<br>00<br>00                 | 43, 8<br>43, 8<br>44, 7<br>44, 6<br>45, 0<br>45, 2 | Cloudy<br>Cloudy<br>Cloudy<br>Falt<br>Cloudy             | G.<br>G.<br>G.             |
| 7 p. to   | 20,757   |  | 42.8<br>41.8                                       | 24<br>24  | NW.                                | Light .<br>Gentle   | Cir. et                | 1 2<br>0   | 0               | 5 | Cu. st .<br>Stratus<br>Cu. st                                  | 5                          | NW.#                                 |            |         | (10)                                 | 45.3<br>45.8                                       | Tau<br>Tau   | L.<br>L.                   |
| 9 to 10<br>10 p. 10                                   | 29 736<br>29 737   |  | 40, 8  | 76<br>76  | NNE.                               | Fresh<br>Utesh  | 0                      | Ð  | 0               | - | Cumulus<br>Stratus<br>Cumulus<br>Stratus                       | 3                          | 0 7                                  |            |         |                                      | 45, 0<br>45, 0                                     | Pair   |                            |
| 11 p 10<br>12 p 10                                    | 29, 745  | 43, 0  | 40, 0  | 76<br>76  | NNE.                               | Presh<br>Gentle   | 0                      | 0  | 0               | - | Cumulus<br>Stratus<br>Cumulus<br>Stratus                       | 3 3 3                      | 0 7                                  |            |         |                                      |  | Fair   |                            |

#### SEPTEMBER 18, 1881.

. (Schooner in outer harbor, Unalaska, latitude 50–50/  $N_{\rm h}$  longitude 166–52/  $\kappa_{\rm h}$ 

| 1 a. 10<br>1 a. 10<br>5 a. 10            | 29, 765<br>19, 777<br>29, 789<br>29, 795<br>19, 810<br>29, 811 | 42.5<br>42.0<br>41.6<br>47.2     | 39, 3<br>19, 8<br>39, 8<br>38, 9                   | 77 82 51                                    | NNF.<br>NNE.<br>NNF.<br>NNW.<br>N. | Gentle<br>Gentle<br>Gentle<br>Gentle<br>Fresh<br>Viesh | 0                | 0<br>0<br>0<br>Hidder.<br>Hidden<br>Hidden.                 | U<br>U<br>U<br>0 | Stratus<br>Stratus<br>Stratus<br>Numbus<br>Nimbus<br>Stratus | 2<br>8<br>9<br>10<br>10<br>10    | 0<br>NNUs<br>0<br>0<br>0<br>Ns | 2.50<br>3.55 | 1 <u>0</u> , 15 | . 61<br>. 61<br>. 61<br>. 63 | 11. 2<br>44. 0<br>44. 0<br>14. 3 | Clear<br>Cloudy<br>Cloudy<br>Light rain<br>Light rain<br>Cloudy     | 1. 1                 |
|--|--|----------------------------------|--|---|------------------------------------|--|------------------|---|------------------|--|----------------------------------|--------------------------------|--------------|-----------------|------------------------------|----------------------------------|---|----------------------|
| 8 a 10<br>9 a a<br>5 a a                 | 29, 841<br>29, 842   | 39. 5<br>59. 5<br>59. 2<br>39. 5 | 37. 9<br>37. 9<br>58. 4<br>37. 8                   | 85 50 A                                     | 1111                               | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh              |                  | Hidden.<br>Hidden<br>Hidden<br>Hidden<br>Hidden.<br>Hidden. |                  | Simbus<br>Nimbus<br>Stratus<br>Stratus<br>Stratus            | 10<br>10<br>10<br>10<br>10<br>10 | 0<br>0<br>1 1 1 1 . s          |              | H 45            | . 04                         | 11.3<br>11.1<br>11.8<br>41.1     | Light min<br>Light min<br>Light min<br>Cloudy<br>Cloudy<br>Cloudy   | A.<br>G.<br>G.       |
| -1: 1:<br>1: 1:<br>1: 1: 1:<br>2: 1: 1:  | 29 860<br>24,870<br>29 800<br>19 881<br>29 885<br>7 7          | 11 2<br>10, 0<br>12 0<br>41 0    | 38.2<br>59.0<br>49.0<br>38.8                       | 74<br>91<br>73<br>83                        | //W.<br>//W.<br>//W.               | Fresh<br>Fresh<br>Fresh                                | Cirus<br>Cir. ci | Hidden.  Hidden.  Hidden.  1. 1                             | t)<br>()<br>()   | Strate .<br>Nimbus<br>Numbus<br>Cu. st                       | 9<br>10<br>5                     | 17 W x                         |              |                 |                              | 11.0<br>11.0<br>15.0<br>41.8     | Cloudy<br>Cloudy<br>Light rain<br>Light rain<br>Farr<br>Cloudy      | 1.<br>1.<br>1.<br>L. |
| 8 h ta<br>9 p ta.<br>10 p m.<br>11 p. ta |  | 42.5<br>41.8<br>40.4<br>40.5     | 40. 0<br>59. 5<br>39. c<br>58. 4<br>38. 5<br>38. 6 | 77 E 21 22 22 22 22 22 22 22 22 22 22 22 22 | N / W.<br>2 / W.<br>2 / W.         |  | 0                | Hidden<br>Hidden<br>Hidden<br>O †<br>Hulden<br>Hidden       | t)               | Stratus<br>Nimbus<br>Cu. st<br>Stratus                       | 10<br>10<br>9<br>10              | NW.8                           | 8, 10        | 7.55<br>9.95    | . 01                         | 44.6<br>41.5<br>44.2<br>41.0     | Light ran<br>Cloudy<br>Light rain<br>Cloudy<br>Cloudy<br>Light rain | M.<br>M.             |

 $^{\star}\operatorname{Short}$  squalls of rain and snow at intervals

#### · EXPEDITION TO POINT BARROW, ALASKA.

 ${\it Meteorological\ record\ of\ the\ voyage\ of\ the\ schooner\ Leo,\ de.-} {\it Continued}.$ 

SEP44.MBFR 19, 1883

| ć.   | 7   | Hygo   | ometa)<br>otad                                |                                    | 11  | mit,   | r,                                      | per closs  | 1                   |         | Lower  | i cies                                 | 141.4  | Earn or<br>snow       | 1                    |                                      |  |                                |
|--|---|--|---|------------------------------------|---|--|---|--|---------------------|---------|--|--|--|-----------------------|----------------------|--------------------------------------|--|--------------------------------|
| Time of wra.   | Currented Co.   |  | Westerne                                      |                                    | Direction   | Ker  | Kod.                                    | Amount in letter   | Purection in of     |         | Kind   | Amounting that                         | Theory to the state of the stat | Cornmenter.<br>Endet. | Amount of the        | Martin W. tol.                       |  | Observer.                      |
| 1 a. m<br>2 a. m.<br>3 a. m<br>4 a. m<br>5 a. m<br>6 a. m. | 29, 918<br>29, 92 -<br>29, 92 4<br>10, 92 1<br>29, 918<br>29, 919 | 29.5<br>29.3<br>29.9<br>29.4<br>40.2<br>40.0   | 08 0<br>38 0<br>1 6<br>38 9<br>38 9           | 94<br>91<br>90<br>98<br>98         | NW<br>NW<br>NW<br>NW<br>NW<br>NW  | Fresh .<br>Cresh<br>Presh<br>Fresh<br>Heak<br>Presh        |   | Hadden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden,<br>Hidden, |                     | 7773    | Simbus<br>Simbus<br>Simbus<br>Bratus   | 10<br>10<br>10<br>10<br>10<br>10       | NW.r<br>0<br>0<br>W.r<br>0   | 4. 70                 | . 01                 | 40.7<br>40.8<br>43.8                 | Estis on<br>Englishmen<br>Englishmen<br>Eighteam<br>Clouds<br>Clouds   | S.                             |
| 7 a m<br>8 a, m<br>9 a, m<br>10 a m,<br>11 a m             | 29, 919<br>99, 901<br>29, 904<br>29, 938<br>29, 935<br>29, 936    | 40 8<br>41 5<br>41 0<br>42 0<br>41 7<br>11 7   | 39 4<br>39 8<br>19 8<br>39 7<br>49 1<br>59 5  | 87 88 87<br>88 889                 | NW<br>NW<br>NW<br>NW<br>NW<br>NW  | Paisk<br>Brisk<br>High<br>High<br>High<br>High             | 0                                       | Hidden.<br>Hidden.<br>Hidden.<br>O<br>Hidden<br>0              | 0                   | NNCS    | Stratus<br>Vimbus<br>Cimbus<br>Tunutus<br>Stratus<br>Stratus                 | 10<br>10<br>10<br>10<br>9<br>10<br>9   | NW.r<br>NW.r<br>NW.r<br>NW.r<br>NW.r   | 7. 25   9 .89         | ( co<br>( ot<br>( ot | 11. 8<br>11. 7                       | Chal<br>Erltwa<br>Fightern<br>Uland,<br>Chad<br>Chad                   | A.<br>A.<br>G.<br>G.<br>G.     |
| 1 p s<br>2 p m.<br>2 p n<br>4 p m<br>7 s m                 | 29 97%<br>30 013<br>30 027<br>30 031<br>30 053<br>31 (43          | 10 0<br>41 0<br>44 0                           | 41 0<br>11 0<br>11 6<br>41 0<br>, L J         | 87<br>89<br>93<br>97<br>97         | N W<br>N W<br>N W<br>N W<br>N W<br>N W  | Brisk .<br>Cresh<br>Cresh<br>Eresh<br>Brisk                | 0<br>0<br>0                             | Hadden<br>o<br>o<br>o<br>o<br>o                                | 0 0 0               | 2222    | Stratus (<br>Stratus (<br>Stratus<br>Stratus<br>(unculus<br>(uncst<br>(um st | 10<br>9<br>9<br>8<br>0<br>4            | NW.r<br>NW.r<br>NW.r<br>NW.r<br>NW.r<br>NW.r   |                       |                      | 11.7<br>14.0<br>11.2<br>44.5         | Cloud<br>Cloudy<br>Cloudy<br>Cloudy<br>Charly<br>Cloudy                | G. L. L. L. L.                 |
| 10 m m.<br>11 p. m.  | 30, 0.39<br>30, 045<br>30, 046<br>30, 048<br>30, 043<br>30, 043   | 43, 0<br>44, 0<br>43, 0<br>43, 0               | 11 6<br>41 9                                  | 92<br>17<br>18<br>85<br>8          | 2.11<br>2.11<br>2.11<br>2.11<br>2.11<br>2.11  | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh                  |   | Hidden<br>Hidden,<br>Hidden<br>Hidden<br>Hidden<br>Hidden      |                     |         | 'am, st<br>'um, st<br>Numbus<br>Nimbus<br>Vimbus<br>Numbus                   | 10<br>10<br>10<br>10<br>10<br>10<br>10 | NW.8<br>NW.8<br>NW.8<br>NW.8<br>NW.8   | 9, 30                 | 00                   | 41, 0<br>41, 0<br>14, 0<br>41, 0     | Chords<br>Clouds<br>Cloud<br>Laghter of<br>Lighters<br>Lighters        | N. N.                          |
|  |   |  |   |                                    | 1   | nalaska t  |   | FPTEM  |                     |         |  | a. 16t                                 |  | 1                     |                      |                                      |  |                                |
| 1 a m<br>2 a, m.<br>3 a m.<br>4 a m<br>5 a m<br>6 a m      | 50, 047<br>30, 053<br>20, 053<br>50, 055<br>50, 051<br>50, 051    | 43.0<br>42.3<br>41.5<br>41.2<br>40.8<br>(1.5   | 41 3<br>41 0<br>40 3<br>40 2<br>31 8<br>1,9,6 | 5 5 5 5 7 7 5 1<br>5 5 5 5 7 7 5 1 | 2 W<br>W 2 W<br>2 W<br>2 W<br>2 W   | Fresh<br>Fight<br>Gentle<br>Gentle<br>Fres'.               |   | Hidden,<br>Hidden,<br>Hidden<br>Hidden<br>Hidden<br>Hidden     |                     | 11117   | Numbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Nimbus<br>Stratus<br>Nimbus          | 10<br>10<br>10<br>10<br>10             | 0<br>0<br>0<br>0<br>0  | 5, 30                 |                      | 43.9<br>43.8<br>43.7<br>43.7         | Laglatia<br>Light van<br>Laglatian<br>Laglatian<br>Clouds<br>Light van | S                              |
| 7 a m.<br>8 a. m<br>9 a m.<br>16 a. m.<br>11 a. m.         | 50, 036<br>30, 019<br>29, 997<br>1 29, 987<br>1 29, 5%<br>24 5%   | 40 C<br>40 C<br>10, 0<br>.0 5<br>40, 1<br>11 C | 9 1<br>19 7<br>39 5<br>39 8<br>70 3           | 92<br>94<br>87<br>91<br>95<br>89   | , II<br>, III<br>, III .<br>, III .   | Uresn<br>Brisk<br>Fresh<br>Presh<br>Presh<br>Uresh         |   | Hidden.<br>Hidden.<br>Hidden.<br>Hidden<br>Hidden<br>Hidden    |                     | 7 7.7.7 | Nombus<br>Nimbus<br>Stratus<br>Stratus<br>Stratus<br>stratus                 | 10<br>10<br>10<br>10<br>10             | 0<br>NW.r<br>NW.r<br>NW.s<br>NW.s  | 18.25                 | 01<br>00<br>00       | 43.7<br>43.6<br>43.8<br>43.0<br>41.1 | Light rad<br>Light rad<br>Cloudy                                       |                                |
| 1 p i<br>2 p. te<br>3 p in.<br>4 p m<br>5 p in<br>6 p in   | 29, 93 -<br>29, 971<br>29, 972<br>19, 96 -<br>19, 964<br>23, 958  | 1.47   | 39 8<br>40 3<br>40 0<br>10 3<br>12 7<br>12 7  | 89<br>83<br>75<br>75<br>84<br>84   | # \ fr .<br># \ fr .<br># \ fr \ fr .<br># \ fr .<br># \ fr .<br>\ fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr .<br>  fr . | Liesh<br>Lresh<br>Gentle<br>Gentle<br>Gentle               | Cir. cu<br>Cir. cu<br>0<br>0<br>Cir. cu |  | 0 0 0 0 0 0 0 0 0 0 | 2.00%   | stratus<br>Stratus<br>Tuno, st<br>Tuno, st<br>Stratus<br>Tunculus            | 6<br>8<br>7<br>9                       | NW.s   |                       | 1 610                | 1 48, 4<br>1 48, 8<br>40, 8          | Cloudy<br>Cloudy<br>Cloudy<br>Fan<br>Cloudy<br>Fan                     | G<br>L<br>1.                   |
| 7 p. m.<br>8 p. m.<br>9 p. m.<br>10 c. m.                  | 29, 978<br>29, 96<br>49, 963<br>29, 963<br>29, 956<br>729, 975    | 41.4   | 40.0<br>40.0<br>40.0<br>30.0<br>38.0          | 2 2 2048                           | WNW<br>NE<br>NE<br>NE<br>NE<br>NE   | Gentle<br>Gentle<br>Gentle<br>Gentle<br>Light .<br>Light . | Carst                                   | 0 0 0  | 0 0 0 0             |         | Tem. 8t<br>Tumulus<br>Tumulus<br>Stratus<br>Tumulus<br>Tumulus<br>Stratus    | 3 2 2 2 4 2                            | NW & 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | }                     | 001<br>000<br>1 000  | 44. 8<br>44. 8<br>41. 9<br>4.0. 0    | Pair<br>Clear  | 1.<br>- M<br>- M<br>- M<br>- M |

 $<sup>\</sup>langle 0\rangle$  , so all rain squalls between observations

Meteorological record of the voyage of the schooner Leo, &c.-Continued.

#### SEPTEMBER 21, 1882

 $\{ \textbf{We shing for time}, \quad \text{Halte a signifies slow}, \ i \ \text{signifies } rapid, \quad \text{for nebodic latefulle} \ \text{as} \ \phi \in \mathbb{N} \ \text{-biogroups the all } W \} = \{ \textbf{w} \in \mathbb{R}^{n} \mid \text{with times} \ \text{one for the all } W \} = \{ \textbf{w} \in \mathbb{R}^{n} \mid \text{with times} \ \text{one for the all } W \} = \{ \textbf{w} \in \mathbb{R}^{n} \mid \text{with times} \ \text{one for the all } W \} = \{ \textbf{w} \in \mathbb{R}^{n} \mid \text{with times} \ \text{one for the all } W \} = \{ \textbf{w} \in \mathbb{R}^{n} \mid \text{with times} \ \text{w$ 

| ċ.   | ž.  | Hygro                              |  | 5   | 11.                              | ind.   | Γį                | quer clou  | de                         | Lewe  | ) i lin                         | usi «                              | Ram         |      | 1   |                              |  |  |
|--|---|------------------------------------|--|---|----------------------------------|--|-------------------|--|----------------------------|---|---------------------------------|------------------------------------|-------------|------|---|------------------------------|--|--|
|  | Completed Company   | Dry bulle.                         | Wet belo.  | Relative humalit                          | Direction.                       | Kint   | Kiml.             | Anount in loth-  | Idention (mo-              | Kind  | Valoratin is the                | Direction mor                      | Comment of. | Eggs | Amount of tark                            | Sather water                 |  | Observ to                              |
| 1. 00<br>2.2.00<br>4.20<br>4.3.00<br>5.50<br>5.00      | 23, 936<br>30, 005<br>30, 010<br>30, 013<br>20, 931<br>2, 931 | 37. 3<br>96. 0<br>37. 1<br>37. 5   | 36, 4<br>35, 9<br>34, 9<br>36, 6<br>36, 1<br>38, 1 | P. of<br>87<br>87<br>89<br>89<br>89<br>85 | E. (.,                           | din<br>de<br>maria (                                       | Cirris<br>Cir. st | . 5 1<br>. 11 1<br>Light. 7                              | ()<br>()<br>()<br>()<br>() | Stratus<br>0<br>0<br>0<br>0                                     | 200000                          | ()<br>()<br>()<br>()<br>()<br>()   |             |      | Lee h<br>00<br>00<br>00<br>00<br>04<br>00 | 11 2<br>11 3<br>11 3<br>11 4 | Char<br>Char<br>Clear<br>Trail<br>Clear<br>Chea    | 1.7 5 5 A                              |
| 7. 00<br>2. 00<br>5. 10<br>10.0 (2<br>11.6 (9)         | 9,550<br>9,944<br>29,920<br>9,870<br>(3,871<br>9,873          | 42.8<br>42.8<br>45.0<br>45.0       | 12.4   | 71<br>73<br>73<br>76<br>76<br>77          | SE.<br>SE.<br>SE.<br>SE.<br>SSE. | Light Gentle, Gentle Fresh Fresh                           | , Л:              | Hidden<br>Hidden<br>ze Lig<br>Hidden<br>Hidden<br>Hidden |                            | Have, De<br>Have De<br>Stratue<br>Stratus<br>Stratus<br>Nindous |                                 | 0<br>0<br>0<br>5E.8<br>SSE 8       | 11, 40      |      | 600<br>660<br>600<br>610                  | 12 7<br>12 7<br>12 8<br>12 8 | Haz<br>Haz<br>Cloudy<br>Cloudy<br>Clouds<br>Lt Lan | \.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\. |
| I p cr<br>" p m<br>I p m<br>I p m<br>I p m<br>C p B    | 10.859<br>10.857<br>19.875<br>19.876                          | . 50, 0                            |  | 85<br>96<br>99<br>96<br>87                | S.<br>SE.<br>SE.<br>SE.<br>SE.   | Gentle,<br>Gentle<br>Gentle,<br>Gentle,<br>Eresh<br>Gentle |                   |  | SE v                       | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus  | 10<br>10<br>10<br>10<br>6<br>-1 | SSE s<br>SE s<br>O<br>SE s<br>SE s |             |      | 00<br>00<br>00<br>00<br>01                | 45.1<br>41.0<br>41.0<br>41.5 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy     | G<br>G<br>L.<br>1.<br>1.               |
| 1 0<br>2 p 12<br>5 p 22<br>10 p 20<br>2 p 16<br>1 p 10 |   | 54. 0 3<br>53. 4<br>53. 4<br>51. 8 | 51 3<br>51 0<br>50 3<br>50, 0<br>19 3<br>20 1      | 87<br>80<br>77<br>84<br>84                | SE.<br>SE.<br>SE.<br>SE.<br>SE.  | Gentle<br>Fresh<br>Gentlo.<br>Light<br>Light               | ! Cir. at         | 9  | 0<br>W 8<br>0              | Cu st<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus    | 4<br>4<br>1<br>9<br>9           | SEs<br>SEs<br>SEs<br>0             |             |      | (0)                                       | 1.0                          | La<br>Fair<br>Fair<br>Clouds<br>Clouds<br>Cloud    | M.M.                                   |

#### OFFICMBLE ... i.e.

Earthean Salangitude on S.W.,

| La to<br>Za to<br>Se to<br>Ala to<br>Control | 9 889 44 2<br>9 889 45 2<br>9 882 18 6<br>9 863 147 9<br>9 803 147 9                 | 46.2 8<br>46.8 3<br>4.8 3<br>46.1 5      | 65. Cab<br>01 Cab<br>06 ENE.<br>58 ENE.    | m.<br>Light'<br>Light                     | Hidder,<br>Hidder,<br>Hidder,<br>Hidder,<br>Huder,<br>Hidder, | Str. t<br>Strat<br>Strat<br>Str. t<br>Str. t<br>Strat  | 03 10<br>05 10<br>65 10                                       | 0<br>0<br>0<br>0    |              | 610<br>610<br>610<br>610 | 10.<br>45<br>46.7<br>46.7    | Clouds<br>Charle<br>Charle<br>Charle<br>Claud<br>Claud | 3. 5. 5. D.D.          |  |
|--|--|--|--|---|---|--|---|---------------------|--------------|--------------------------|------------------------------|--|------------------------|--|
| 9. h   | 10,719 41.0<br>1,0737 41.0<br>10,692 50.2<br>19,45 50.0<br>10,578 50.0<br>23,541 5厘c | 46.8 7<br>46.8 7<br>46.8 7               | 86 ENE. 1<br>77 ENE.<br>77 ESE. 1          | Light                                     | Hidden<br>Hidden<br>Hidden<br>Hidden<br>Hidden<br>Lidden      |  | n 10<br>us 10<br>'S 10<br>us 10                               | SWA                 |              | f ()<br>f ()             | 15 1<br>15 1<br>16 1         | Cond<br>Cond<br>Chart                                  | D,<br>D<br>\<br>\<br>\ |  |
| 1 p. 10<br>3 p. 10<br>4 p. 20<br>p. 10       | 29 478<br>79 445<br>99 445<br>71 54, 0<br>71 584<br>71 684<br>71 684<br>71 751, 0    | 49, 8 3<br>42, 0 4<br>19, 2 5<br>19, 8 3 | -3 SE.<br>-6 SE.<br>-5 SE.<br>-6 SE.       | Brisk<br>Fresh<br>Fresh<br>Fresh<br>Fresh | Hidder.<br>Hidden,<br>Hidder.<br>Hidder.<br>Hidder.           | Number Nu | им 36<br>им 10<br>им 10<br>им 10                              | SW.r<br>SW.r        | CTITE 4.95   | .61                      | 45 ± 15 ± 15 ± 16 ± 1        | Ir or or III or or Chapter                             | (),<br>()<br>()<br>()  |  |
| 5 j. m<br>9 j. m<br>10 j. n<br>11 j. m       | 10.417 48.0<br>29.449 46.7<br>29.472 45.0<br>19.197 44.0<br>10.521 14.0              | 16 3 3<br>4 5 5 5<br>4 5 8 5<br>4 1 8 7  | 87   NW<br>80   WNW<br>90   NW<br>52   WNW | Fresh<br>Fresh<br>Brisk                   | Hidder,<br>Hidder,<br>Hidden,<br>Hidden,<br>Hidder,           | Nimi<br>Nimi<br>Strat<br>Strat   | 18 11<br>965 - 10<br>969   10<br>984   10<br>484   10<br>fr 9 | 0<br>0<br>0<br>VW 4 | 7.10<br>9.30 | . 01                     | 46 a<br>45 b<br>45 a<br>45 a | 11:1   | - M                    |  |

Complete lunar halo at tach - Na n - Cach - Na so

H. Ex. 44----15

#### Meteorological record of the voyage of the schooner Leo, dv.—Continued.

#### SEPTEMBER 23, 180.

 $\{W_{i}, V_{i}\}, \text{ for time.} \quad \text{Unifor significal strong $r$ significal } rapid. \quad \text{Pinalaska, latitude 53} \quad \text{US}(X_{i}, \text{longitude 155}) \\ \text{up}(W_{i}) = \{W_{i}, W_{i}\}, \text{ for time.} \quad \text{Uniform } \text{U$ 

| ę  | 4   | Hy is                        |                                 |                           | 11.   | ind  | F      | pper closs                                    | ils.                        | Lowe   | relo                           | uds.                               | acin o     | 0.10           |                                      |  |          |
|--|---|------------------------------|---------------------------------|---------------------------|---|--|--------|---|-----------------------------|--|--------------------------------|------------------------------------|------------|----------------|--------------------------------------|--|----------|
| This of the erviction  | Corrected latered                                       | The bulk                     | Wet bulb                        | Believe lemela.           | Direction.  | Kind.  | Kind.  | Amount in Jotis-                              | Direction (mov-<br>ing from | Kind.  | Amount in Inths.               | Direction (mov-<br>ing from-)      | Commenced. | Amount of form | Surface water.                       | s n of worther                               | Observer |
| 1 a. m.<br>2 a. m<br>3 a. m.<br>4 a. m.<br>5 a. m<br>6 c. to | 29,545<br>29,575<br>29,574                              | 111 1                        | 10.0                            | 70                        | 1,11,   | Presh<br>Brisk<br>High<br>Brisk<br>High<br>Brisk     | 0 0 0  | 1 0<br>Hidden.<br>! 0 :<br>! 0                | ()<br>()<br>()<br>()<br>()  | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus | 10<br>6<br>8                   | W N W. ()<br>0<br>0<br>0<br>0<br>0 |            | 60<br>00<br>00 | 11.8<br>11.8<br>11.7<br>41.5<br>11.7 | Faur.  | 877755   |
| 5 a. m<br>8 a. m<br>9 b. m<br>10 a. m<br>11 a. m<br>22 a     | 1, 55,<br>90, 55,<br>10, 50<br>0, 50<br>1, 50<br>2, 10, | 42                           | 11.0                            | 50<br>50<br>50<br>80      | /11   | Presidents<br>Bush<br>Bush<br>Dush<br>Presh          | U<br>U | 0<br>Uidden<br>Hidden<br>Hidden<br>Hidden     | i)<br>Ø                     | Strates<br>Stratus<br>Numbus<br>Numbus<br>Stratus<br>Stratus   | 5<br>9<br>10<br>10<br>10<br>10 | 0<br>0<br>0<br>0<br>N.W.s<br>N.W.s | 8.30       | 25             | 44.5<br>44.5<br>44.5                 | Chart<br>Linte in<br>Light in<br>Char        | 1.       |
| 1 p to 2 p to 3 p to 4 p o 1 c to p o 10                     | 10.6%<br>10.6%<br>10.6%<br>10.69                        | 1 0                          | 11 1                            | - 6<br>54<br>- 57<br>- 51 | 11.711.   | Fresh<br>Vitsle<br>Fresh<br>Gresh<br>Bitsle<br>Fresh |        | Hadde<br>Hidden<br>Hadden<br>Hidden<br>Hidden |                             | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Numbus<br>Numbus   | 10<br>10<br>10<br>10<br>10     | NW.r<br>NW.r<br>NW.r               |            | !!!            | 11.1                                 | Cloud<br>Cloud<br>Light                      |          |
| 7 page<br>8 page<br>9 page<br>10 page<br>11 page<br>12 page  | 2 1 6 7<br>29 <b>6</b> 8<br>29, 624<br>29, 626          | 42.0<br>42.0<br>45.7<br>46.7 | \$2.0<br>\$2.0<br>\$0.0<br>50.0 | 100                       | $\begin{array}{c} u \times w \\ u \times w \\ w \times w \\ w \times w \\ w \times w \end{array}$ | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh   | 0 0    | Hidden.<br>Hidden:<br>0<br>Hidden:<br>0<br>0  | 0                           | Stratus<br>Nimbas<br>Cu, st<br>Nimbus<br>Nimbus<br>Cu, st      | 10<br>8                        | W.r<br>W.s<br>W.W.                 | 0,40 ;     |                | 11.0<br>11.6<br>11.6                 | Light ca<br>Clouds<br>Light con<br>Light con | M        |

#### SEPTEMBER 24, 1883

I affinale for the Na lengthale  $R_{\rm b} = \mathcal{Q}/W_{\rm b}$ 

| 2 a. m<br>3 n. m<br>4 a. m<br>5 a. ra  | 2 ± 6 14<br>29, 6 (9)<br>29, 6 (0)<br>29, 6 (0)<br>29, 6 (0)<br>19, 6 (1) | 10 0<br>17, 1<br>13, 2<br>13, 6   | 38 .<br>38 .<br>17. 1<br>17. 1    | 85<br>95<br>96                     | $H_* \neq H_*$                  | From<br>to atle<br>lm<br>Light<br>Light<br>Gentle      |          | 0<br>0<br>Hidden.<br>0<br>0                                    | 0 0 0 |           | 9<br>10<br>6<br>4 | W.N.W.&<br>0<br>0      |                                   | 00 .<br>00 .<br>00   | 14.5<br>44.3<br>16.2<br>16.2     | Cloudy<br>Cloudy<br>Fair<br>Fair             | ٠.                           |
|--|---|-----------------------------------|-----------------------------------|------------------------------------|---------------------------------|--|----------|--|-------|-----------|-------------------|------------------------|-----------------------------------|----------------------|----------------------------------|--|------------------------------|
| 8 n. n<br>9 a. m<br>10 a. m<br>11 a. m | 29 598  | 100, 0<br>1 S S<br>100 C<br>100 C | 95, 9<br>163, 4<br>16, 4<br>16, 9 | 91<br>82<br>76                     | 11 SW.                          | Gentle<br>Gentle<br>Gentle<br>Gentle<br>din.<br>Gentle | ()<br>() | Hidden,<br>Hidden,<br>0<br>0<br>Hidden<br>jus 3                | 0     |           | 10                | W5W.8<br>W.s<br>W.s    | it. 25   11   50                  | ( E)<br>( E)<br>( E) | 14. 3<br>44. 2<br>44. 0<br>15. 5 | Clouds<br>Clouds<br>Clouds<br>Clouds         | 1),<br>1),<br>1,<br>1,<br>1, |
| 2 june<br>5 june<br>4 june<br>5 june   | 34.55   | 29 S<br>30, 7<br>10,<br>44, 6     | 38 d<br>38 T<br>39.4<br>30.8      | 84<br>91<br>93<br>91               | W<br>NNW,<br>NNW,<br>NW,<br>NW, | Fresh  |          | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. |       |           | 10                | W.s                    | 12, 20<br>2, 40<br>3, 40<br>5, 20 | (0)                  | 43.5<br>43.5<br>43.5<br>43.5     | Lighter of<br>Cloudy<br>Lighter of<br>Cloudy | ti.                          |
| 8 p. m                                 | 29.465  | 49. 0<br>19. 8<br>40. 0<br>40. 5  | 10 0<br>38, 8<br>39, 0<br>39, 0   | 100<br>100<br>91<br>91<br>86<br>86 | NW.<br>NW.<br>NW.<br>NW.        | Fresh<br>Brisk<br>Brisk<br>Brisk<br>Brisk              | Ó        | Hidden.<br>Hidden.<br>  0<br>  Hidden.<br>  0                  | 0     | Stratus . | 10<br>10<br>10    | NW.r<br>0<br>0<br>NW.s | 7. 10                             | 00<br>00<br>00       | 41.0<br>11.0<br>44.0<br>41.0     | Clouds<br>Clouds<br>Clouds                   | И.<br>М.<br>М.               |

Occasional light rain between observations.

## Meteorological record of the royage of the schooner Leo, $\Delta v.{\leftarrow}$ Continued.

SEPTEMBER 25, 1883.

 $\{ \text{Washing ton time.} \ | \text{Italic } s \text{ signifies } \textit{alow} : r \text{ signifies } \textit{rapid.} \ | \text{Latitude 522 N., longitude 165-467 W.} \}$ 

| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | E .  | 4  | Hygre<br>(corre                  | meter<br>cted).                           |                            | W                             | ind.                          | Uppe              | telor             | uls.          | Lowe                                       | r chi                                   | uls.                    |       | 10 OF | Ē                          |                                  |                           | ,   |
|--|--|--|----------------------------------|---|----------------------------|-------------------------------|-------------------------------|-------------------|-------------------|---------------|--|---|-------------------------|-------|-------|----------------------------|----------------------------------|---------------------------|---|
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | Fine of else reation                         | Corrected harometer.                     | bulb.                            | bulb.                                     | Lelative humality.         | Direction                     | Kind.                         |                   | Amount in teri-   | Direction and | An interface                               | Amount in Tolli-                        | Direction ones,         |       |       | 3.5                        | Surface war a.                   | State of weath:           | 1) Laurententententententententententententente |
| a m. [29.521   42.2   39.8   81 NW.   Fresh.   0   0   0   Cumulus   0   0   0   47.0   Clearly   a m. [29.524   42.2   39.8   81 NW.   Fresh.   0   0   0   Cumulus   8   0   0   0   47.0   Clearly   a m. [29.525   42.5   39.8   50 NW.   Fresh.   0   0   0   Cum st   8   0   0   0   47.0   Cloudy   p. m. [29.525   43.0   40.5   79 NW.   Fresh.   0   0   0   Cum st   8   0   0   47.0   Cloudy   p. m. [29.525   43.0   40.5   79 NW.   Fresh.   0   0   Cum st   7   0   0   0   p. m. [29.527   43.0   40.5   79 NW.   Gentle Cumulus   1   0   Strains   7   0   0   0   47.0   Cloudy   p. m. [29.527   43.0   40.6   50 NW.   Fresh.   Cumulus   2   0   Strains   7   0   0   0   47.0   Cloudy   p. m. [29.527   43.0   40.6   50 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.527   43.5   41.8   87 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.528   44.2   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.527   43.5   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.528   44.2   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.528   44.0   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.535   44.2   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.535   44.0   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.535   44.0   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.535   44.0   41.8   84 NW.   Fresh.   0   0   0   Cumulus   p. m. [29.535   44.0   41.8   44.8   p. m. [29.535   44.0   44.8   p. m. [29.535   44.0   44.0   44.0   p. m. [29.535   44.0   44.0   p. m. [29.535   44.0   44.0   p. m. [29 | a.m.)<br>(a.m.)<br>(a.m.)                    | 29, 514<br>29, 521<br>29, 523<br>29, 523 | 40. 8<br>40. 9<br>41. 0<br>41. 3 | 39. 7<br>40. 0<br>39. 7<br>39. 8<br>40. 1 | 93<br>90<br>90<br>90<br>90 | NW.                           | Brish<br>Fresh<br>Fresh       | 0<br>0<br>0       | ()<br>()<br>()    | 0<br>0<br>0   | Stratus .<br>Stratus .<br>Stratus .        | 5<br>4<br>3                             | 0<br>0<br>0             |       |       | 00<br>00<br>00<br>00<br>00 | 43, 5<br>44, 2<br>45, 0<br>46, 0 | Fair<br>Clear<br>Clear    | 1 2 2 1   |
| 1.5   29.534   43.8   43.5   73   NW.   Gentle Cumulus   2   0   Strains   7   0   00   47.0   Cloudy   0  | Carl Dis<br>Carl Dis<br>Carl Dis<br>Carl Dis | 29, 526<br>29, 524<br>29, 524<br>39, 536 | 42.0<br>42.2<br>42.3<br>42.3     | 41. 0<br>39. 8<br>39. 8<br>59. 8          | 81<br>81<br>80             | Z.B                           | Fresh.,<br>Fresh.,<br>Fresh., | 0 0               | 0 .<br>0 .<br>0 . | 0             | Stratus<br>Cumulus<br>Cum. st .<br>Cum. st | 1 | 0<br>0                  |       |       | 00<br>00<br>00             | 46. 2<br>46. 8<br>47. 0<br>47. 0 | Clear<br>Cloudy<br>Cloudy |   |
| p. 60. 29.556   45.0   42.0   75   NW.   Gentle.   0   0   0   Canadas   7   NW.s.   604   47.0   Fair.   p. 60. 29.556   41.0   41.0   75   NW.s.   Gentle.   0   0   Canadas   7   NW.s.   606   47.0   Cloudy.   p. 60. 29.556   44.0   40.5   72   WNW.   Gentle.   0   0   0   Canadas   4   NW.s.   60   47.0   Cloudy.   p. 60. 29.556   44.2   40.2   68   NW.   Gentle.   0   0   0   Canadas   4   NW.s.   0   0   0   47.0   Cloudy.  | p. to<br>p. to<br>p. to<br>p. to             | 29, 534<br>29, 544<br>29, 557<br>29, 550 | 43.8<br>43.0<br>43.0<br>43.5     | 41.3<br>39.8<br>40.6<br>41.8              | 79<br>71<br>80<br>87       | NW.<br>NW.<br>NW.             | Fresh.,<br>Fresh.,            | Camulas<br>Cirrus | 0 0               | 0<br>0<br>0   | Strains .<br>Camalus<br>Camalus<br>Camalus | -1-1-1                                  | 0<br>0<br>0<br>NW.8     | 4, 15 | 4.10  | 00                         | 47. 0<br>47. 0<br>47. 2<br>45. 0 | Cloudy<br>Fair<br>Fair    |   |
| p. m. (29.554) 44.2 40.2 68 NW. Gentle. 0 0 0 St. alus. 4 NW s   | p. 10.<br>p. 10.                             | 29, 52 <b>6</b><br>19, 53 <b>6</b>       | 45.0<br>44.0                     | 42.0<br>41.0                              | 76<br>74                   | $H_{Z,H,\gamma}^{Z,H,\gamma}$ | Gentle.                       | 0                 | 0                 | 0             | Cumulas<br>Cum st.<br>vStratus             | - F<br>- 4                              | N.W.s<br>N.W.s<br>N.W.s | ,     |       | 00                         | 47.0                             | Choudy                    |   |
|  |  |  |                                  |   |                            |                               |                               |                   |                   |               | vSL atus :<br>/Consulas                    | 4                                       | H                       |       |       |                            |                                  |                           |   |

|   | 83 : NW. Gentle.<br>84 NW. Gentle.<br>80 NW. Gentle.<br>80 NW. Gentle.                        | 0 0 0<br>0 0 0<br>0 0 0<br>0 Hidden.<br>0 0 0         | Stratus 6<br>Stratus 4<br>Stratus 19<br>Stratus 9    | 0                   | 60 47, 0 Clear S.<br>60 46, 9 Fair S.<br>60 47, 0 Fair S.<br>60 47, 0 Gloudy S.<br>60 48, 0 Fair D.  |
|---|---|---|--|---------------------|--|
| 7 p. m. 29, 587<br>8 p. m. 29, 578<br>9 a. m. 29, 578<br>10 a. m. 29, 586<br>11 a. m. 29, 582<br>12 m. 29, 570<br>12 a. m. 29, 570<br>13 a. m. 29, 570<br>143, 5 a. 41, 0<br>43, 6 40, 8<br>43, 6 40, 8 | 87 NW. Gentle.<br>87 NW. Gentle.<br>80 NW. Gentle.<br>56 WNW. Gentle.<br>78 W. Gentle.        | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                 | Stratus 1<br>Cumulus 3<br>Cum st 5<br>Cumulus 8      | 0                   | 00         47, 7         Urit.         D.           00         48, 2         Clear         D.           00         48, 2         Clear         A.           00         47, 5         Eair         A.           00         47, 4         Cloudy         A.           00         47, 0         Fair         A. |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 71 S. Light<br>74 S. Gentle<br>73 SE. Fresh.<br>70 SE. Gentle.                                | Cirus 3 0 0 Cirus 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Stratus 5 Cumulus 2 Camulus 3 Cum.st 5               | SE.8                | 00 47.1 Cloudy. G.<br>00 47.3 Fair G.  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 70 SE. Fresh<br>74 SE. Fresh<br>71 S. Light<br>74 ESE. Light<br>73 E. Light<br>84 ENE. Gentle | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                 | Cum, st. 7<br>Cum, st. 9<br>Cum, st. 9<br>Cum, st. 9 | SE.8<br>0<br>0<br>0 | 00 (8.0 Fair. L <sub>b</sub><br>00 (48.0 Fair. L <sub>c</sub><br>00 47.8 Cloudy M.<br>00 47.8 Cloudy M.<br>00 47.4 Cloudy M.<br>00 47.2 Cloudy M.  |

## Meteorological record of the royage of the schooner Leo, &c.—Continued.

#### SEPTEMBER 27, 1883.

 $\{ \mathbf{W}_{a} \text{st ington time}, \quad \text{Italic } s \text{ signifies } s \text{ low} : r \text{ signifies } rapid = \text{Latitude } \texttt{7e-10}^r | \mathbf{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{7e-10}^r | \mathbf{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{7e-10}^r | \mathbf{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{N}_{a} \text{ longitude } \texttt{157} - \texttt{55}^r | \mathbf{W} | \text{Latitude } \texttt{N}_{a} \text{ longitude } \texttt{N}_{a} \text{ lo$ 

| ion.   | tet.                                     | Hygrometer<br>(corrected).  | så.                  | Wind.  | t°p                     | per clou        | als.                            | Lowe   | r ele                 | uds.                           | Rain<br>snov |        | n er                        |                                  | _  |          |
|--|--|---|----------------------|--|-------------------------|-----------------|---------------------------------|--|-----------------------|--------------------------------|--------------|--------|-----------------------------|----------------------------------|--|----------|
| f<br>Time of observation.                                      | Corrected baremeter                      | Dry bulb.<br>Wet bulb   | Relative humidat     | Pusction.<br>Kind.   | Kind.                   | Amount in foths | Direction (mov-                 | Kind.  | Amount in 10te-       | Direction (moving from-)       | Commenced.   | Ended. | Amount of 1810 melted snow. | Surface water.                   | State of w. et. ::                                   | total of |
| 1 a. m.<br>2 a. m.<br>3 a. m.<br>4 a. m.<br>5 a. m.<br>6 a. m  | 29, 598<br>29, 520<br>29, 528<br>29, 573 | $\begin{array}{cccc} 15,0 & 43,0 \\ 45,2 & 13,0 \\ 45,2 & 43,0 \\ 45,2 & 43,0 \\ 44,8 & 42,8 \\ 41,8 & 42,8 \\ 41,8 & 42,8 \end{array}$ | 82<br>82<br>84       | LNE Presh.<br>ENE Presh.<br>ENE Fresh<br>ENE Light.<br>ENE Gentle                    | . 0                     | Hidden.         | 0<br>0<br>0<br>0                | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus                               | 10 5 4 9 3 9 2        | ()                             |              |        | 00 ;<br>00 ;<br>00 ;        | 47. 4<br>47. 2<br>47. 0<br>47. 4 | Clear<br>Far<br>Far<br>Clear<br>Clear<br>Clear       | 18.2     |
| 7 a. m.<br>8 a. m.<br>9 a. m.;<br>10 a n.<br>11 a. m.<br>12 m. | 29, 569<br>29, 593<br>29, 613            | 41.8 42.8<br>14.6 42.7<br>15.0 42.8<br>14.7 42.2<br>14.8 41.8<br>41.0 41.3  | 85<br>82<br>80<br>77 | ENE. Gentle<br>FNE: Gentle<br>NE. Gentle<br>NNF. Gentle<br>NNW. Fresh.<br>NNW. Fresh | . ()                    | 0 1 0 1 0 1 0 1 | 0<br>0<br>0<br>0<br>0           | Stratus<br>Cu. str<br>Cu. str<br>Cumalus<br>Ca. str  | 9 5 8 1               | 0<br>0<br>0<br>0<br>0<br>NNW.s |              |        | 00<br>00<br>00<br>00        | 47. 5<br>47. 8<br>47. 8<br>47. 7 | Clear<br>Clean<br>Cloudy<br>Fair<br>Cloudy<br>Cloudy | D.       |
| 1 p. m.<br>2 p. m.<br>3 p. m.<br>4 p. m.<br>5 p. m.<br>6 p. m  | 29 678<br>29 679<br>29 682<br>20 686     | 41. 1 11. 7<br>14. 5 41. 6<br>45. 0 41. 8<br>46. 0 43. 1<br>45. 0 43. 1<br>45. 0 43. 1  | 77<br>73<br>17<br>88 | NNW Fresh<br>NNW Fresh<br>NNW Fresh<br>NNW Fresh<br>NNW Fresh<br>NNW Fresh           | Cir. eu<br>Cir. eu<br>0 | 3               | 0<br>0<br>0<br>0<br>0<br>0<br>0 | «Commins »<br>«Stratus »<br>Stratus «<br>Cu. str<br>Cu. str<br>Cu. str<br>Cu. str<br>Cu. str | 3393474               | NNW.s<br>NNW.s<br>NW.s         | ·····        |        | (H)<br>(H)<br>(H) (H)       | 48.0<br>48.0<br>48.0<br>48.0     | Clonny<br>Cloudy<br>Fair<br>Cloudy<br>Fair<br>Cloud  | G,       |
| 7 p. m.<br>8 p. m.   |  | 16, 5   11 s<br>40, 0   41 0  |                      | NNW. Fresh.  |                         | 0               | 0                               | Cu, str<br>sCumulus<br>zCu, str  | 9 2 3                 | NW.8<br>NW.8                   | ·····        |        |                             |                                  | Check<br>Fall  | 1<br>1   |
| 9 p. m.<br>10 p. n.<br>11 p. m.<br>12 p. m.                    | 29, 721<br>29, 725                       | 46, 0 44, 0<br>46, 2 42, 2<br>46, 2 44, 2<br>45, 5 31, 5  | 62<br>69<br>62<br>69 | NW Brisk .<br>NW Brisk .<br>NW Brisk .<br>NW Brisk .                                 | , ()<br>()              | 0 0 0           | 0                               | Cumulus<br>Stratus<br>Cu. str<br>Cumplus<br>Stratus<br>Stratus                               | 3<br>9<br>3<br>4<br>6 | NW.8<br>NW.8                   | ;            |        | 90 (9)                      | 45.7<br>13.0                     | Lin<br>Cloudy<br>Paor<br>Fac                         | M<br>M   |

#### SEPTEMBER 28 1880.

Latitude 48 | 26° N., longitude 154 | 4 | W.,

|   |  |                                      |   |  |   |   |                                       |  |  | -              |
|---|--|--------------------------------------|---|--|---|---|---------------------------------------|--|--|----------------|
| 1 A. 66 29, 759<br>2 a. 66 29, 767<br>3 a. 66 29, 782<br>4 a. 66, 29, 782<br>5 a. 66 29, 792<br>6 a. 66 29, 155     | 45 2 42 5<br>45 0 12 5<br>14.7 15 4<br>44.6 12 5         | 78 NW.<br>79 NW.<br>81 NW.<br>81 NW. | Brisk<br>Brisk<br>Brisk 0<br>Brisk 0                                | . 0 0<br>Hidden,<br>Hidden<br>0 1 0<br>0 0 0               |   |   |                                       | 00   48, 8<br>00   48, 8<br>00   48, 8<br>00   49, 0 | Cloudy<br>Cloudy<br>Fair<br>Cloudy                           | 12772          |
| 7 (a. 6), 29 708<br>8 (a. 6), 29 802<br>9 (a. 6), 29 812<br>10 (a. 6), 12 812<br>11 (a. 6), 12 812<br>1 (c), 29 802 | 43.1 10.0<br>15.0 12.0<br>45.0 1.8<br>45.5 42.5          | 67 XW.<br>8 WXW<br>8 WXW             | Brisk 0<br>Fresh . 0<br>Fresh . 0<br>tiertle Cumul                  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                      | Stratus :<br>(Cu. str<br>Cu. str<br>Cu. str                 | 10 0<br>8 0<br>7 0<br>3 0<br>5 0<br>2 0 |                                       | 00 : 49, 9<br>00 : 48, 8<br>00 : 48, 9<br>00 : 19, 3 | Clor dy<br>Cloudy :<br>Fair :<br>Clear :<br>Cloudy :<br>Fair | A.<br>1.       |
| \$ p. 8a   20 810<br>2 m, m   29 840<br>5 p. m,   29 846<br>4 p. m,   29 865<br>5 p. m,   29 764<br>6 p. m,   29 74 | 47.0 H 5<br>19.2 H 5<br>50.8 47.8<br>15.5 H 8            | 8)                                   | l tesh Cir. en<br>Presh Cir. en<br>Presh Cir. en<br>Uresh<br>L tesh | 2 0<br>0 0<br>1 4 0<br>Hidden.                             | Consulus<br>Consulus<br>Cansulus<br>Stratus                 | 4 WSW.5<br>2 WSW.5<br>3 W.8<br>10 0     | · · · · · · · · · · · · · · · · · · · | 00 49, 6<br>00 50, 1<br>00 50, 2<br>00 51, 0         | Fair<br>Fair<br>Fair<br>Clouds                               | i.<br>i.<br>i. |
| 7 p. m. 29 674<br>8 p. m. 29 666<br>9 p. m. 29 774<br>10 p. m. 29 728<br>11 p. m. 29 725<br>12 p. m. 19 719         | 19. 5 47. 5<br>49. 6 47. 6<br>48. 8 47. 3<br>48. 6 47. 6 | 81 W<br>83 SW<br>89 SSW              | Fresh.<br>Fresh.<br>Fresk   | Faden.<br>Hader<br>Hidden<br>Hidden,<br>Hidden,<br>Hidden, | Stratus<br>Stratus<br>Stratus<br>Numbus<br>Numbus<br>Numbus | 10 SW s<br>10 0<br>10 0                 | 9.45                                  | 00   51, 0<br>00   50, 5<br>  50, 5<br>  50, 3       | Cloudy<br>Cloudy<br>Light rain<br>Light rain                 | M<br>M<br>M.   |

Meteorological record of the royage of the schooner Leo, &c. —Continued.

SEPTLMBER 29, 1883.

[Washington time. Traffe x signifies slow : x signifies rapid. Latitude 47° 36′ N., longitude 150 · 55′ W (

|  | Hygrometer<br>(corrected).   | Wind.  | Upper clouds.  | Lower clouds.  | Rain or    | 5   |   |
|--|--|--|--|--|------------|---|---|
| Time of observation.   | Dry bulb.  Wet bulb.  Relative humidity.   | Direction.   | Kind. Amountin loths. Direction mov-                           | Kind.  Amount in 1ºths.  Direction (mov. ing from)   | Commenced. | Amount of rain<br>meltidenor.<br>Surface water.                         | State of weather.   |
| 1 a. m. 29, 706<br>2 a. m. 29, 685<br>3 a. m. 29, 654<br>4 a. m. 29, 547<br>6 a. m. 29, 556                                | $\begin{array}{c ccccc} 49.7 & 49.1 & 9.5 \\ 49.3 & 49.3 & 100 \\ 49.2 & 49.2 & 100 \\ 49.5 & 49.5 & 100 \\ 50.9 & 50.9 & 100 \\ 51.0 & 51.3 & 100 \\ \end{array}$ | SSW. High<br>SSW. High<br>SSW. High<br>SSW. Gale<br>SSW. Gale            |  | Nimbus 10 0<br>Nimbus 10 0<br>Nimbus 10 0<br>Nimbus 10 0<br>Nimbus 10 0<br>Nimbus 10 0       |            | .01   50.3   Li<br>.04   50.2   Li<br>.02   50.4   H<br>.01   50.8   Li | ght rain   S.   |
| 7 a. m. † 29, 409<br>8 a. m. † 29, 409<br>9 a. m. † 29, 473<br>10 a. m. † 29, 468<br>11 a. m. † 29, 455<br>12 m. † 29, 405 | 52. 0   52. 0   100   52. 0   52. 0   100   53. 0   53. 0   100   53. 0   53. 0   100   53. 2   52. 9   08   53. 2   53. 2   100                                   | SSW. Gale<br>SSW. Gale<br>SSW. Gale<br>SSW. High<br>S                    | Hidden.<br>Hidden.   | Nimbus 10 0<br>Nimbus 10 0<br>Nimbus 10 0<br>Stratus 10 0<br>Stratus 10 0<br>Nimbus 10 0     | 0.45       | .02 51.8 H<br>.01 52.0 Li<br>.01 51.4 Cl<br>.00 51.2 Cl                 | ght rain. D. ght rain. A. oudy A. ght rain. A.                                      |
| 1 p. m. 29, 428<br>2 p. m. 20, 410<br>5 p. m. 29, 418<br>4 p. m. 29, 433<br>5 p. m. 29, 458<br>6 p. m. 29, 431             | 53. 1 53. 1 100<br>53. 2 53. 2 100<br>63. 0 53. 0 100<br>52. 3 52. 3 100<br>52. 0 52. 0 100<br>51. 5 51. 5 100   | SSW. High<br>SSW. High<br>SSW. High<br>SW. Fresh<br>W. Fresh<br>W. Fresh | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden. | Nimbus. 10 88W.r<br>Nimbus. 10 88W.r<br>Nimbus. 10 88W.r<br>Nimbus. 10 8W.r<br>Stratus. 10 0 |            | .01   50.8   Li<br>.01   50.5   Li<br>.01   50.6   Li<br>  51.0   Ci    | ight rain. G. ight rain. G. ight rain. G. ight rain. G. ight rain. G. ight rain. L. |
| 7 p. m. 29, 463<br>8 p. m. 29, 496<br>9 p. m. 29, 532<br>10 p. m. 29, 532<br>11 p. m. 29, 547<br>12 p. m. 29, 665          | 51. 0 49. 7 96<br>51. 5 51. 2 97<br>51. 5 50. 0 90<br>51. 2 49. 7 90<br>51. 0 40. 8 90<br>51. 0 49. 5 90   |  | Hidden.  0 0 0 0  7. cm. 1 : 0  0 0 0  0 0 0  0 0 0            | Stratus   10   0   | Я          | 00 51.2 Cl<br>00 51.0 F.<br>00 51.0 F.                                  | lear M.   |

Rain at intervals.

SEPTEMBER 30, 1883.

[Latitude 45 \ 56' N., longitude 146\ 24' W.]

| 1 a.m. 29.611 51.5 49.8<br>2 a.m. 29.616 51.4 49.5 3 a.m. 29.623 51.8 49.6<br>4 a.m. 29.627 52.0 49.7 5 a.m. 29.683 52.1 49.8<br>6 a.m. 29.697 52.3 50.1  | 88   W.N.W. Brisk<br>86   W.N.W. Brisk<br>85   W.N.W. Brisk<br>84   W.N.W. Brisk<br>85   W.N.W. Brisk<br>85   W.N.W. Brisk | 0 0                      |                                       | Stratus · 2<br>Stratus · 2<br>Stratus · 4<br>Stratus · 8<br>Stratus · 3<br>Stratus · 2 | 0     | 00 51.2 Clear. S.<br>00 51.5 Clear. S.<br>00 51.7 Fair. S.<br>00 52.0 Cloudy S.<br>00 52.1 Clear D.<br>00 52.1 Clear D. |
|---|--|--------------------------|---------------------------------------|--|-------|---|
| 7 a.m. 29, 732   52, 0   40, 0  <br>8 a.m. 29, 761   52, 0   40, 0  <br>9 a.m. 29, 761   52, 5   49, 0  <br>10 a.m. 29, 807   51, 8   49, 8  <br>11 a.m. 29, 808   51, 2   48, 2  <br>12 m. 29, 864   52, 5   49, 0 | 79 W.N.W. Brisk<br>79 W.N.W. Brisk<br>77 W.N.W. Fresh<br>80 W.N.W. Fresh<br>79 W. Fresh<br>77 W. Fresh                     | 0<br>0<br>0<br>0         | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Stratus 2<br>Stratus 1<br>Stratus 1<br>Cu. str 5<br>Cumulus 3<br>Cumulus 6             | WXW.F | 00 52.2 Clear D. 00 52.3 Clear D. 00 55.0 Clear A   |
| 1 p. m. 29, 880   53, 0   49, 7<br>2 p. m. 29, 928   51, 0   50, 7<br>3 p. m. 29, 942   55, 0   51, 0<br>4 p. m. 29, 983   55, 0   50, 8<br>5 p. m. 30, 016   55, 0   51, 6<br>6 p. m. 30, 026   53, 5   51, 6      | 78   W. Fresh.<br>78   W. Fresh.<br>74   W. Fresh.<br>73   W. Fresh.<br>84   W. Fresh.<br>86   W. Fresh.                   | ()-<br>()-<br>()-<br>()- | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Cumulus 6<br>Cumulus 4<br>Cumulus 6<br>Cumulus 8<br>Cumulus 4<br>Cumulus 3             | W.#   | 00 54.6 Cloudy G.   |
| 7 p. m. 30, 058 54, 5 52, 3<br>8 p. m. 30, 047 54, 5 52, 0<br>9 p. m. 30, 059 54, 5 50, 5<br>40 p. m. 30, 159 54, 5 50, 3<br>11 p. m. 30, 113 54, 2 50, 3<br>12 p. m. 30, 113 54, 5 51, 4                           | 87   W. Fresh.<br>84   W. Fresh.<br>74   W. Brisk.<br>74   W. Brisk.<br>75   W. Brisk.<br>76   W. Brisk.                   | 0<br>0<br>0<br>0         | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Cumulus 5<br>Cumulus 5<br>Cumulus 4<br>Cumulus 6<br>Stratus 4<br>Stratus 5             | W .s  | 00 55,4 Fair I. 00 56,0 Fair L. 00 55,4 Fair M. 00 56,0 Lair M. 00 56,4 Fair M. 00 56,4 Fair M.                         |

<sup>\*</sup> Light rain between observations.

#### EXPEDITION TO POINT BARROW, ALASKA.

### Meteorological record of the voyage of the schooner Leo, de.—Continued.

#### OCTOBER 1, 1883.

[Washington time. Italic s signifies slow; r signifies rapid. Latitude 44° 26' N., longitude 142° 28 W.]

| do  | er.  | Hygre<br>'(corts                 | ometer   |  | W                                 | ind.   | $\mathbf{U}_1$        | per clou  | ls.                   | Lowe   | r clo                 | uds.                            |            | n or   | 10                                       |  |  |
|---|--|----------------------------------|--|--|-----------------------------------|--|-----------------------|---|-----------------------|--|-----------------------|---------------------------------|------------|--------|--|--|--|
| Time ebservation.   | Corrected barometer.   | Dry bulb.                        | Wet bulb.  | Relative humidity                                | Direction.                        | Kind   | Kind.                 | Amount in 10chs.  | Direction (mov-       | Kind.  | Amount in 10ths.      | Direction (mov-                 | Commenced. | Ended. | Amount of rain melted snow.              | Surface water.                                     | State of weather.  |
| 2 a. m.<br>3 a. m.<br>4 a. m.<br>5 a. m.                      | 80, 156<br>30, 182<br>30, 192<br>30, 213<br>30, 213<br>30, 234 | 55.0<br>54.9<br>54.8             | 51, 9<br>, 52, 1<br>, 51, 9<br>, 51, 9<br>, 52, 8<br>, 52, 3 | P. ct.<br>81<br>80<br>81<br>80<br>81<br>80<br>79 | W.<br>W.<br>W.<br>W.              | Brisk<br>Brisk<br>Brisk<br>Brisk<br>Brisk                        | 0<br>0<br>0           | llidden.<br>Hidden.<br>Hidden.<br>U                           | 0 0                   | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .   | 10<br>10<br>10<br>8   | 0<br>0<br>0<br>0<br>0           |            | 1      | 1nch<br>00<br>00<br>00<br>00<br>00<br>00 | 56, 8<br>56, 7<br>56, 7                            | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy |
| R ก. 16.<br>0 ส. 10<br>0 ส. 16.                               | 20, 247<br>30, 259<br>30, 287<br>30, 309<br>30, 317<br>30, 324 | . 55, 8                          | 54. 8<br>52. 0<br>53. 3<br>53. 2<br>53. 5<br>53. 5           | 80<br>84<br>84<br>84<br>84<br>84                 | W.<br>W.<br>W.<br>W.              | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Gentle .                     | Cir. cu               | L. 4 ·  | 0<br>0<br>0<br>0<br>0 | Stratus .<br>Stratus .<br>Stratus .<br>Cum. st<br>Cum. st                    | 0<br>4<br>9<br>7<br>5 | 0<br>0<br>0<br>W.s<br>W.s       |            |        | 00<br>00<br>00<br>00                     | 56. 7<br>56. 8<br>58. 0                            | Clear<br>Fair<br>Cloudy<br>Cleudy<br>Cloudy<br>Cloudy    |
| 1 p. m.<br>2 p. m.<br>3 p. m.<br>4 p. m.<br>5 p. m.<br>6 p. m | 30, 347<br>30, 356<br>30, 354                                  | G0. 9                            | 50. 7<br>54. 8<br>55. 5<br>55. 4<br>55. 5<br>55. 5           | 76<br>70<br>14<br>68<br>68<br>68                 | W.<br>W.<br>W.                    | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh                        | Cir. er<br>Cir. er    | 1. 1  | 0<br>0<br>0<br>0<br>0 | Stratus :<br>Cumulus<br>Cumulus<br>Cumulus<br>Cumulus<br>Cumulus             | 20224                 | W.8<br>W.8<br>W.8<br>W.8<br>W.8 |            |        | 00                                       | 58, 6<br>58, 6<br>59, 0                            | Cloud<br>Cles.<br>Fair<br>Clear<br>Fair<br>Fair          |
| 8 p. m.<br>9 p. m.<br>9 p. m.<br>1 p. m.                      | 30, 382  | 59. 0<br>58. 0<br>57. 0<br>57. 2 | 55, 5<br>56, 5<br>54, 0<br>52, 0<br>52, 2<br>52, 5           | 73<br>85<br>76<br>69<br>69<br>71                 | W.<br>W.<br>W.<br>WSW.<br>WSW.    | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh                        | 0<br>0<br>0           | 0<br>0<br>0<br>Hidden<br>Hidden                               | 0 0 0                 | Cumulus<br>Cum, st.<br>Cum, st.<br>Cum, st.<br>Stretus<br>Stratus<br>Stratus | 3<br>8<br>9<br>9      | W.8<br>W.8<br>W.8<br>W.8<br>0   |            |        | 00<br>00<br>00<br>00                     | 58, 5<br>57, 9<br>57, 6<br>57, 8<br>57, 8          | Cloudy<br>Cloudy<br>Cloudy                               |
|   |  |                                  |  |  |                                   | {La  | titude 4              | OCTOB   |                       | 1883.<br>ude 140 - 17  | W.;                   |                                 |            |        |  |  |  |
| 2 at. m.  | 30, 431<br>30, 442<br>30, 448<br>30, 454<br>30, 466<br>30, 471 | 57.1                             | 70, 5<br>50, 3<br>52, 7<br>50, 1<br>54, 2<br>53, 1           | # 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1          | WSW.<br>WSW.<br>SW.<br>SW.<br>SW. | Fresh.<br>Fresh.<br>Fresh.<br>Fresh.<br>Fresh.                   | 0<br>0<br>0<br>0<br>0 | : 0<br>0<br>0<br>0  | 0<br>0<br>0<br>0<br>0 | Stratus .<br>Stratus .<br>Stratus<br>Stratus<br>Stratus .<br>Stratus .       |                       | 0<br>0<br>0<br>0<br>0           |            |        | . 00                                     | 57. 7<br>57. 5<br>57. 9<br>57. 9<br>57. 4<br>57. 6 | Cloudy   |
| 8 a. 10<br>9 a. 10.<br>9 a. 10.                               | 30, 451  | 55.00                            | 51.1<br>51.5<br>51.5<br>51.7                                 | 70<br>70<br>74<br>71<br>70<br>69                 | SW.<br>SSW.<br>SSW.               | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Gentle<br>Light              | 0                     | 0<br>0<br>Hidden,<br>Hidden,<br>Hidden,                       |                       | Stratus :<br>Stratus :<br>Stratus :<br>Stratus<br>Stratus<br>Stratus         | 8                     | 0<br>0<br>0<br>0<br>0           |            |        | 00                                       | 57, 6<br>57, 8<br>58, 2<br>58, 7<br>58, 7<br>58, 7 | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy           |
| 2 p. m.<br>3 p. m.<br>4 p. m.<br>5 p. m.                      | 30, 484<br>30, 494<br>50, 489                                  | 60, 4<br>61, 0<br>61, 0          | 74 7<br>74 9<br>55, 3<br>55, 5<br>55, 9<br>56, 7             | 69<br>65<br>69<br>74<br>74                       | WSW.<br>WSW.<br>SW.<br>SW.<br>W.  | Gentle<br>Gentle .<br>Light .<br>Light .<br>Gentle .<br>Gentle . |                       | Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden.<br>Hidden |                       | Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus<br>Stratus               | 1                     | 0<br>0<br>0<br>0<br>0           |            |        | 90<br>90<br>00<br>00                     | 59, 5<br>59, 2<br>59, 1<br>59, 5                   | Cloudy<br>Cloudy<br>Cloudy<br>Cloudy<br>Cloudy           |

#### ${\it Meteorological\ record\ of\ the\ royage\ of\ the\ schooner\ Leo,\ de.}\hbox{--}{\it Continued}.$

[Washington time. Italic s  $\cdot$  ignifies slow  $_{F}$  r signifies "rapid. Latitude 42° 59′ N., longitude 156° 50′ W  $^{\circ}$ 

| ter.   | Hygrometer<br>(corrected).   | Wind.  | Грре           | er clouds  | ٠,                          | Lowe   | r cloud              | ds.                          | Rain o     |                             |                                  |  |
|--|--|--|----------------|--|-----------------------------|--|----------------------|------------------------------|------------|-----------------------------|----------------------------------|--|
| Time of observation.   | Dry balb. Wer bulb. Relative humidity  | Direction.   | Kind.          | Amount in Julis.   | Direction mov-<br>ing from- | Kind.  | Amount in 10ths.     | Direction (mov-<br>ing from) | Commenced. | Amount of rain melted snow. | Sarface water.                   | State of weather Observer.   |
| 1 n. m. 100, 454<br>2 n. m. 100, 422<br>3 h. m. 100, 403<br>4 n. m. 100, 403<br>5 n. m. 100, 388<br>6 n. m. 100, 388 | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                          | S. Gentle S. Gentle S. SW. Fresh W. Fresh W. Fresh                         | ii<br>H<br>H   | lidden.<br>Iidden.<br>Iidden.<br>Iidden.<br>II d               | 0                           | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Stratus . | 10<br>10<br>10<br>8  | 0<br>0<br>0<br>0             |            | 00                          | 59, 6<br>59, 7<br>59, 7<br>69, 1 | Cloudy S, Cloudy S, Cloudy S, Cloudy S, Cloudy D, Cloudy D, Cloudy D,                                    |
| 7 a. m 30, 371<br>8 a. m 50, 361<br>9 a. m.   30, 348<br>10 a. m.   30, 343<br>11 a. m 30, 345<br>12 m 30, 328       | 61.0 59.5 91   | W Gentle   | 11             | 0<br>0<br>lidden.<br>lidden.<br>ladden.                        | 0<br>U<br>0                 | Stratus .<br>Stratus .<br>Stratus .<br>Stratus .<br>Nimbus .<br>Nimbus     | 5<br>10<br>10        | 0<br>0<br>0<br>0<br>0        |            | 00                          | 60, 4<br>60, 5<br>60, 8<br>60, 8 | Clear D. Clear D. Fair A. Cloudy A. Light rain A. Light rain. A.   |
| 1 p. m. 00, 024<br>2 p. m. 50, 036<br>3 p. m. 60, 299<br>4 p. m. 00, 259<br>5 p. m. 50, 254<br>6 p. m. 00, 226       | 61. 4   60. 9   97   62. 0   61. 0   91   62. 0   61. 5   . 62. 0   59. 9   88 | WNW Fresh<br>WNW Fresh<br>WNW Fresh<br>WNW Fresh<br>WNW Fresh<br>WNW Fresh | 11<br>21<br>21 | lidden.<br>lidden.<br>lidden.<br>lidden.<br>lidden.<br>lidden. |                             | Nimbus<br>Nimbus<br>Stratus<br>Stratus<br>Stratus<br>Stratus               | 10<br>10<br>10<br>10 | 0<br>0<br>0<br>0<br>0        |            | 10                          | 61, 7<br>62, 2<br>62, 0<br>62, 0 | Light rain. G. Light rain. G. Cloudy G. Cloudy G. Cloudy L. Cloudy L.                                    |
| 7 p. m. 50, 221<br>8 p. m. 50, 194<br>9 p. m. 30, 177<br>10 p. m. 30, 160<br>11 p. m. 30, 159<br>12 p. m. 30, 161    | 61, 0   60, 5   97   61, 0   60, 0   94   60, 5   59, 0   91                   | WNW Fresh<br>WNW Brisk<br>WNW Brisk<br>WNW Brisk<br>WNW Brisk<br>WNW Brisk | 0<br>11<br>11  | lidden.<br>0<br>Lidden.<br>Lidden.<br>Lidden.<br>Lidden.       | 0                           | Nimbus<br>Cam. st.<br>Stratus<br>Stratus<br>Stratus<br>Stratus             | 10<br>10<br>10       | N.W.8<br>0<br>0<br>0<br>0    | 6.30       | 10 00 00 00                 | 62. 6<br>62. 5<br>63. 0<br>62. 5 | Light rain. La Cloudy La Cloudy M. Cloudy M. Cloudy M. Cloudy M. Cloudy M. Cloudy M. Cloudy M. Cloudy M. |

OCTOBER 4, 1883.

[Latitude 41 | 28] N., longitude 132 | 10] W.]

| 1 a. m. 30, 192   61, 2   59, 3   2 a. m. 30, 194   61, 0   58, 9   3 a. m. 30, 196   60, 3   58, 3   4 a. m. 30, 179   60, 0   58, 2   5 a. m. 30, 164   60, 0   55, 1   6 a. m. 30, 172   60, 0   54, 1              | 89 NNW. Brisk<br>87 NNW. Brisk<br>88 NNW. Brisk<br>9 N. Brisk<br>71 N. Brisk<br>70 N. Brisk        | 0 0<br>0 0<br>Hidden.<br>0 0 | 0 Stra 0 Stra 0 Stra 0 Stra              | tus 10 0 tus 8 0 tus 8 0 tus 10 0 tus 4 0 tus 4 0                                     | 0                          | 62.0 Cloudy S. 90 62.4 Cloudy S. 90 62.6 Cloudy S. 90 62.7 Cloudy S. 90 63.0 Fair. D. 90 63.1 Cloudy D.                       |
|--|--|------------------------------|--|---|----------------------------|---|
| 10 a, m. 30, 202 [ 50, 7 ] (i)   | (f) N. Brisk<br>(f) NNW. Brisk<br>(f) N. Brisk<br>(f) N. Brisk                                     | 0 0<br>0 0<br>0 0<br>Hidden. | 0   Stra<br>0   Stra<br>0   Cun<br>  Cun | tus . 8 0 (tus . 9 0 (tus . 9 0 tus . 9 0 tus . 9 0 tus . 9 N. mulus 10 N. mulus 9 N. | e                          | 00 63.6 Cloudy D. 00 63.2 Cloudy D. 00 63.0 Cloudy A. 00 63.6 Cloudy A. 00 63.6 Cloudy A. 00 63.6 Cloudy A.                   |
| 1 p. m.   30, 208   159, 7   56, 2   2 p. m.   30, 216   59, 8   51, 5   7 p. m.   30, 216   69, 2   53, 9   4 p. m.   30, 233   59, 6   54, 5   5 p. m.   30, 230   60, 6   54, 7   6 p. m.   30, 230   50, 8   54, 7 | 68 NNW. Brisk<br>63 NNW. Brisk<br>73 NNW. Brisk  | Hidden,<br>Cir, cu           | 0 Cun<br>Cun<br>Stra                     | tits 10 NNV<br>inlus 6 NNV<br>inlus 10 NW<br>itts 10 0                                | 5.7 (0<br>5.7 (0<br>.2° (0 | 00 64.0 Cloudy G. 00 64.0 Cloudy G. 00 61.4 Cloudy G. 00 64.0 Cloudy G. 00 64.4 Cloudy G. 00 64.4 Cloudy L. 00 64.6 Cloudy L. |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 71 NW, Brisk.<br>73 NW, Brisk.<br>67 NNW, High.<br>79 NW, Brisk.<br>76 NW, Brisk.<br>70 NW, Brisk. | 0 0<br>0 0<br>Hidden,<br>0 0 | 0 Cun<br>0 Cun<br>Nin<br>0 Stra          | mlus 2 : NW<br>n. st 4 NW<br>n. st 6 0<br>bus 10 0<br>dus : 7 ! NW                    | 9.40                       | 00 64.5 Cloudy L. 00 64.0 Fair L. 00 63.0 Fair M. 01 63.1 Light rain M. 01 63.0 Fair M. 06 63.6 Cloudy M.                     |

<sup>\*</sup> Light shower of rain between observations. (Exposed thermometer broken; wet bulb used as exposed, (A thermometer substituted for the broken one.

#### Meteorological record of the voyage of the schooner Leo, &c.—Continued.

OCTOBER 5 1883.

[Washington time. Italie s signifies slove, x signifies rapid. Latitude 30% 50° Na, longitude 128° 28° W.]

| -   | ,                          | Lympo                            | meter  | 1                                |                                  |   |                                       |  |                       |  |                              |   | dain or              | £ .  | -   |
|---|----------------------------|----------------------------------|--|----------------------------------|----------------------------------|---|---------------------------------------|--|-----------------------|--|------------------------------|---|----------------------|--|---|
| B 2   |                            |                                  | ted).  | . i                              | W                                | ind.  | f, b1                                 | er clou                                    | Mar.                  | Lowe   | 1. 4 10                      | mels.                                   | Show.                |  |   |
| Time of observation.  |                            | Dry bulb.                        | bulb.  | zelative humidity.               | - deficit.                       | Klee  | Kind.                                 | Ynount in 10ths.                           | Direction mov         | Kind.  | Amount in loths.             | Dies tien enoving frem—)                | Com, icneed.<br>Ende | Amoto : of rain in .ed spow.                       | Section of two pilets   |
| 1 a. m. 30. 2<br>2 a. m. 30. 3<br>3 a. m. 30. 3<br>4 a. m. 30. 3<br>5 a. m. 30. 3<br>0 a. m. 30. 3    | 03                         | 59, 0<br>59, 0<br>59, 2          | 51.0 +   | 10<br>66 (                       | N.<br>N.<br>N.                   | resh<br>esh<br>Leish<br>B<br>Free                   |                                       | 0<br>lidden.<br>lidd <b>e</b> n.<br>0<br>0 | 0 0 0                 | Stratus<br>Nimbus<br>Stratus<br>Stratus<br>Stratus<br>Stratus  | 4<br>10<br>10<br>5<br>2<br>4 | 0<br>0<br>0                             | 1.45 2.10            | 00 63.8<br>00 64.4                                 | Lan   |
| 7 a. m. 30, 2<br>8 a. m. 30, 2<br>9 a. m. 30, 2<br>10 a. m. 50, 2<br>11 a. m. 30, 3<br>12 m. 30 3     | 97 : 1<br>96 : 1<br>99 : 1 | 57. <b>4</b> ± 58. 5 ± 8. 0 ±    | 51.0 ;<br>51.0 ;<br>53.5 ;<br>55.2                 |                                  | N.<br>N.<br>N.<br>N.<br>N.<br>N. | Brisk<br>Brisk<br>Fresh<br>Brisk<br>Brisk           | Cu. st                                | i ::::::::::::::::::::::::::::::::::::     | 0<br>0<br>0           | Stratus<br>Stratus<br>Cu. str<br>Cumulas<br>Cu. str.           | 6<br>6<br>2<br>10<br>3       | N.r<br>N.s<br>0<br>N.s<br>N.s           | 11.10                | 60   61,6<br>60   61,6<br>63   64,6<br>64   63   8 | Lai D. F. (tt. D. Chody A. Fair A. Chondy A |
| 1 p. m. 30, 3<br>2 p. m. 30, 2<br>3 p. m. 30, 5<br>4 p. m. 30, 5<br>5 p. m. 30, 2<br>6 p. m. 30, 2    | 95<br>17<br>15<br>97       | 19, 0<br>59, 3<br>59, 2<br>59, 5 | 54, 5<br>54, 5<br>53, 3<br>54, 2<br>53, 7<br>58, 7 | 73<br>73<br>65<br>70<br>68<br>68 | N.<br>N.<br>N.<br>N.<br>N.       | Fresh .<br>Fresh .<br>Fresh .<br>Fresh .<br>Fresh . | Curus.<br>Curus.<br>Cirus.<br>Cir.en. | . 1  | 0 0 0 0               | Cumulus  |                              | N # N # N # N # N # N # N # N # N # N # |                      | 00 63, 7<br>00 63, 4<br>00 63, 4<br>00 60, 5       | Cloudy G,<br>Fair G.<br>Fair G,<br>Fair G,<br>Fair La<br>Va.r L   |
| 7 p. m. 30, 2<br>8 p. m. 30, 2<br>9 p. m. 30, 2<br>10 p. m. 30, 2<br>11 p. m. 30, 2<br>12 p. m. 30, 2 | 54 : 6<br>56 : 3<br>81 : 5 | 0.0<br>8.2<br>8.5                | 54. 7<br>54. 5<br>55, 0                            | 76<br>83                         |                                  | Fresh<br>Fresh<br>Fresh<br>Fresh<br>Fresh           | Cirus .<br>Cirus .                    | . 2  | U<br>U<br>U<br>U<br>U | Camples<br>Cumulus<br>Cumulus<br>Cumulus<br>Cumulus<br>Stratus |                              | NN II                                   |                      | 60 60, 8<br>60 60, 6<br>00   60, 7<br>60 61, 0     | Fair 1. Fair M. Fair M. Fair M. Fair M. Fair M.   |

#### OCTOBER 6, 1883.

[Latitude 38 \ 39] N., longitude 124 \ 47] W.]

| ***                                |                |       |        |           |        |    |            |                 |
|------------------------------------|----------------|-------|--------|-----------|--------|----|------------|-----------------|
| 1 a. m 30, 246   57, 0   55, 5     | 90 NAW. Fres   | h 0   | 0 ' 0  | Stratus . | 9 0    | 1. | 60.7       | Cloudy, s.      |
| 2 a. m.   30, 242   56, 3 - 54, 4  | 87 : NW Bris   |       | 0 0    | Stratus . | 6 ( 0  |    |            | Van 8.          |
| 3 a. m. 30 139 57, 0 55, 0         | 87 NW. Bus     |       | 0 1    |           | 4 0    |    | 8.50 CO    | Fair 8.         |
| 4 n. m.   20, 232   57, 2   55, 4  | 88 NW. Fies    |       | 0 0    |           | 9 0    |    | 00 60,6    | Clear S.        |
| 5 a. m. 30, 189   57, 1   55, 3    | 88 NW. Fres    |       | 0 0    |           | 3 0    |    | 60 61.0    | Clear(D.        |
| 6 a. m. 30. 172 56. 5 53. 7        |                |       | 0 (    |           | 9 0    |    | 00 62 7    | 1 (1111)        |
| 6 h. m. 30, 172 30, 3 3, 7         | 83 NW. Fres    | 0     | 0 0    | Stratus   | 2 0    |    | (0) (0)    | Clear, D.       |
| 7 a. m 30, 160 56, 2 54, 8         | 91 NW. Fres    | di 0  | 0 (    | Stratus   | 2 NW r |    | 00 61 .    | Close D.        |
| 8 a. m. 30, 155   56, 2   54, 8    | 91 NW. Fres    |       | 0 (    |           | 1 0    |    |            | Cles D.         |
| 9 a. m. 30, 163 56, 5 53, 5        | 81 NW. Fres    |       | 0. 0   |           | 5 0    |    | 001 - 56 1 | Fa'r A.         |
| 10 a. m.   30, 168   56, 8   53, 8 | 81 NW. Fres    |       | 3 : 6  | Cu. str.  | 9 0    |    | 145 54 -   | 1 au A.         |
| 11 a. m. 30, 170 56, 0 53, 5       |                |       | 0 . 6  | Cu. str.  | 5 . 0  |    | (11)       | Class A.        |
|                                    |                |       | 0 1 1  |           | i o    |    | 000 74 4   | 1 1 1 1 1 1 1 A |
| 12 m. 30.178 55.5 59.2             | 80 An Fres     | HI    | 0 . (  | Stining   | 1 0    |    | 100 . 4. 4 | Clearitin A.    |
| 1 110 171 74 7 70 4                | et Yur En      | h . 0 | 0 (    | Stratus.  | 1 0    |    | 00 71      | /*) /*          |
| 1 p. m. 30, 174 54, 7 52, 4        | 85 XW. Fres    | or    |        |           |        |    | (1)        | Clear G.        |
| 2 p. m. 30, 171 54, 5 ; 51, 0      | 77 NNW. Fres   |       |        |           | 0 0    |    |            | Charles 6.      |
| 3 p. m. 30, 161 54, 8 51, 5        | 78   NNW. Free |       | 0 (    |           |        |    |            | Clean b.        |
| 4 p. m.   30. 131   54. 5   51. 5  | 80 NNW. Fres   |       | 0.1 0  | 0         | 0 0    |    |            | Clear, b.       |
| 5 p. m. 30, 114 55, 0 51, 7        | 71 NNW. Fres   | di 0  | 0 i t  | 0         | 0 0    |    |            | Clear, L.       |
| 6 p. m., 30, 974 56, 0 53, 2       | 81 NNW. Fres   | h 0   | 6 ! (  | 0         | 0 0    | '  | 00 54.2    | Chart. L.       |
|                                    |                |       |        | 1         |        |    |            |                 |
| 7 p. m. 30, 081 55, 0 52, 7        | 81 NNW. Fres   | h 0   | -0 : ( | 0         | 0 0    |    | 00 50, 8   | Clear L.        |
| 8 p. m.   30, 065   54, 5   52, 6  | 64 NNW. Fres   |       | 0 1 6  | î î .     | 0 0    |    |            | C'ent la        |
| 9 p. m.   30, 120   54, 0   51, 0  | 60 I NNW. Bris |       | 0 1 -  |           | 1 0    |    |            | Clear M.        |
| 10 p. m. 30, 075 + 53, 0 50, 0 .   | 80 NW. Bils    |       | 0 1    |           | 0 0    | 1  | 004 57 3   | Clear M.        |
| 11 p. m. 30, 063 52, 6 50, 1       | 83 NW. Bris    |       | 0 1    |           | 0 . 0  |    |            | C 'Car ' M.     |
| 12 p. m. 30, 047 52, 6 50, 6       | 86 XW. Bris    |       | 0 (    |           | 0 0    |    |            | Clear M.        |
| 12 p. m. 90. 641 (2. 0 30. 0       | CO A 11 . D118 | n 0   | 0 1 1  | , 0       | 0      |    | 00 -50, 0  | TICHT M.        |
|                                    |                |       |        |           |        |    |            |                 |

#### OCTOBER 7, 1883.

(Latitude 37+ 48+ 26+  $N_{\odot}$  longitude 122+ 04+ 39  $^{\circ}$  W. ,

|                  |       |         |     |     |        |    |     |    |            |     |      |          | 54.2 Clear S.  |
|------------------|-------|---------|-----|-----|--------|----|-----|----|------------|-----|------|----------|----------------|
| 2 a nv. 130, 054 | 53. 0 | 51.3    | 88  | XW. | Fresh  | 0  | 0 1 | 41 | Stratus .  | 1 . | - 61 | <br>()() | 54.0 (Clear S. |
| Эл. н і 30, 052  |       |         |     |     |        |    |     |    |            |     |      |          | 55.5 Clear 8   |
| 24 r. m. 30, 072 | 53. 5 | 52, 0 - | 88  | S.  | Light  | 0  | 0 - | () | Stratus.   | 1   | 0    | <br>(14) | 57, 0 Clear S. |
| 44 1 1 100 10 2  | 00.0  | 47_, 17 | 000 | 47. | man in | 17 | 17  | 11 | STIRTING . |     | 17   | <br>1111 | 01.0 VICH 05   |

10.30 a.m. small, incomplete rainbow. 1 Light shower of rain between observations. 14.35 a.m. passed the "Heeds" into the Harbor of San Francisco.

#### AURORA.

The aurora was observed hourly during the whole period when there was sufficient darkness to allow it to be visible, and any extraordinary appearances observed between the hours were also noted.

The bearings given all refer to the true meridian, and as well as the altitudes are all estimated, as the aurora was never quiet enough for instrumental observation.

The brightness of the aurora was estimated on a scale of 0 to 4.

AURORAL RECORD, OOGLAAMIE, ALASKA, 1881, 1882, 1883.

Time of beginning and time of ending-Washington time.

October 17, 1881, 1.57 a. m. to 3.35 a. m.—From a point 30° W. of N. through Ursa Major and the Pleiades to a point about 15° E. of S. It was requilibrate arch of white light showing very little tremulous or lateral motion and only a few mercy-decembers were observed. As a whole it had a motion to the S. and moved nearly 45° past the zenifal pefore it was obscured.

October 22, 1881, 2.40 a. m. to 6.30 a. m.—F. ou the NNW. to the SE., passing through Ursa Major, the Pleiades and Hyades. Very brill not white light without any changes of color. Very bright toward its southern end. Several arcnes operared in succession. Very little lateral motion.

October 27, 1881, 7 a. m. to 7 a. m.—Observed through breaks in the clouds. It was apparently brilliant, but the weather was too cloudy to allow it to be observed.

October 27 and 28, 1881, 10.30 p. m. to a m.—From a point 5° W. of N. to the SE. Not remarkably brilliant, but displayed a good deal of tremulous motion, and sometimes assumed the curtain form. At first it was white, but changed to sulphur yellow. Position constantly changing, but the change confined to the higher part of the arch, the ends retaining a comparatively fixed position. Time of ending is the time last seen.

October 30, 1881, 7 a. m. to 10 a. m.—General position as usual, and not stationary for any time. A bright arch of the curtain character possessed a good deal of motion, both of vibration and translation. A few streamers at 7.30 a. m.

November 3, 1881, 2.30 a. m. to 5 a. m.—NW. to SE., passing through Ursa Major and the Pleiades. An arch of irregular form and pale color. Cloudiness prevented much observation. But little motion observed.

November 6, 1881, 12.15 a. m. to 7.10 a. m.—From NNW, to nearly SE. Position constantly changing. Not very brilliant, but dimmed by the superior brilliance of the moon. There were intervals of cessation amounting at times to an hour and more, when it became imperceptible. At 7 a. m. it flashed into great brilliance for a short time. It then extended from the horizon NNW, through Cygnus to Cassiopeia, where it curved back toward the NW. It was then full of quivering vibratory motion, the motion being mainly lateral or back and forward from E. to W.

November 7, 1881, 6 a. m. to 8.10 a. m.—General direction from NW. to SE.; position constantly changing. Three bands sometimes uniting and forming one, and sometimes two arches. Very brilliant at times and a great deal of vibratory motion observed.

November 11, 1881, 9 a. m. to 10 a. m.— N. to NE. Faint bands changing rapidly and vertical to the horizon. There were several patches of flocculent light, sometimes approaching the curtain form, but always very faint.

November 12, 1881, 4.50 a. m. to 8.30 a. m.—When first seen it was low down near the northern horizon extending from NNW, to SE., and rising slowly. At 7 a. m. it extended through Ursa Major and Leo down to the SE. At 8 a. m. nothing remained but a short curtain directly below Cygnus. 'faint and irregular arch with a slow upward motion. Very few traces of color and very little quivering or lateral motion. Rendered fainter by the moonlight. Weather clear.

November 12 and 13, 1881, 10.50 p. m. to 10.30 a. m.—North, low down. At 12 m. a very faint arch with its center in Gemini. At 7 a. m. a faint light extending from Orion to the moon. A streamer in the E. at 9 a. m.; still visible at 10 a. m. Faint rays perpendicular to the horizon, sometimes scarcely perceptible, but possessing a quick flashing motion as if it were the reflection

H. Ex. 44---46

of lights below the horizon. When the arch appeared it had no apparent motion and only last-at a short time; the light in the S. at at 7 a.m. resembled a band of faintly illuminated cirrus cloud, November 15, 1881, 3 a. m. to 3.15 a. m.—Position not observed. Seen through breaks in the clouds.

November 16, 1881, 6.45 a.m. to 10,30 a.m.—NW, to SE.; position continually changing. First seen at 6.45 a.m., when the clouds rolled off. At 8 a.m. an irregular curtained arch ran from the NW, horizon, passing 8, of the Pleiades through Orion and down to the moon. Below this to the 8, was a complete arch clevated about 15° above the horizon with a well defined dark segment below it. Patches of nebulous light were, at the same time, visible in different parts of the 8ky to the N, and NE. At 9 a.m. several detached segments of curtains were scattered over the zenith and N, and NE, sky, while a broad and pale band extended round the southern sky from the NW, to the SE, forming a semicircle elevated about 10° above the horizon with the "dark segment" below it. At 10 a.m. all that remained was a pale narrow band passing through the zenith, and at 10.39 all had faded away.

November 16, 1881, 9:30 p. m. to 11.55 p. m.—From NNW, to SE, constantly changing both in position and appearance. Arch developed rapidly into a broad curtain with a number of streamers at its northern end. It rose rapidly, passed the zenith and soon faded away, and was succeeded by another very brilliant one, of intense sulphur-yellow color, running through the zenith from NW, to SE. There was a quick quivering motion, curtains formed and faded, and faint rays shot upward in the well-known form of flames arising from burning alcohol; these arches followed each other in quick succession and seemed mostly to be propagated from the SE, to the NW, Disappeared at 11.35 p. m.

Vorember 17, 1881, 7 a. m. to 11.40 a. m.—NW. to SSE. A low arch passing through the belt of Orion, brightness 2. Another narrow band (brightness 3) reached from NW. horizon to the Hyades, Very little change was exhibited except that the light grow gradually paler, and at 9 a. m. had resolved itself into a number of nebulous patches scattered over the southern half of the sky, but at the same time a bright curtain appeared near the northern horizon. All faded and became more diffused, and finally disappeared at 11.40 a. m.

November 18, 1881, 1 a. m. to 1 p. m.— Large auroral streamers rising from near the northern horizon almost to the zenith, first seen at 1 a. m., and had disappeared at 2 a. m. At 7.20 a. m. it reappeared, and several bands or irregular arches appeared, passing through the zenith from NW. to 8E., but being, to a great extent, obscured by clouds, their position and peculiarities could not well be determined. The arches had changed at 9 a. m. to a broad band of very pale diffused light to the southward running through Orion. Seen at intervals, though very indistinct, until 1 p. m., when it entirely disappeared.

November 19, 1881, 3.40 a. m. to 3.30 a. m.—A pale narrow band appeared in the zenith running from from NW, to SE.—Disappeared at 3.30 a. m.

November 19, 1881, and 20, 1881, 8 p. m. to 10.40 a. m.—This aurora was a very extensive one and assumed a very great variety of shapes and positions. It was at no time very brilliant as a whole, though some of the curtains were quite bright. There were but few traces of color other than bright sulphur yellow and white. There seemed two foci from which the rays, bands, and arches seemed to spring, one in the NNW, and the other in the SE. From these points the arches were mostly propagated in direction of their length, not simultaneously but very irregularly. The development of the arches was always rapid, and, once they were formed, their motion upward to the zenith and to the southward, though not very perceptible at any particular instant, was also very rapid. At 7 a. m. the greater part of the sky was more or less illuminated: bands, curtains, and patches of pale nebulous light were scattered over it in great confusion. After this it began to fade, and disappeared at 10.10 a. m.

November 21, 1881, 9 a. m. to 19:20 a. m.—Indistinct and dim; seen through the clouds, so that peculiarities, if any, could not be observed.

Norember 21 and 22, 1881, 12 mid-day to 10.40 a.m.—Had some short intervals of intermission and periods of comparative brilliancy. The light was very pale and diffusive, the bands mostly broad and ill-defined. At 7 a.m. reached its greatest brilliance, when a bright irregular arch was formed, narrow at the ends and very broad at the top. The broad part consisted of a number of bands,

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ssion and tly broad s formed, of bands, sometimes reaching the number of six, but mostly fewer. When at their broadest they extended from Regulus to the head of Orion. All the arches that appeared had the usual motion to the southward. There was a good deal of vibratory motion, but the vibrations being extremely short they were scarcely perceptible. Most of the arches were propagated laterally from the SE. Finally it broke up into numerous rays and nebulous patches scattered over the sky and disappeared.

Narember 23, 1881, 1 a. m. to 10,20 a. m.—Commenced as faint diffused light near the northern horizon, which soon brightened and extended to the eastward, so as to form a bright curtained farch which at 2 a. m. extended through Ursa Major, through Gemini, and a little above Orion, with both its ends sharply curved toward the N.—From its upward side rose numerous slender quivering rays of almost imperceptible light, which sometimes separated from the parent arch and amited laterally at their bases, forming a second but less brilliant arch above the old one. Occasional streamers appeared at its north end.—I may here remark that the sharp curvature of the ends of arches toward the N, is a general feature up to the present. At 7 a. m. reduced to a broad extending a few degrees along the northern horizon with steady light and brightness 3, Very faint arches in the S.

Eight a. m. low arch running from SSE, to SW., E. end brilliant, highest point between Orion and the Hyades: at 9 this arch had developed into a broad fan-shaped sheaf of pale streamers using nearly to the zenith. After this it gradually faded and disappeared at 10.20 a. m.

November 23 and 24, 1881, 9.30 p. m., 12 noon.—Faint streaks and partly developed rays in the SE, at 9.30 p. m. Soon afterwards developed into several broad bands of very irregular shape extending from SE, to NW, through Ursa Major. Very bright spiral whorls in the SE, at 11 p. m. while a faint band crossed to the NW.—At 12 p. m. top of arch was in Cygnus pale in the SE, but bright in the NW, with an occasional streamer.—After this slowly faded, and all that remained until 6 a. m. was a band of very pale diffused light lying along the S, and SW, horizon.

At 7 a. m. a pale semicircular arch extended around the horizon with an elevation of about 15 from a point right under Regulus through the head of Orion, and ended in the NW. In the W., when brightest, a number of pale converging rays shot up occasionally towards the zenith, which soon afterwards rose and formed an imperfect corona with converging point exactly in the zenith. There was a great display of motion—very rapid—up and down and lateral, but with nothing approaching regularity. Merry dancers, whorls, and convolutions followed each other in quick succession. The general motion was from S. to N., the opposite of what it usually is. After it passed the zenith it became very bright in the NW. so that the illumination cast therefrom on the snow was distinctly visible; occasional dark rays at this time shot across it upwards towards the zenith. They appeared very dark, and seemed like shadows of some opaque bodies thrown across the surrounding brightness. At 9 a. m. it was considerably faded, and all that remained was the usual faint band lying near the southern horizon running from SE, to NW. At about 11 a. m. it brightened somewhat again and a few rays again appeared in the NW, and extended nearly to the zenith. Disappeared at 12 m.

November 25, 1881, 5 a, m, to 9 a, m.—Faint patches appearing at intervals at different parts of the sky, principally in the E.; at 8 a, m, had developed into a broad wavy line running from SE, horizon through zenith to the NW., its brightest point being in the SE. At 8 a, m, a small arch from SE, to N, about 15° above the horizon, and another broken irregular arch from the same point to the NW, but very faint; still seen through breaks in the clouds at 9 a, m., but immediately afterwards obscured.

November 26, 1881, 2.20 a, m, to 3.30 a, m, +Occasional glimpses of auroral bands through the clouds to the SE, during this time.

November 27, 1881, 1 a. m. to 9 a. m.—Probably brilliant, but the clouds prevented it being satisfactorily seen. At 2 a. m. the light appeared to form a circle round the zenith, a corona being probably formed. An arch of irregular shape ran from N. to SE, at an elevation of about 15° above the northern horizon at 7 a. m., brightest at the N. end, with occasional streamers. After this it became much dimmer, but did not disappear until it was obscured by clouds about 9 a. m.

November 28, 1881, 2 a. m. to 1 p. m.—When first observed it appeared as two low broken arches running from the SE, to a point NNW. At the same time the sky was covered with patches

of nebulous light resembling cirro-cumulus cloud. Changed rapidly, and was succeeded by a brilliant convoluted arch running up through Orion's 6-belt," through Taurus, and through Cassiopeia, which was in the zenith towards the NW. Faint and irregular until 7 a. m., when there was another burst of brilliancy. A brilliant scrpentine arch extended from the NNW, through Ursa Major to the SE. It exhibited none of the usual quiescence, but was rapidly and intensely in motion with streamers shooting apwards and converging towards a point in Auriga. There was no predominant direction of motion, and the general characters changed with great rapidity. The sky near the zenith was filled with bands, patches, and segments of arches, but all was changing every minute. The amount of light was 2, but no traces of color appeared other than white and pale sulphur yellow. After this there was no further display. The light became diffused and difficult to locate, with isolated patches appearing at intervals in different parts of the sky until it finally faded about 1 p. m.

November 28 and 29, 1881, 11.50 p. m to 6 a. m .- First observed as a faint band starting exactly at Arcturus and running a little below Ursa Major until lost in the clouds near Gomini. This was rapidly succeeded by other bands and patches in various parts of the sky until about 1.50 a. m, of the 29th, when a magnificent burst of energy occurred. Over every part of the sky uncovered by clouds masses of light of every shape and form flashed out all in a condition of intense vibration. There seemed to be three foci of activity, one E., one S., and one W. (magnetic), each about 20° above the horizon. The changes in character were extremely rapid, so that it was impossible to get a mental image of the whole phenomena at any particular instant of time owing to this fact: the variety and multiplicity of features being such that the mind could not grasp them all at once. A brilliant but irregularly formed corona appeared with its converging point in Cassiopeia, which was then in the zenith, and flashed and gyrated, changing its character and shape every instant. The colors displayed were various and very intense-orange, green, pink, rose, yellow, and crimson: green and rose predominated. Magnet at this time was deflected 49 17 to the west of magnetic meridian. The display lasted about twenty minutes, after which it gradually faded and assumed the usual diffused and indistinct form. The increasing cloudiness prevented its being clearly observed afterwards, but traces were visible until 6 a.m.

November 30, 1881, 4.30 a. m. to 7.25 a. m.—Patches of nebulous light, incipient arches, and occasional pale rays slowly developed in various parts of the sky, all more or less diffused, but constantly changing in character. A pale wavy arch at 7 a. m. ran from the NW, through Cygnus to Arcturus, where it bent off to the S. until lost in the clouds at the feet of Orion. Sky obscured after 7 a. m.

December 1, 1881, 1,50 a.m. to 10 a.m.—Faint band appeared extending from a point almost due N., passing through Taurus and ending in Orion; narrow and moving slowly to the southward. Patches and bands and much diffused light succeeded, but assumed no very definite forms; obscured by clouds about 5.30 a.m.; still visible, though faint, until 10 a.m.

December 5 and 6, 1881, 11 p. m. to 2 a. m.—First observed as a faint band running from E. to SSW., with an altitude of 20°. Remained faint, and faded away occasionally, but very difficult to observe from the haziness of the sky. At 12 m. several bands appeared to the northward, passing through Ursa Major. Not seen after 2 a. m. of the 6th, but as the magnetic needles were constantly disturbed for several hours afterwards, it probably still continued, though obscured by clouds.

December 7, 1881, 8 a.m.—Small patches of curtain aurora in NW. at 8 a.m., with an altitude of 10°, sending up one long streamer: changing rapidly.

December 8, 1881, 12.30 a. m. to 12 midday.—This was one of the most magnificent displays that has yet occurred here. First appearance was in the S. and SE., and for several hours nothing appeared but a few pale arches and bands which had no remarkable feature worthy of notice except the rapidity with which they changed their position and character. They appeared faded, and reappeared in various parts of the sky so quickly that it was very difficult to localize them. At 2.40 a. m. a narrow greenish-yellow arch with a beautiful rosy fringe developed in the SSE and in a few minutes extended through Taurus, Cassiopeia, and Cygnus down to the N., and for about ten minutes displayed some extremely beautiful tints, especially along its northern half; it seemed to be composed of an infinite number of short rays in a condition of intense vibration, the

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rs nothing notice exred faded, dize them. the SSE. \(\). and for \(\)n half; it ration, the motion being principally in direction of its length, while flashes of the most vivid coloring beamed out in most bewildering variety. At the same time numerous rays and patches of quivering light appeared in various parts of the sky in quick succession, dancing and gyrating to and fro swift as the lightning's flash. While the northern half of the arch remained thus brilliant, the southern half faded away. A few minutes afterwards a patch of rosy greenish light appeared in the middle of Orion and in a minute or two developed into numerous sheafs of rays with the greatest variety and intensity of motion and displaying the most brilliant colors as they rose and converged to a point close to the star Algol, forming an imperfect but most brilliant corona, which swayed and swirled and eddied round our zenith with a kaleidoscopic rangnificence utterly indescribable; the changes of tint, aspect, and position were so rapid and numerous that the eye strove to following their bewildering confusion in vain. The general motion was to the N., though a brilliant curtain was at the same time moving towards the zenith from the N. The brilliance of the moon seemed to have little effect on the intensity of the colors which appeared. The colors were very numerous, orange, yellow, rose, ruby-red, peach-blossom, emerald-green, and numerous intermediate tints changed and interchanged in beautiful confusion; the whole phenomena of waving wreaths, flickering fumes, rays, curtains, fringes, bands, and flashing colors, the strange confusion of light and motion, presented a picture of which words can convey a very poor idea. The whole display lasted about 30 minutes. There was also intense magnetic disturbance during this time, the needles being almost unmanageable. A peculiarity of this Aurora was its lowness in the atmosphere, several patches of cloud apparently not very clevated appearing far above it. Did not entirely disappear until about 12 midday. The apparent elevation of the cloud may have been caused by an optical illusion.

December 8 and 9, 1881, 10,50 p. m. to 10 a. m.—First appeared as a patch of nebulous light immediately below Ursa Major; other patches soon afterwards appeared, and several partially developed arches were observed up to midnight, when it brightened a little and several broad diffused bands were found passing through the zenith. Quivering rays appeared to the SE in Orion, and a partly formed corona in the zenith at 1 a. m.—After this to 10 a. in. occasional bands, patches, and rays of light appeared in various parts of the sky, and several times a complete arch was formed, but mostly pale and ill-defined. The magnetic needles were disturbed to a considerable extent about 8 a. m.

December 10, 1881, 10:30 p. m. to 12 m.—Faint detached rays appeared in various parts of the northern quarter of the sky, and a few converged towards the zenith from Ursa Major. Soon afterwards they faded considerably, and for intervals of half an hour at a time were entirely invisible.

December 11, 1881, 5 a. m. to 8 a. m.—Faint and irregular in shape, no variety of color, and but little motion other than the general motion of translation.

December 11, 1881, 11 p. m. to 11.15 p. m.—Straight auroral bands converging towards the zenith, all faint and pale, lasted about 20 minutes.

December 12, 1881, 2 a. m. to 10.50 a. m.—Two narrow bands (brightness 2) running from the north point to the SE. For the next four hours the sky was clouded, but at 7 a. m. a pale curtained band low down in the north under Cygnus with a few rays above it; this rose and expanded into numerous others, which covered the sky for about 20° on each side of the zenith, running from XW. to SE. There was very little motion at this time, but the magnetic needles were a good deal disturbed. At 9 a. m. there was a very irregular curtained arch in the zenith which constantly and rapidly changed both its position and character, the magnets being still disturbed. From 9.20 to 10.30 a. m. the aurora was invisible, but at 10.30 it reappeared in the shape of several bands and patches of floculent light in various parts of the sky and lasted 20 minutes, when it finally disappeared.

December 12 and 13, 4881, 9 p. m. to 10.30 a. m.—First seen at 9 p. m. as a broad pale arch of lambent luminiferous vapor running from N. to SE, with its center in Geraini. From this position it did not materially change until nearly 1 a. m. of the 13th. The dark segment was very strongly marked below it. This is the first aurora of this kind I have seen since our arrival; it is also the first that has remained for so long a period stationary—nearly four hours. About 1 a. m. it began moving upwards and augmented greatly in brightness, and in a few minutes developed

into an extremely brilliant band of yellowish white light rising from the horizon due N., making a great sweeping curve upwards, and extending through Cygnus to the zenith, Taurus, and down into Orion. There was much quiet movement, the vibrations being very short, mostly in direction of its length, but no variety of coloring. The pale hazy arch and dark segment reformed underneath, and hang for some time longer in the N. and NE. The bright arch above, however, soon moved to the southward, and a very brilliant series of broken curtains and convolutions appeared in Orion, but all soon faded considerably, and nothing appeared except numerous disconnected bands and patches of diffused and flocculent light until about 4.30 a. m., when it disappeared for nearly an hour. About 6 a. m. there was another brilliant burst in the N. moving very rapidly towards the horizon. Up to this time the magnets showed very little disturbance, but immediately on this display the disturbance became very great, the unifilar magnet being deflected out of the field to the W. so far that the azimuth circle had to be removed 2° 10' to bring it back so as to point the telescope on its axis. After 6 a. m. there were occasional rays and bands in various parts of the sky, but mostly pale and indistinct. All disappeared about 10.30 a. m.

December 14, 1881, 1 a. m. to 1 p. m.—First seen very indistinct near the SE, point of horizon, and afterwards only at intervals glimpses were had of it through the clouds, and was last seen as a narrow band of white light extending from NW, to SE, with its highest point in Ursa Mino. A

1 p. m.

December 14 and 15, 1881, JO p. m. to 2.30 p. m.—Faint traces in NE., where it remained as a series of irregular patches and partly arches, disappearing and reappearing from time to time up to about 2 a. m. of the 15th, when it became more extensive but still retained its diffused and irregular character. At 1 a. m. the magnets were much disturbed, though the display at the time was very faint; the weather being very hazy however at the time, it was difficult to determine its extent. Occasional bands formed and moved southward up to 12 midday, when several bands appeared and remained for a short time, but displayed no remarkable features. Disappeared about 2,30 p. m.

Pecember 15, 1881, 14 p. m, to 11 a. m. December 16.—Pale arch in NE, with its highest point in Cominj, but as the clouds soon increased rapidly its after position could not be determined, though occasional traces were observed through breaks. At 9 a. m., 16th, a broad pale band was visible through the clouds. It was not seen afterwards, but at 11 a. m. the magnets were greatly disturbed: the unifilar needle being so strongly deflected to the eastward that it was necessary to move the azimuth circle 3° 4′ so as to enable observer to point on axis. It remained in this con-

dition for nearly three hours.

December 16 and 17, 1881, 11 p. m. to 10,30 a. m.—Faint traces of auroral light low down in the NE.; at 12 midnight a still arch, broad, pale, and with the dark segment strongly marked below it, extended from the center of Boötes through Gemini down to the head of Orion. Very little motion was perceptible, and soon afterwards it disappeared, but seen reappeared again as a few straggling rays in Boötes, which continued to fade and flicker for a time and then faded away for a short interval, and so it fluctuated until about 6 a. m. of the 17th, when it suddenly became more brilliant. A brilliant series of bands and arches extended across the sky from NW. to 8E., passing through and on both sides of the zenith with a general southward motion. There was much, but not to a remarkable degree, internal vibratory motion. The unifilar magnet was deflected so strongly to the westward that the azimuth circle had to be moved 7° 12′ to bring it into the field. Numerous bands and arches, though not very brilliant, succeeded each other rapidly until about 8 a. m., when the phenomena became less distinct, and about 10.30 a. m. all had faded. The magnets remained in a disturbed condition until 8 a. m.

December 17 and 18, 1881, 11 p. m. to 1 p. m.—Pale nebulous patches appeared low down in the N. and NE, and a scarcely perceptible arch accompanied by a few slowly waving rays formed about 12 m. Afterwards patches appeared and disappeared at intervals, and occasional arches were formed, principally low in the NE. About 6.30 it began to brighten, and a rather bright arch passed down to the southward and faded away into a band of nebulous haze. After a few minutes' quiescence a brilliant patch appeared in the SE, a drapidly developed into an irregular custined arch which shot up numerous slender rays, and exhibited very intense activity. In a few minutes it had risen to the zenith, where a brilliant but imperfect corona was formed, which whirled

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own in the med about rches were right arch a few minegular cur-. In a few ich whirled round and quivered and vibrated for a infinite or two with intense rapidity and then slowly moved to the northward, its coronal character changing into the irregular curtain form. There were some beautiful flashes of rosy red and deep green, but in general the color was an intensely brilliant yellowish white, and the light emitted was such as to render objects distinctly visible half a mile away. The magnets were disturbed, but not extremely. At 8 a. m. the greater portion of the sky seemed covered by a faintly luminous haze, and a very pale circle of diffused light extended all around the sky at an elevation of a few degrees above the horizon. After this only occasional streaks and patches appeared until about 1 p. m., when it disappeared.

December 18 and 49, 1881, 10.50 p. m. to 1.30 p. m.—A very faint arch formed in the NE., low down, which rose slowly with a few flickering rays shooting from its upward side, and at 12 m. its highest point just touched Cor Caroli in Canes Venatici. After this there was but little display other than a few straggling patches and rays scattered irregularly over the sky until about 8 a. m., when the brightness increased considerably and streamers appeared in various parts of the sky. Several narrow bands or arches rose from the N. and NE., broke up into irregular curtains, and inally passed down to the south, when they faded away into a kind of faintly luminous haze. The magnetic needles were deflected to the W.—An intermittent period again intervened until about 10 a.m., when another period of brilliancy occurred. Several bright curtains and streamers appeared in the S. and W. but did not exhibit much apparent motion. The magnets were again deflected, this time to the E.—A fer this no noticeable features appeared, and at 1.30 p. m. a few pale bands were visible in the zenith, but they soon disappeared before the brightening twilight.

December 19 and 20, 1881, 11 p. m. to 11 a. m.—Auroral light pale and diffused and appearing in the NE, as usual, but rather unusually stretching thence as a broad diffused band towards the W. At 11.30 this band faded away into a kind of luminous haze, which covered the greater part of the sky, and across this, stretching from Boötes down to the  $\mathrm{SW}_\alpha$  two parallel black bands appeared, which slowly rose towards the zenith, still retaining the same shape and relative positions and looking exactly like a jet-black aurora. They possessed all the characteristics of ordinary auroral bands except the color, and occasionally rays of shadow, if I may use the expression, streamed from their upper side, much the same as rays of light ordinarily do from auroral arches, The cause of this phenomenon seemed to be that two long rents appeared in the luminous haze and took and maintained for a considerable time the form of long bands stretching across the sky. They were certainly not streaks of cloud, for the stars shone brighter through them than in any part of the neighboring sky; their motion was not that of cloud, and their black color was given by confrast with the surrounding luminous haze. After passing the zenith they disappeared, but afterwards nothing appeared for several hours other than a few nebulous patches here and there, and the faintly luminous haze, which still remained unchanged as long as it could be observed, observation being rendered difficult by the increasing cloudiness. From 8 to 10 a.m. several bands appeared through the clouds in and near the zenith, and during that time the magnets were very much disturbed. Last traces observed at 11 a. m.

December 20 and 21, 1881, 14 p. m. to 10.30 a. m.—Faint nebulous masses of faint light low down in the NE., which soon expanded into a narrow still arch running from Arcturus through Canes Venatici and down until lost in the haze in the SE.—It rose very slowly, and as it approached the zenith divided into two, and afterwards into several, which passed towards the S., where they faded into a nebulous-haze and at 1.15 of the 21st nearly all the visible sky was covered with bands, patches, and imperfect arches, the general direction of which was from NW. to SE.—This condition of things remained until about 10 a. m., when there was a brilliant burst of sbort duration, consisting chiefly of vertical rays in extremely rapid motion, and converging towards the zenith where a brilliant but imperfect corona was formed, lasting for a few minutes.—A broad waving band moved up rapidly from the N. and collected into a mass at the zenith, and passed as rapidly to the SE.—The brightness was fully 4, and the colors principally white and yellow with tinges of green and rose on the edges.—Magnets much disturbed.—Unifilar deflected towards the east.—In about twenty minutes the display was over, and all that remained were numerous patches of light all round the horizon, which soon also disappeared.

December 21 and 22, 1881, 10 p. m. to 1 p. m.—As has been usual for some time back in the commencement of auroras, a few flocculent patches of hazy light appeared low down in the NE., which

blowly changed from time to time; those first appearing soon fading away and giving place to others of similar character until about 11.30, when they assumed the form of a regular arch, quiet and narrow, and extending from N. to SE, with an altitude of about 20 degrees. It rose very slowly and showed varying degrees of brightness, but was generally pale. At 3 a. m. of the 22d its center was in Ursa Major, and between 6 and 7 a. m. its center was in Auriga. After it passed the zenith it imperceptibly faded into a diffused luminous haze, which covered the greater part of the visible sky. Sections of half-formed curtains and arches appeared from time to time, and afterwards a very bright one formed in the E about 11 a. m. Traces of it were still visible at 1 p. m.

December 22 and 23, 1881, 11.30 p. m. to 2.15 p. m.—Faintly luminous haze appeared in the NE, at 11.30, but soon afterward disappeared in the haze which covered the sky. About 2 a. m., 23d, it reappeared in nearly the same position and apparently shining through the haze. After this it became brighter, showed more motion, and developed more rapidly. Faint arch succeeded faint arch, and bands and curtains flourished and faded too numerously and too irregularly to particularize, until about 4 a. m., when an imperfect corona was formed with its culminating point almost in the zenith. There was considerable variety of colors, yellow, pink, red, and white, the total light emitted being probably equal to that of a full moon, but as the emitting surface covered the greater part of the sky the light was much more diffused than moonlight. This period of intensity continued until about 5.30 a. m., when the bands and arches gave place to a diffused light spreading over the greater part of the visible sky. There was great magnetic disturbance during the period of maximum displays. The untillar magnet was deflected to the E. so as to necessitate the movement of the azimuth circle through 4° 10′, while the dip of the weighted dip needle increased 2° 15′. Last traces were observed at 2.15 p. m.

December 23 and 24, 1881, 8.30 p. m. to 2.15 p. m.—At 8.30 p. m. a faint pinkish ray rose from the SE, and extended upwards almost to the zenith, but lasted only a few minutes. Luminous patches soon afterward appeared in the NE., and a narrow quiet arch soon was formed, which remained quiescent for about half an hour, when it began to move rapidly, shooting out rays as it approached the zenith, forming a pale but imperfect corona with its culminating point in Cassiopeia, This is the first occasion of such activity at such an early hour. It was of short duration, however, and was succeeded by the usual diffused light or luminous haze occasionally interspersed by bands and patches of deeper light. Several bands developed about 1 a. m. of the 24th, and afterwards became numerous, forming generally low down in the NE, and moving slowly toward the zenith, where they generally became broader and more diffused, sometimes dividing into two or more. The brightness seldom exceeded 2, but the haziness of the sky dimmed it to a great extent. At 7 a. m. all that remained was a rather bright light low down in the SW. behind the clouds, with patches of luminous haze in various parts of the sky. Although the phenomenon at this time showed no appearance of intense activity, yet the magnets were greatly disturbed. The horizontal force was greatly increased, as was also the vertical, while the needle of the declinometer was deflected first to the W. and then to the E., the former deflection taking the magnet out of the field of the telescope. Very little brilliancy was exhibited until about 1 p. m., when there was quite a burst of light and intensity. Rays, bands, convoluted curtains, and flashes of quivering light appeared over the greater part of the sky. Numerous rays shot up from all sides toward the zenith, but no proper corona was formed. Magnetic disturbance lasted all through the display. which finally disappeared about 2.15 p. m.

December 24 and 25, 1881, 9 p. m. to 10 a. m.—Patches of light low down in the NE., which broadened out into luminous haze, that extended slowly upward toward the zenith, shooting up occasional rays, which about 1 a. m. developed into a faint arch near the zenith. Other arches increasing in brightness succeeded this in quick succession until about 3 a. m., when the light was spread all over the sky, sometimes as curtains and bands and broken segments of arches, sometimes as large floculent masses looking like cumulous clouds illuminated by transmitted light. There were periods of quiescence alternating with brief displays of activity. No colors, however, were observed beyond the usual white and yellow, but these at times were very intense, reaching the maximum of brightness. After lasting for about an hour the display gradually subsided, and until 7 a. m. only occasional patches and bands appeared irregularly in various parts of the sky, but being mostly brightest in the W. From 7 to 8 a. m. the brilliance rapidly increased. Curtains,

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broken arches in every variety of convolution spread extensively over the sky, being propagated from the E. toward the W., and being brightest in the S. and W. Declination and vertical force increased and the horizontal intensity decreased. Ended at 10 a. m.

December 26, 1881, 1 a. m. to 10 a. m.—Very pale and irregular in shape and position. Seldom a complete arch appeared, and when it did its outlines were mostly very undefined and its continuance very brief. The sky was very hazy, so that it was only near the zenith that the phenomenon could be observed. At 9 a. m. a narrow but bright arch formed in the NE. and rose rapidly toward the zenith. As it rose it displayed a peculiar intermittent kind of activity, especially when it reached the zenith. Pulsations of intense vibratory motion passed along it from NW. to SE. in direction of its length at short intervals, each succeeded by brief intervals of quicseence. Once it reached the zenith it began to fade, or, rather, its outlines became indistinct, and it slowly passed down to the southward, when it changed into the usual luminous haze. The magnets at this time showed great increase in vertical force and decrease in horizontal intensity. Previously, at 6 a. m., they showed another period of disturbance, although scarcely any aurora was visible. There was at no time a brilliant display, but during most of the time the magnets were as much disturbed as during the most brilliant ones.

December 26 and 27, 1881, 11 p. m to 7 a. m.—A faint arch running from N. to E. very low down appeared behind the haze, and afterwards traces of light and portions of bands were observed in various parts of the sky near the zenith, until about 7 a. m. the 27th. The night was however so cloudy and hazy, that its characteristics could not well be observed.

December 27 and 28, 1881, 11 p. m. to 1 p. m.—A faint diffused arch appeared low down in the NE., which remained with but very little change for several hours. This aurora lasted with several periods of intermission until 1 p. m. of the 28th, but there was no brilliant display of either light or color. Occasional arches and parts of arches formed in various parts of the sky, but they were always pale and of brief duration. The only noticeable peculiarity of this aurora was the extent and brightness of the luminous haze. It covered most of the sky, and at times assumed a peculiar stratified appearance, like numerous polar bands very close together. Sometimes it broke up into patches of deeper density, and sometimes was so diffused as to almost disappear. At 5 a. m. the magnets were considerably disturbed, the unifilar being strongly deflected to the east.

December 29, 1881, 4 a. m. to 2 p. m.—First appeared as narrow bands running from the SE, towards the zenith, which soon rose and spread over the sky assuming the usual hazy and diffused character. Bands, rays, and partly formed arches appeared from time to time, but presented no marked features worthy of notice. There was no apparent internal motion and no variety of color. At 8 a. m. it was at its brightest, and coverent the greatest extent of the sky, but did not reach a brightness exceeding 2. The magnets were however a good deal disturbed, the vertical force and castern declination increased and horizontal intensity decreased. These conditions continued with but slight change until 10 a. m., after which the magnetic disturbance decreased, and the auroral light faded away, but did not entirely disappear. Traces of it were visible until about 2 p. m.

December 30, 1881, 1 a. m. to 1 a. m.—Traces of aurora seen through haze at 1 a. m., but it was too cloudy to observe either its beginning or ending.

January 1, 1882, 7 a. m. to 7 a. m.—Traces of aurora bands seen through the clouds at 7 a. m. Beginning or ending not observed, owing to cloudiness of weather.

January 2, 1882, 4.15 a. m to 10.30 a. m.—Narrow arch running from W. to SE. low down toward the southern horizon. Very little motion, and brightness about 2. It rose very slowly toward zenith where it became broken up, and assumed the diffused character. After this it maintained a fluctuating existence until 10 a m. At 8 a. m. a few rather bright streamers appeared in the N., and extended themselves across the sky toward the SE. but soon faded away. Magnets were slightly disturbed.

January 3, 1882, 7 a. m. to 9 a. m.—A few patches appeared at intervals between 7 a. m. and 9 a. m. None of them were bright; all were irregular in shape and seemed to start from no point in particular but apparently seemed suddenly to burst out of the sky and after flickering for a short time, disappeared. Magnets were slightly disturbed.

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January 4, 1882, 2 a. m. to 9 a. m.—Faint arch low down in the NE., searcely distinguishable from a long band of cirrus cloud which after languishing for a short time disappeared and did not reappear until 7 a. m., when a few fugitive bands appeared in the NE. which soon developed into a well marked curtain (brightness 3). There was but little vibratory motion and not much change in color. Declinometer needle deflected slightly to the E. and vertical intensity increased, accordance and occasional patch or ray, lasting generally only a few minutes.

9. I disappeared at 9 a. m.

Fanuary 5, 1882, 1 a. m. to 8.30 a. m.—Occasional rays, curtains and patches of light from 1 i. m. to 7 a. m., none very bright and all of brief duration. There was very little apparent metrop. The various curtains and patches did not usually have a regular forward motion in any direction. They appeared to burst out of the sky, fluctuate for a few minutes, and then disappear. At 7 a. m., however, an irregular curtained arch appeared ascending from Taurus to Boöfes with its center slightly N. of zenith—It exhibited momentary bursts of vibratory motion and was brighter at 1 southeastern en 1. Its brightness was about 2. The magnets were greatly disturbed, the horizontal force decreased, the vertical intensity greatly increased, and the declination to E. also increased ended about 8.30 a. m.

January 5 and 6, 1882, 11 p. m. to 3.30 p. m.—Appeared as a narrow pale arch running from Y to SE., with its center in Gemini. It lasted only a short time, and exhibited no apparent metrod. It reappeared at rather lengthened intervals, mostly low down in the N. and NE., and never very

bright or high, and was last observed at 3,30 p. m.

January 6 and 7, 1882, 11 p. m. to 7.30 p. m.—Luminous haze all round the horizon, with a d. 1 circle of about 5.1 width, corresponding to the well-known dark segment below it. From this harmonic rays, so faint and ethereal as to be almost imperceptible, shot up towards the zenith. In fact, it appeared as if a series of pulsations or ethereal quiverings, which almost cluded the group of vision, passed over the sky in a kind of rythmic unison; the converging point of motion of the zenith. This phenomenon continued until the light of the moon, which soon rose, rendered invisible. Occasional cartains and arches, mostly pale and irregular in shape, followed. At 7 p. m. a very pale arch ran from NW, to SE, through Taurus and Boötes, and after remaining a short time it slowly faded away.

dawn my 8, 1882, 1 a. m. to 10.40 a. m.—Appeared first in the usual form of a faint still of his extending from N. to SE., and possessing a slow upward motion. At 2 a.m. it had risen to the zenith, when it divided into six or seven narrow bands, brightness about 2, with consider 40% vibratory motion, but no streamers. After passing the zenith it became diffused and soon disc pearen. Bands and curtains, patches of light, and detached rays succeeded in quick succession. appearing in various parts of the sky, but none were very brilliant or of long duration. The cowere intervals of quiescence when scarcely any light, other than the usual luminous haze, was vi ible, and this was generally by an interval of display more or less brilliant until about 10 ... . .. when there was quite a brilliant one. Several rays appeared in the NW, and the SE,, which proagated the vely's toward the zenith where they met, forming an irregular but brilliant was eshiofier, an extremely rapid motion. Numerous short rays shot up and whirled to and sof park, yellow, and green flashed out, convoluted curtains appeared and rolled and Lengthali or error, exacting to and tro, at if hung out by invisible hands, but all changing was very hard to point their place. The brightness at this time was fully to rap. av v be each to fade; in about twenty crimites all had disappeared.

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the declination was irregular, being sometimes easterly and sometimes westerly. After this display was over the light greatly faded and finally disappeared about 10 a. m.

January 9 and 10, 1882, 10 p. m. to 1.50 a. m.—Appeared as a quite still arch, low down in the NE., with the dark segment distinctly visible below it.—About 12 m. it had risen almost to zenith and grown considerably brighter, but at no time did the brightness exceed 2. There was some slight vibratory motion, but it soon began to fade, and after nearly disappearing brightened up and formed a broad irregular arch, running from the NW. through Cygnus, through the zenith and down through Canis Minor, displaying considerable vibratory motion; this was at 1 a. m. of the 10th.—At 2 a. m. all had disappeared. Magnets very little disturbed.

January 10 and 11, 1882, 11 p. m. to 8 a. m.—Traces of hazy light appeared low down in the E.; afterwards succeeded by several faint arches, which rose slowly and generally faded or became very diffused as they approached the zenith. At 3 a. m., 11th, a bright broad arch ran from NW. to SE, through Cygnus, Ursa Major, and Leo. Several whorls and patches succeeded until about 8 a. m., when all had disappeared.

January 13, 1882, 11 p. m. to 12 m.—Auroral arches observed through the clouds and drifting snow near the zenith between 11 p. m. and 12 m.

January 14 and 15, 1882, 10 p. m. to 12 midnight.—Pale narrow arch appeared low down in the NE, which rose slowly and as it approached the zenith was succeeded by others below, flocculent patches and much diffused light at the same time in various parts of the sky. This condition of arches, patches, and bands and diffused light constantly changing, but the general features remaining the same, continued till 10 a.m., after which they became paler and entirely disappered at 12 m.

January 15, 1882, 10 p. m. to 6.30 a. m.—The usual low arch appeared in the NE, with the dark segment for a time clearly visible, but as the arch arose the segment disappeared. This arch rose very slowly, but presented an appearance of an extremely rapid internal quivering while numerous short rays fringed its upper side which swayed and flickered like the flame of burning alcohol. A succession of similar arches followed until 5 a. m. They were all pale, and after the latter hour only a few patches were visible, and all had disappeared at 6.30 a. m.

January 17, 1882, 1 a. m. to 7 a. m.—Faint lov arch in NE, remained stationary for a time and then rose slowly and became broken up and diffused; sometimes it entirely disappeared for a time, reappeared as occasional patches and curtains which maintained a fluctuating existence until 7 a. m. when it had disappeared.

January 17 and 18, 1682, 10 p. m. to 8 a. m.—Quiet arch low in NE. It rose very slowly, and about 2 a. m. 18th, had reached the zenith where it had broken up into sundry bands and patches which seon faded away into an extensive luminous haze which continued until about 8 a. m.

January 19, 1882, 1 a. m. to 4 a. m.—Traces verble through rents in the clouds near zenith at 1 a. m. and 4 a. m.

January 20, 1882, 4 a.m.—Several bands is—e zenith visible through rents in the clouds at 4 a.m.

January 21, 1882, 4 a. m. to 4.30 a. m.—At 4 c. in, the sky which had been previously cloudy suddenly cleared up and a pale arch appeared excluding from NW, to south and elevated about 26° above the SW, horizon. After rising slowly a few minutes it suddenly burst into a state of intense activity, and at the same time move? A silly toward the zenith, the distance between the head of Orion and the zenith being passe and in about five minutes. Numerous swirling thys tandout shooting upwards and apparent acconverging toward Capella. A kind of compressed or foreshortened corona was formed, and from the hapidly changing swirls and convolution, various brilliant colors flashed out, green, pink, rose and yellow being the prevailing times. The head of a transmits were strongly deflected. The head will be reased and the easterly declination increased. The sky became clouded at 4.20. No more was all served.

January 23, 1882, 12 a. m. to 40 a. m.—A patch of flocculent light appeared near the Lee of a in the NE. Others soon after appeared and so year times approached the arch form until the matter that time there was a period of cessation until 4 a. m., when a faint of heavy and to the flowing and more observed the enith, where it divided into a broad so he of the latter of flow N, to the Art is a time the dimes of condition have of the discount of the condition.

January 23 and 24, 1882, 10.30 p. m. to 8 a. m.—A few patches low down in the NE. soon roso and formed a pale broad arch with its center touching Ursa Major, which soon faded away and did not appear until about 4 a. m. of the 24th, when a low pale arch appeared to the southward with its center in Orion. This slowly rose until it approached the zenith, when it became stationary and remained in an irregular hazy condition until about 8 a. m.

January 25, 1882, 2 a. m. to ——.—Patches of light appeared low down in the E., which slowly gave place to a series of faint irregular arches running from the N. to NE., which mostly faded away as they approached the zenith into a faintly luminous baze. Several bright whorls appeared in the E. at various times, but did not extend higher than 30° from the horizon. Time of ending not reported.

January 27, 1882, 4 a. m. to ——. —A very pale band running from NW. to SE., and rising very slowly, reached the zenith, where it divided into pale, very broad, and ill-defined arches, and at 6 a. m. nothing was visible except a few patches of floculent and a great deal of diffused light. Termination not reported.

January 28, 2 a, m, to 2.30 a, m,—A few faint rays appeared low in the N, from 2 a, m, to 2.30 a, m,

January 29, 1882, 4 a. m. to 7 a. m.—A faint ray rose from the N., and after reaching the zenith curved to the eastward, forming a broad irregular arch. At 5 a. m. the N. end had faded away, or rather seemed to be drawn up towards the zenith, when it became twisted into a series of whorls and convolutions; the other end at the same time extended in irregular curves to the SE.—There was a slow motion to the northward, the light at the same time fading away. At 6 a. m. there was a repetition of the phenomenon, but at this time the convolutions and whorls extended from the remith down towards the N. horizon.—Last reported at 7 a. m.

January 29 and 30, 1882, 10 p. m. to 8 a. m.—Faint arch from N. to E., with altitude of about 16, a few streamers at its N. end. It rose slowly in the usual manner until it reached the zenith, when it slowly faded away. Others of a similar character followed at intervals, accompanied by flocculent whorls and much diffused light. Occasionally several bands passed through the zenith at the same time, always from the NW. to SE., but none of them were brilliant. Last observed at 8 a. m.

January 31, 1882, 3 a. m. to 6 a. m.—Faint patches of light appeared low in the NE., which scon arranged themselves into the usual form of a faint broad arch, which rose slowly, and had reached the zenith at 4 a. m., when it looked exactly like an immense tail of a comet, curving from the NW. to the SE. horizon.—It soon afterwards faded, and was succeeded by faint nebulous light in various parts of the sky, chiefly in the NE.—Last reported at 6 a. m.

February 1, 1882, 6 a. m. to 9 a. m.—A few very faint arches were formed, differing from the usual character in the circumstance that their general direction was from N. to S.

Pebruary 2, 1882, 1 a. m. to 7.30 a. m.—First observed as a narrow wavy band, running from N.W. to S., with an altitude of about 50°. At 2 a. m. it had become lower and more sinuous and exhibited a rapid vibratory motion, its lower edge being slightly tinged with pink. It soon afterwards faded away, and was succeeded by occasional patches and whorls until 7.30 a. m., when it entirely disappeared. For the last few days the light of the aurora has been much dimmed by the brilliance of the moon.

February 2, 1882, 11 p. m. to ——.—At this hour a few streaks and patches were observed in the E., but the haziness and cloudiness prevented further observation.

February 4, 1882, 11 p. m. to 9 a. m. February 5.—Low arch in the NE., indefinite outlines, and rising very slowly. At 12 m. a few streamers appeared at its N. end, but did not continue long. Several similar urregular arches appeared up to 3 a. m. Streaks, patches, and bands appeared also at intervals during the same time, but afterwards it was too cloudy, and nothing more was observed until 9 a. m., when a few streaks were seen through breaks in the clouds in the zenith-

Fibruary 5, 1882, 11 p. m. to ——————At this time traces of auroral light were visible low in the NE., but the weather being cloudy nothing was had but an occasional glimpse through breaks in the clouds, so it was impossible to give a description. Magnets read very irregularly.

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innes, and inue long, appeared more was zenith, ow in the breaks in February 6, 1882, 10.30 p. m. to 9 a. m. February 7.—An irregular but rather bright arch appeared low in NE., with faint rays occasionally shooting from its N. end. Occasional arches followed, but they could not well be observed, owing to cloudiness. Last observed at 9 a. m. of the 7th. Magnetic needles very irregular.

February 7 and 8, 1882, 11 p. m. to 7 a. m.—Faint arch low in NE., rising slowly. The cloudiness of the sky prevented observation, but occasional glimpses were had of arches near the zenith up to 7 a. m. of the 8th.

February 8 and 9, 1882, 10.30 p. m. to 11 a. m.—Beginning of display could not well be observed in consequence of haziness of the sky, but occasional glimpses were had until 3 a. m. of the 9th, when there was quite a brilliant interval. Several bands passed through the zenith and on each side of it, running from N. to SE. The haziness was such, however, that it was only near the enth that a distinct view could be had. It was still visible from time to time until about 11 a. m.

Tebruary 9 and 10, 1882, 10:30 p. m. to 10 a. m.—Commenced low down in the N. and extended as low arches towards the SE, and SW., and afterwards rose to the zenith, but the haziness of the sky still obstructed observation. Last seen at 10 a. m.

February 10 and 11, 1882, 11 p. m. to 10 a. m.—This was the most brilliant display that has been observed for some time past. It commenced the usual way, as an irregular arch low in NE., anch rose slowly, and became brighter as it rose towards the zenith, but after reaching that point it immediately faded away. This was followed, in rapid succession, by other arches, brighter and broader, which mostly faded away on reaching the zenith, or broke up into numerous fleecy masses of light, which often spread over the greater part of the sky, and which, though individually not of great brightness in the aggregate, yielded an amount of light approaching that of a full moon. It differed, however, from moonlight in its more diffused character, but still large objects, over a ande distant, were clearly visible. Several times during the night arches were formed, which deserved the name much better then apporal arches usually do. Instead of being large and concentric or parallel, as is usually the case, they were end to end, small, and resting on long straight columns, running down to the horizon, as many as five appearing at one time. One in SE., one in the E., one in the NE., one in the N., and one in the NW. In most cases two arches sprang from one column and went in opposite directions. None of the arches were, of course, exactly symmetrical, but sometimes they approached it closely. Faint tints of pink and green were occasionally visible, but the prevailing color was yellowish white. The magnets displayed much irregularity.

February 12, 1882, 12 a. m. to 11.30 a. m.—Began very faint and went through the same succession of changes, but with much less brilliancy than last night. After 9 a. m. it was very irregular and mostly faint, and finally disappeared at about 11.30 a. m.—The needles, as usual, disturbed and irregular.

February 12 and 13, 1882, 11.30 p. m. to noon.—Began as usual faint and low in the NE., but did not increase much in brightness or become very extensive until after 3 a. m. of the 13th. After that hour arches, bands, and fleecy masses of light, very extensively distributed, succeeded each other quite rapidly. There was very little appearance of the parallelism usually observed, and seldom more than one band or arch appeared at the same time, but as each arch which retained its shape approached the zenith it generally became very broad and hung overhead like a great clonicated canopy, and again it stretched across the sky in graceful convolutions like an immense scroll, but the commonest form was that of irregular detached masses which spread over the greater part of the sky and faded into a sort of nebulous haze. The general motion was from N. to S. and tather slow. The magnets read irregularly, but there was not very much disturbance even when the whole sky was nearly covered with light. Ended about 12 noon.

Fibruary 14, 1882, 12.30 a. m. to 10 a. m.—Began as faint irregular patches low in NE., aftermids succeeded by the usual series of irregular arches, bands, and patches, but at no time was the 1 pby very brilliant; less so than on the two last preceding evenings. Last observed at 10 a. m.

Leberary 14 and 15, 1882, 11.45 p. a. to, 10 a. m.—Began as a faint light low down on the N. and NYE, horizon, appearing like twilight behind the haze and light clouds. Several arches afterwards appeared in the zenith through the clouds, extending in the usual direction from NW, to SE,, but the presented no marked feature other than the slowness of their movement. This slowness of motion seems to be increasing as the brilliance of the display decreases. Maintained a fluctuating

existence until 10 a.m. of the 15th, after which it was no more seen. Needles, as usual, reading

February 15 and 16, 1882, 11.30 p. m. to 7 a. m.—Began as faint light behind the clouds on large NW. horizon, and afterwards an occasional band or arch was dimly visible in the zenith through the clouds and were apparently for the most part stationary, and the last time they were visible was 7 a. m. of the 16th.

February 17, 1882, — to 10 a.m.—Time of beginning could not be ascertained, owing acceptable cloudiness, nor could the extent be observed from the same cause. Was last seen at 10 a.m.

February 18, 1882, 1 a. m. to ——.—First observed at 1 a. m., but owing to the increasing cloud incs no proper observation of its extent or brilliance could be had. Bands and whorls were some times visible in and near the zenith, where they seemed in or very near to the haze or thin 1 1. To the eye they seemed below it, but this could not be really the fact or more of their length at 1 have been visible than what appeared in the zenith. After 5 a. m. the clouds were too the form any light to get through.

Fibruary 19, 1882, — to ———Beginning or ending could not be observed, owing to be cloudiness. The display seemed to be quite brilliant, however, at times as its light could be through the clouds, although no stars could be seen at the time. The magnets were, as used by the clouds of the clouds of the clouds of the clouds.

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is a congress, to the constant of heginning not observed, owing to the clonests and only occasional glimps, s of it were had during the night, when in the zenith. Never the state of the constant of the cons

Peteracy 10 and 21, 4882, 11.30 ρ. m. to 10.30 a. m.—This was a rather beilliant display accidinated an e-what more motion than has been usual for some time. It commenced as pale not loss patches, sometimes in the NE., in N., and NW., but always rose rapidly and culminated in the zero, in after reaching which it remained stationary for a time, sometimes flashing and gyrand, and then gradually fading into a luminous haze to the southward. At 5 a. m. of the 21st, the whole sky for about 60°, on each side of the zenith, was filled with light which looked like a harmous cloud. There were periods of activity lasting about half an hour, with similar intervals of quiescence, which constituted a succession of waves which culminated in or near the zenith. Continued until obliterated by daylight, about 10.30 a. m.

soon are and formed a narrow, faintly luminous arch and rose slowly to the zenith, where it broke up into numerous patches which, after a time, faded away in a kind of luminous haze to the senting ward. Faint arches and patches thus succeeded each other at short intervals until a little become

the dawn, when they entirely faded away.

February 23, 1882, 2 a. m. to 10.20 a. m.—Begun as usual, very faint in the NE., and the usual succession of phenomena occurred. Narrow arches were found to be succeeded by whorls, patelo and nebulous haze, but on the whole there was more activity than has been displayed for successional rays appeared and several imperfect coronas were formed. At 5.15 a. m. of sections was quite brilliant. Numerous faint rays appeared converging in Ursa Major, then S. c. zenith. The motion was very rapid and some flashes of color appeared—green, yellow, and test zenith arches generally appearing as patches in the S. or SE, and were propagated to the northward. The display lasted, with periods of intermission, till daylight. The magnets were considerable dispatched.

February 23, 1882, 11.30 p. m. to ——.—Began in the usual manner in the NE., but althor, see etc. taint corona were formed they were not so brilliant as on the previous evening and evens was besides considerably more diffused light and luminous haze.

February 21, 1882, 12:30 a. m. to 10 a. m.—Appeared first as faint patches, which developed and faint, narrow bands and irregular arches, and faded away into the usual luminous haze. At the time was this display very brilliant, nor did it apparently pass through any of the active stands. The bands often broke into detatched masses which were scattered irregularly over the sky. Despected before the advance of the dawn at 10 a. m. The needles were disturbed.

February 25, 1882, 2 a. m. to 10 a. m .- Commenced in the usual way in the NE, but selde:

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assumed the arched form so common on other nights. Irregular-shaped masses of hazy light appeared in various parts of the sky, principally in the N. and SE., which extended imperceptible upwards until they formed broad cloud-shaped masses in or near the zenith, and then after a time faded away into the usual luminous haze. Needles disturbed. Disappeared before daylight; who if to a. m.

Proceedings 26, 1882, 6 a.m. to 7.30 a.m.—A faint patch appeared in the SE, and one in the N value a soon extended towards each other and formed a faint arch, which rose slowly until it reached the zenith, when it broke up into irregular-shaped masses, which arranged themselves round the zenith. In form almost circular. A period of activity then cusued, and numerous short rays shot of red and converged directly overhead. While in this condition it was simply a corona with the sening. A few tints of green, rose, and yellow were observed during this active period, but they were of very brief duration. The display lasted about fifteen minutes, and then sendually faded, and was no more visible after 7.30 a.m.

If we y 27, 1882, 3 a. m. to 7 a. m.—Impossible to determine the beginning or end of this was a strong to the cloudiness of the sky. It was occasionally seen until 7 a. m. The magnets are the tyled disturbed.

the erg 28, 1882, — to — ... —Too cloudy to permit observation. Auroral light was only some erge, near the zenith to the NE. Needles somewhat disturbed.

7. 4. 4. 1882, 7 a.m.—Seen through the clouds in the SE, at 7 a.m., but the rest of the night the acceptance of the second of

2, 1882, 9.15 a. m. to ——.—At 9.15 a. m. the clouds rolled off for a few minutes and left and the bright auroral band visible, passing through the zenith in a NW, and SE, direction.

3, 4882, 3 a. m. to ———Commenced faint and irregular, and at 4 a. m. there were two arches at right-angles to each other, the brightest running from X. to SE. Soon afterwards they became broken up into segments, and soon faded into the usual luminous haze, and as the sky conditional and obscured by clouds the termination of the display could not be ascertained. The many is, as usual, were agitated.

... vl. 4 and 5, 1882, —— to ——.—On the 4th and 5th, especially the former, there was magneticilistic bance at times, but being cloudy no aurora could be seen.

Take 6, 1882, 2 a. m. to 8 a. m.—First observed about 2 a. m., when three somewhat sinuous rays or bands extended from N. to 8E, about 10° west of zenith. Between 2 and 3 a. m. there was gate a brilliant interval when the sky in and near the zenith was covered with fleecy cloud-shaped aurora. There was very little apparent motion, and after 3 a. m. there was a constant electronse in brilliance, and after 4 a. m. but little light was seen. The last was seen at 8 a. m., when a faint ray was visible in the W.—The increasing cloudiness, however, prevented its termination from being observed.

Which 7, 1882, 1 a. m. to 9 a. m.—Commenced as faint rays in the N. and SE., which soon formed a narrow arch with a few streamers at its northern end. Occasional arches and scattered streamers followed at intervals, but none were very brilliant and there was much less of the luminous haze which has been so common during last month. After 4 a. m. only an occasional ray appeared until 6 a. m., after which no more were visible until just as the dawn began to appear at 9 a. m. at 15 a. m. local time), when a few rays appeared for a few moments just above the line of light in the E. and parallel to the rays of light coming from below the horizon.

Fixeh 8, 1882, 5.15 a, m.—The night was cloudy and only one glimpse of auroral light was had at 5.15 a, m.—The magnets were considerably agitated.

Merch 9, 1882, 3 a, m, to 8 a, m.—Commenced about 3 a, m, while the sky was partly covered by clouds. There were occasional displays of streamers, irregular curtains, and arches, accompanied by considerable motion. The streamers were long, pale and slender, and sometimes approached the coronal form converging towards the zenith. The prevailing character, however, was the diffused form distributed in patches all over the sky; the light threw the intervening chard-anto-strong relief and seemed on many occasions similar to the diffused brightness of the dawn. The general motion was from N, to S,, but it was mostly very difficult to determine its direction owing to the cloudness and the extensive distribution of the light. The sky became entacky cloudy after z a, m, and no more of the display was observed. The magnetic water cay

much disturbed and the perturbations were more than usually intense after sunrise and continued up to noon, local time.

March 10, 1882, 3 a.m.—Commenced about 3 a.m., but very little of it was seen owing to the cloudiness. There was considerable magnetic disturbance.

March 12, 1882, 3 a, m, to 5 c, m,—The usual time of commencement for some time back has been about 3 a, m, (10 p, m, local time). This was quite a brilliant display while it remained visible. At 4 a, m, there was a very broad irregularly convoluted arch through the zenith from NW, to SE, with a number of scattered whorls. There was little apparent motion, but still constant change; a little before 5 a, m, the clouds came suddenly up and obscured the sky, but the thinner portions were rendered quite luminous by the light behind them at 5 a, m,, but it was not visible afterward. The magnets were disturbed.

March 13, 1882, 1 a, m, to 9 a, m,—Appeared as soon as the twilight had faded sufficiently to permit it to be visible as a broken and sinuous arch from N, to 8E, with an elevation of about 45, which soon afterwards reached the zenith where it remained stationary for a short time, and then passed to the southward. Other arches followed, mostly broken and bright in places, with occasional rays shooting toward the zenith. The general motion was, as usual, from N, to S,, but most of the arches that appeared to swing round on their northern end as a pivot until they reached position running from N, to SW,, and an elevation of about 35° or 40°, when they became stationary. After 6 a, m, they became paler, but did not wholly disappear until the twilight rendered them invisible about 9 a, m, (4 a, m, local time); but slight magnetic disturbance.

March 14, 1882, 6 a. m. to 9 a. m.—Probably extensive, but the clouds were very dense and mobservation could be had. At 6 a. m. and 9 a. m. light shone through near the zenith. The needles were slightly disturbed.

Now h 15, 1882, 1 a. m. to 10 a. m.—Began probably during daylight, for it appeared as a narrow arch high up even before twilight had faded. After this, arch succeeded arch until the approach ing daylight rendered them invisible. The movement of the arches was in general from N, to S. Sometimes, however, after passing the zenith some of them seemed to pause and retrogade toward the  $N_n$  at the same time casting out numerous short rays from their upper side and exhibiting a good deal of motion. Sometimes tints of green and rose were visible, but they were faint and tranient. Several of the arches on reaching the zenith expanded into bread, irregular canopies which extended down on all sides as much as 25°. Sometimes several arches and irregular shaped curtains appeared at the same time, and faint, almost invisible, rays shot up to the zenith. At times the arches became broken up into numerous broken rays scattered over the sky, but close enough to gether and with enough parallelism to give them a very peculiar appearance, like patches of luminous send swept along by the wind; in fact a kind of luminous or auroral drift. Another peculiarity of those arches was that they did not rise from a low point near the horizon, as was usually the case earlier in the winter, but first appeared as faint rays in various parts of the sky, mostly in the N, and SE,, and then rapidly developed into arches mostly rather brilliant but mostly very narrow. There was besides a good deal of the usual haziness, especially towards the south ward after the arches had passed the zenith. The magnets were somewhat disturbed, but not remarkably so.

March 16, 1882, 3 a. m. to daylight.—This was a much more brilliant display than has occurred for some time; the degree of brightness was higher, there was more activity, and the variety of feature was greater. For some weeks back the successive phases of the phenomenon followed each other rather slowly, and even the culminations were not characterized by much intensity of brilliance, but on this occasion it was different; there was rapidity of motion both collective and vibratory, and brilliant culminations. The arches, bands, and whorls were very numerous and very irregular both in position and shape, the perfectly arched form being seldom reached until the light masses had passed the zenith and become pale to the southward. Sometimes the whole sky overhead was covered with a great field of fleecy light, which after passing through a variety of changes mostly seemed to fade away from the center, while the surrounding margin seemed to sink down towards the horizon like a great ring, which, as it slowly faded, gave birth somewhere in its northern or southeastern quarter to rays or wherls which soon developed into new arches or bands and new phases of the phenomenon. There were numerous rays, fringes, and curtains,

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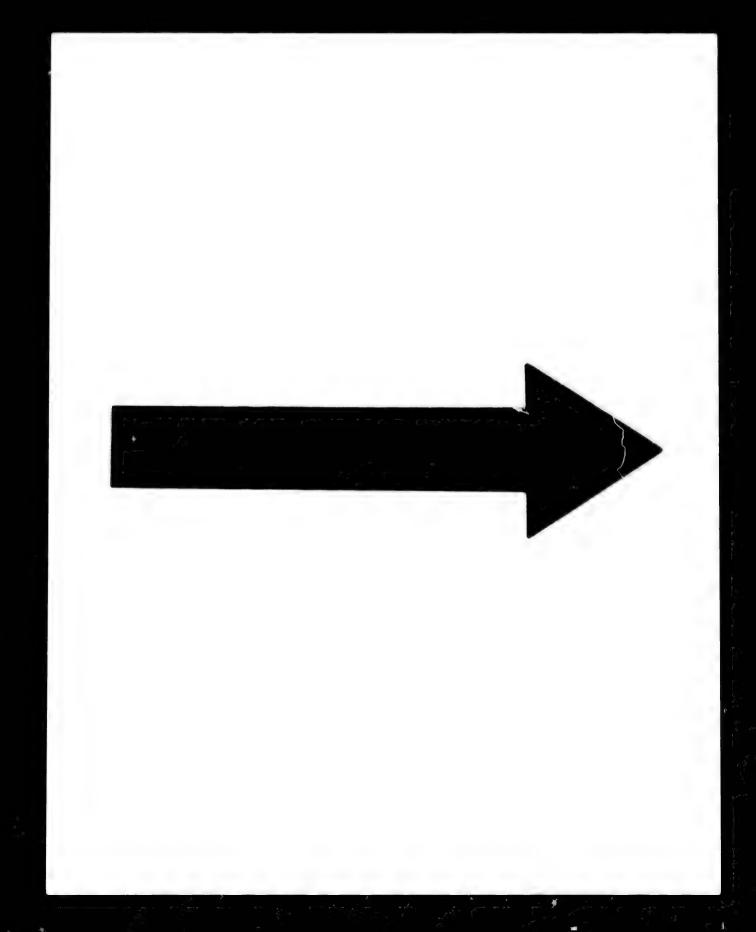
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occurred caracty of followed ensity or etive and rons and ied until he whole a variety cenaed to mowhere arches or currains, and often small canopies or imperfect corone were formed in the zenith. The culminating point was at 6 a. m., when a brilliant canopy of dancing rays, circling whorls, and waving banners covered the sky overhead and extended down on all sides 30 or 40 degrees. The culminating point was in Ursa Major, and the whirling, gyratory motion was not in the plane of an arch, but in that of a circle having its center almost in the zenith. There was but little variety of color—pink, rose, and green appearing occasionally at the base of the rays and columns. The brightness was at the maximum, the ice surface along the horizon out to sea being pretty clearly visible. The magnets were greatly disturbed.

March 17, 1882, 4 a. m. to 7 a. m.—This was not an extensive display, nor was it of long duration. The arches were not numerous nor very bright, and were very irregular in shape, more like great whorks or scrolls than arches. The only noticeable feature about them was that they never passed the zenith to the southward, but generally faded on reaching it. They commenced probably in the north and extended towards the SE., but displayed little motion and but few rays appeared. After 7 a. m., or 2 a. m., local time, it was no more visible. The magnets were very slightly disturbed.

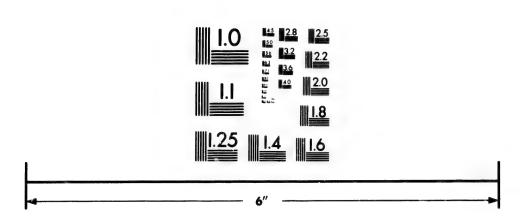
darch 20, 1882, 3 a. m. to 8 a. m.—Began probably some time earlier than 3 a. m., as imme-Eately on the clouds rolling off, a bright sinuous but broken arch was visible extending from NNW, to SE., and passing close to the zenith. After this for three hours there was quite a rapid since sion of bands, arches, and whorls, accompanied by much internal or vibratory motion. The ereal motion of the arches was from N. to S., but on several occasions they seemed to part in the middle when near the zenith, and the broken ends became folded up like a rope that had then at a high tension; generally, however, on reaching the zenith the arch broadened or divided up into several, or spread out into an immense field or canopy, dim at first in the center, and brighter round the margin. When this form was reached, numerous rays shot up from this bright margin towards the zenith, where a more or less bright but irregular shaped corona was formed which swirled and swayed and assumed a great variety of form, but was always of brief duration. At 4 a. m. (11 p. m. local time), the display had reached its maximum, where there was an immense canopy covering a great part of the sky, numerous streamers, several imperfect corone, and great vibratory activity. There were numerous flashes of color at the base of the streamers; ted and yellow were the predominant colors. This period did not last more than fifteen minutes, and was succeeded by the usual hazy condition of the sky, with a whorl and patch here and there. At 6 a. m. there was another period of activity, similar to the above, but on a smaller The activity was probably equal, but the brilliance and extent of their display was much There was one bright arch extending from about N. to SE., through the zenith with much point light on each side of it. Its center when overhead broadened, and being like a curtain waying to and fro, and looked remarkably near. After slightly passing the zenith it remained tationary for some minutes, and its upper side became very jagged or serrated, and seemed as if a trong wind were blowing against it, while projecting points protected it in front. This condition remained nearly ten minutes, and was indeed very peculiar. The jagged appearance was too irregular and too persistent to be caused by a series of rapid undulations, and conveyed very strongly the idea that a strong wind was blowing across the arch. After this there was very little activity and but few arches, and all faded at the approach of the dawn. The magnetic disturbance was very great, especially during the appearance of greatest activity. There was great decrease in horizontal force and increase in vertical intensity, and a large increase in declination to the eastward.

March 21, 1882, 2 a. m. to daylight.—Not a brilliant display, but there was great rapidity of change and motion. There were very few perfect arches, the general form being that of whorls and patches, which were scattered nearly all over the sky. It was last visible at 9 a. m. (4 a. m. local time), when there was a period of great activity, the flashing of the light being faintly visible overhead, notwithstanding the brightness of the twilight. There was very great magnetic distribute, the greatest we have had since this year commenced. The needles were very much agitated, but at 9 a. m. the agitation became extreme; the bifflar needle went far out of the field and remained for two hours out, the force greatly decreased. The unifilar was deflected 25 30°



M1.25 M1.4 M1.8

IMAGE EVALUATION TEST TARGET (MT-3)



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from the meridian towards the E, and the dip increased about 2° above its average amount,  $|\psi_0|$  needles did not get back to their normal condition until about 4 p. m.

March 22, 1882, 3 a, m. to 7 a, m.—A faint and irregular display, with very little motion few faint arches developed in the NE, and rose slowly to the zenith, but as clouds lay along to the southward the light soon became lost behind them. At 7 a, m. the sky was completely overcome which rendered it impossible to determine whether the display continued till daylight or not. The needles were but slightly disturbed.

March 24, 1882, 4 a. m. to ————————Very irregular and not brilliant, but as the sky was medical cloudy until the coming of daylight it could not be well observed. The needles were only slightly, distarbed.

March 25, 1882, 3 a. m. to 8 a. m.—Faint and very irregular, but could not well be observed, owing to the cloudiness; was last seen at 8 a. m.; needles reading irregularly, but not much at tated.

March 27, 1882, 2 a. m. to daylight.—Rather more brilliant than the preceding one. The abelia were much more numerous and bright, but the brightness of the moon dimmed them conside a 7. The arches mostly formed in the NE., but seldom rose higher than the zenith until about 7 a m. when they began to pass to the S. At 8 a. m. (2.43 a. m. local), there was a bright convolute a curtain in the NE., just outside of the boundary line of the advancing twilight, which exhibited much lateral and vibratory motion and the needles were considerably agitated.

March 28, 1882, 3 a. m. to 6.15 a. m.—The beginning of auroras cannot now be determined with much correctnes; owing to long continuance of daylight. They are generally firs; some about two hours after sunset and generally high up near the zenith and at present the brightness. of the moon dims their brightness considerably. This display was first observed as a pale street rising vertically from SSE,, and occasional pale arches followed without exhibiting much brillians. and mostly faded out in the zenith. At 6 a. m. (12.43 a. m. local), a convoluted arch appeared to the southward at an elevation of about 50° where it hung for a short time and passed through a var. of changes until about 6.15 a.m., when it suddenly moved upwards to the zenith where it follows: a very brilliant corona and exhibited the most intense activity, swirling and gyrating with great rapidity. The principal motion was not that of detached vibrating rays but that of a kind of a tertwined curtain or fringe which was bent back and folded on itself into a kind of true lover. knot, which seemed to hang out of the sky. The vibrations followed each other from right to left in direction of length of the figure, passing round every turn and convolution and coming back to their starting point with too great a rapidity for the eye to follow. There was great variety of color from the intensest red, yellow and green through every shade and variety of those colors: rose being probably the predominating color. The whole period of activity lasted about ten minuteafter which the corona expanded, lost its activity, and spread over the sky as a kind of milky haze Clouds soon afterward intervened and no further display was seen. During the active period (1) vertical intensity was greatly increased accompanied by a strong easterly deflection, and a decreain the horizontal force.

March 29, 1882, 3 a, m. to 7 a, m.—When first observed as daylight faded the arch had alread: passed the zenith but was very pale. The display was not a noticeable one, mostly appearing as hazy masses and partly formed bands or curtains of no great brilliance and was not observed after 7 a, m. The needles only slightly disturbed.

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March 31, 1882, 4 a.m. to 8.15 a.m.—Began later than usual and was very faint. It was mostly confined to a single ray rising from the SE, towards the zenith and occasionally extended through to the NW. Sometimes none were to be seen for a short time, but the brightness of the moon may have hidden it. It was last seen after 8.15 a. m. (2.43 a. m. local), but the needles which had been steady during the greater part of the night became disturbed and read very irregularly for several hours afterwards.

Inril 3, 1882, 2 a. m. to 7 a. m.—Very pale and irregular shaped. Appeared only occasionally and mostly near the zenith. The cloudiness of the sky prevented it being observed. The moon being about the full and the clouds somewhat striated it was often difficult to say which was cloud and which aurora. Magnets somewhat disturbed.

April 4, 1882, 4 a. m. to 6 a. m.—First seen at 4 a. m. The brightness of twilight and the moon Leagy too great to permit of its being observed much sooner. First appeared as a faint narrow arch running from from N. to SE, with an elevation of about 20%. A few rays appeared and the arch assumed a curtain form, which was soon succeeded by the usual hazy condition of the sky. At 5 a.m. a similar curtain appeared for a short time, extending from NW, to SE, and elevated about 20 - above the horizon. At 6 a. m. a faint corona was formed with long, slender, and very faint rays converging towards zenith, but although displaying considerable motion no variety of olors was noticeable. It was only of few minutes' duration and was again succeeded by the hazy regulation of the sky. Clouds soon afterwards covered the sky so that nothing further could be . . . The needles were considerably agitated.

1,775, 1882, --- to --- Beginning or end not known in consequence of the cloudiness, egg at 5 a.m. (11.13 p. m. local of the 4th) the clouds around the zenith were all rendered largers as by transmitted light, the aurora behind them being apparently very bright. The magnets

were very much disturbed, the disturbance continuing until the afternoon.

17 6, 1882, 4 a. m. to ------The brightness of twilight prevents the beginning of displays being correctly ascertained, and when this one was first observed it was rather brilliant in the SE. at an elevation of 40°. While in this position, rays and streamers were rapidly developed which shot up towards the zenith while individually possessing a rapid swirling motion. An arched form combined with that of the curtain was then assumed, which extended across towards the NW., rising at the same time towards the zenith, the motion of translation being from W. to NE. Alter reaching the active condition it ceased and was succeeded by the usual hazy appearance of the sky. During the burst of activity the base of the whirling rays was often tinged with pink and rose; the prevailing color was yellow. During this time the magnets were much-disturbed, the vertical intensity on eastern declination being largely increased and the horizontal force decreased. Afterwards but little was seen, but as the cloudiness increased very rapidly it was impossible to say if any further bursts occurred. The needles were occasionally disturbed until everal hours after sunrise.

April 7, 1882, —— to ————The 7th was cloudy, but the magnetic disturbance was large.

Ipril 8, 1882, 4 a. m. to 7 a. m.—Began as a narrow band in the SE, stretching toward the N., which after a few minutes' quiescence became active and displayed considerable motion and a few traces of color, but very soon broke up into hazy patches. At 5 a, m, a narrow pale yellow arch extended across from NW, to SE, at an altitude of about 35% above the S, horizon. After remaining stationary for a short time it rose towards the zenith. Pale slender rays shot up from its eastern end, and several small patches of yellow light in a condition of rapid motion appeared along it. There was a slight approach to the coronal form, but all faded very rapidly, and at 5.20 no trace of it remained; no more appeared until about 7 a. m., when a faint ray appeared in the N. just outside of the line of twilight. There was a strong easterly deflection of the declination needle and an increase in the vertical intensity and decrease in horizontal force.

occurred, but only lasted about ten minutes. When first seen it was in and around the zenith, which was tilled with whiching vibrating rays. Flashes of green and rose appeared, but yellow, as usual, was the prevailing color. The magnets were considerably disturbed, the vertical intensity increasing, the horizontal force decreasing, and the deflection and netimes E, and sometimes W.

The night became cloudy and no more was seen.

April 10, 1882, 3 a. m. to 4 a. m.—The sky was hazy and partly covered with foggy stratus clouds, so that only the larger stars were visible, and then only near the zenith; besides, the twilight was so bright behind the clouds that it was sometimes very difficult to say which was twilight and which aurora. At 3 a. m. several pale white bands, probably auroral, extended from SE. to N. and to the E. of zenith. At 3.15 a. m. a pale yellow arch, certainly auroral, appeared in the SW, with an altitude of about 20°. At 4 a. m. there were luminous traces in the SE., but the clouds soon afterwards became too dense, and nothing more was seen. Needles slightly disturbed.

April 11, 1882, 4 a. m. to 6 a. m.—About the usual time as a faint ray running from SE to NW, with an altitude of about 30° above the SW, horizon. At 5 a. m. it had moved up to the zenith, where a kind of clongated corona was formed, the clongation being in direction of the length of the arch. This had been the general form of all the corona that have appeared. Elementated in direction of the arch and compressed at right angles to it. I may here remark that the autoral light is almost always something more, apparently, than simply so many areas of light of various shapes. It is composed of luminous medium which seems quite tangible, more like luminous cloud or dense vapor than anything else. Its distinctness of character and outline strongly tends to give it an appearance of nearness which I had never noticed any place else, but at the same time I have never been able to observe a case of where it appeared below any cloud strata. The clouds are often rendered luminous by it, but I am almost certain that in every case it was oy transmitted light. At 6 a. m. a faint streak was visible in the NE., but the twilight soon became too strong to permit its being visible.

April 12, 1882, 4 a. m. to 6 a. m.—Very faint, but interfered with by the increasing brightness of the twilight. At 4 a. m. there was a pale narrow arch running from the SE, horizon, S, of zenith, to NW, with an altitude of about 30°. After a short time this broke up into hazy patches which occasionally emitted a few rays, and appearing and disappearing from time to time until 6 a. m., after which the daylight was too bright to allow them to be seen. Magnets steady during the time display was visible, but some time after sunrise they were largely disturbed, the disturbance however, lasting only for a short time.

April 13, 1882, 5 a. m. — 3.—A few patches appeared in the SE, at 5 a. m., exhibiting considerable motion. The highest and brightest was immediately below a Boötis. They being immediately afterwards overcast, no more was seen. The needles were considerably disturbed for several hours after.

April 15, 1882, 5.50 a. m. to ——?.—Weather cloudy, but about 5.50 a. m. (12.30 a. m. local) auroral light appeared a little southward of zenith and apparently in rapid motion, the direction of motion being from S. to N. From the character of the light when in zenith there was a corona formed possessing a rapid gyratory motion. The magnets were largely disturbed, the horizontal force decreased, and vertical intensity being increased, and the easterly declination also increased; the needle swinging out of field, but afterwards there was a westerly deflection, but not so pronounced as the easterly. No more of the display was seen, but the needles continued unsteady for several hours afterwards.

April 16 and 17, 1882, magnetic storm.—On the 16th, about 1 p. m. (8 a. m. local) a very intense magnetic storm set in, which continued at intervals until about 9 a. m. of the 17th. The night was cloudy and no aurora was seen; the greatest disturbance, however, took place in the daytime. At first there was a strong E. deflection attended by a decrease in the horizontal and an increase in the vertical intensities, but about 7 p. m. there was a great change, the deflection changed to the W. so that the azimuth circle had to be moved several degrees to bring the needle into the field. An increase took place in horizontal force and an increase in the vertical intensity. Again, after a period of about five hours another change took place to the E., the vertical intensity increasing and the horizontal decreasing as usual, which conditions continued to the end.

April 20, 1882, 5 a. m. to —— ! .—At 5 a. m. auroral light was discernible a little S. of zenith The twilight was too bright to allow a distinct view to be had. The magnets were considerably disturbed. A very intense disturbance, however, took place some hours previously, commencing at 11 p. m. (5.43 p. m. local) of the 19th, and continuing more or less to 6 p. m. (12.43 p. m. local) of the 20th. The range of the various changes of declination amounted to over 10°, while that of the dipping needle amounted to 7°. The greatest deflection was westerly, but the E. was

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5. of zenith onsiderably ommencing p. m. local) while that the E. was of much longer duration. As formerly, the westerly deflection was accompanied by an increase in horizontal force and a decrease in the vertical intensity, and the E. by an increase in the vertical intensity and a decrease in the horizontal force.

September 3, 1882, 4 a. m. to 4.30 a. m.—When first noticed at the 4 a. m. observation, the twilight was still bright in the N.—The aurora appeared in the constellation Auriga, as a small arched band rapidly shifting, extending in azimuth from about N. 70° E. to N. 90° E. (brightness 2) and showing faint tinges of red, green, and yellow. In fifteen minutes the whole aurora had risen and greatly extended, forming a number of sinuous shifting bands, color white brightness 2, extending from the NNE. horizon to SSW., passing through Ursa Major, Ursa Minor and Cygnus. At this time the needles were slightly agitated, while the earth currents showed no disturbance. Fifteen minutes later the aurora had disappeared, except a few scattered streaks, which continued faintly visible for an hour.

September 4, 1882, 4 a. m. to 4.05 a. m.—The sky was still quite light and overspread with chough hazy cirro-stratus cloud to dim the stars slightly. When noticed at the 4 a. m. observation the aurora occupied mostly the whole of the eastern sky, reaching the zenith. Color white; brightness 2; form utterly inconstant, shifting with the rapidity of lightning. In general the bands had a north and south direction and were inclined to be sinuous. The display was most prominent in the constellations Cassiopeia, Auriga, and Camelopardalis. In five minutes only a few pale streaks were faintly visible. The magnetic needles were slightly agitated.

September 5, 1882, 2 a. m. to 7.30 a. m.—The aurora appeared at 2 a. m., while the twilight was so bright that no stars were visible. It was then a slightly luminous band, white and unstable, extending from the SE, horizon to NW, about 10° W, of zenith; brightness 1 to 2. At 3 a.m. the bands were broad and more numerous, sinuous and shifting, running from N. to SE. through Ursa Major, Ursa Minor, Cassiopeia, and Pegasus; brightness 2; color white, with several paler arched bands in SW., one of which at 3.15 had reached the brightness of 3, with a bright yellow color, while the main aurora had somewhat faded. The magnetic needles were slightly agitated. At 1 a. m. the aurora overhead had almost wholly disappeared, while a new band had appeared in Taurus near the NE, horizon, extending into Gemini. This band was yellow, sinuous, and rapidly changing in form, approaching, however, the curtain type. Altitude about 20°; brightness 3, brightest in Hyades. It was replaced at 4.15 by a comparatively steady pale (1) arch with streamers, reaching its greatest altitude close above a Geminorum, extending in azimuth about 40°. At 5 a.m. a sinuous band with streamers was observed in Canis Minor, stretching into Hydra close to eastern horizon (brightness 2). At 6 a.m. there was an extensive sinuous band, approaching the curtain form, mostly in Hydra and Virgo. This showed violet color in Hydra, where it was brightest (5; elsewhere 2). The whole aurora was exceedingly changeable and shifting, ending with a long sinuous band, pale (brightness 1), running through Ophiuchus, Corona Borcalis, and Canes Venatici.

Neptember 6, 1882, 3.30 a. m. to 6 a. m.—As early as 3.30 a. m. streaks of auroral light were visible through the fog, and at 4 a. m. a definite aurora in the form of a pale band stretched across from the southern horizon to the W. of the zenith, starting in Aries and passing through Triangulum, Andromeda, Lacerta, and Cygnus, and ending near a Lyra. This band moved towards the zenith, fading and reappearing, and at 4.05 passed through Cassiopeia. The fog cleared as the night grew darker, and the aurora appeared as bright horizontal bands near Aquila. At 5 a. m. a bright (2 to 3) sinuous arched band with streamers ran along the western horizon, from Libra, through Hercules and Vulpecula, to Pegasus. At 5.30 a brilliant whirl in the S. sent up streaming bands, one through Cassiopeia across the zenith, ending in Boötes: a second through Andromeda and Cepheus, ending in Corona Borealis; a third through Pisces to Aquila. The aurora ended with a single sinuous band running up through Taurus and Auriga from the southern horizon and reaching to Ursa Major.

September 12, 1882, 4.17 a. m. to 4.50 a. m.—The clouds which had covered the sky during all the evening cleared off near the zenith at 4 a. m., and at 4.17 a white, hazy but well defined rather narrow band, shifting its position, appeared stretching from NE. to SW., passing through Ursa Major, Ursa Minor close to the zenith, and Cepheus, ending in Cygnus (brightness 1). The mag-

netic declination and vertical force were but little affected, while the horizontal force was very greatly increased. The band was invisible at 4.50, and the sky soon clouded over.

Neptember 15, 1882, 2 a. m. to 7 a. m.—As early as 1 a. m., while the twilight was still bright, pale whitish bands were to be seen crossing the sky from the N. to SE. These at 2 a. m. had developed into an aurora, brightness as high as 2, beginning near the SE, horizon in Pegasus, where it was brightest, narrow, and of a yellow color. As it approached the zenith in the form of a sinnous shifting band it became somewhat paler, and stretched in width from Cassiopeia to Cygnus, narrowing again and ending in the twilight just below Ursa Major. Most of the aurora was white in color. At 3 a. m. a broad arch (brightness 3) passed from the SE, horizon, begin ning in Pisces and running through Pegasus, Andromeda, Lacerta, Draco, and the tail of the Dipper, and ending in Canes Venatici. Slight magnetic disturbance. At 4 a. m. the sky was hazy and no aurora visible, and at 5 a. m. the sky was clouded over. At 6 a. m. pale bands (brightness 1) stretched across the sky from Taurus and Aries in the SE, through Ursa Major near the zenith, ending in Corona Borealis. At 7 a. m. there was one pale band (brightness 1) in SE, occupying the constellations Gemini and Leo, and another similar but smaller band low in W., in Hercules and Vulpecula.

Neptember 25, 1882, 2.17 a. m. to ———. Up to 2 a. m. the sky was completely covered by heavy stratus clouds, but at 2.17 these broke away near the zenith, exposing several horseshoe-shaped concentric sinuous arches rising from the N. The apex of the brightest arch was near Polaris, and other paler bands apparently forming part of similar arches were visible in Cassiopeia. The near arch had a brightness of 2, the others about 1, and all appeared quite unstable. The sky continued much covered with rapidly moving clouds and the aurora was only visible at intervals through openings between them. At 3.17 a.m., three pale (0 to 1), motionless, slightly arched horizontal bands were visible in the N., in the constellation Canes Venatici. At 4 a. m. the sky was much clearer, and a band of streamers pointing towards zenith flashed across the sky from NW, to S. on an arched course at an altitude of about 45°. The motion of translation from N. to S. was very rapid and accompanied by a rapid vibration from S. to N., and rice versa. The brightest part of the display was tinged with red and yellow, and reached a brightness of 3. At 4.17 there was a a small patch of aurora reaching a brightness of 3 in the constellation Aries on the SE, horizon, This had the form of a vertical sinuous streak, and showed red and yellow colors, fading rapidly and shifting and twisting. At the same time the clouds in the SW, were illuminated with a bright greenish auroral glow. After this the sky became completely overcast. A magnetic disturbance began in the afternoon and continued all night (local time), the declination varying through a range of 1° 38′, the horizontal force .424 and the vertical force .055.

September 26, 1882, 3 a.m. to 6 a.m.—At 3 a.m. the clouds had broken away so as to leave the northern sky clear, and then there appeared three horizontal curtains taking in about 452 of azimuth from the N. to NE., the altitude of the highest being about 30°. They occupied for the most part the constellation Leo, though with the twilight and moonlight it was impossible to see the stars distinctly. Their brightness was 3, the lower edge of each curtain colored bright rose, then yellow, and finally pale yellowish green. There was a rapid lateral vibration and the whole had completely faded in about five minutes, leaving only a few bright streaks, and a new curtain then formed a little farther to the E. At 4 a. m. there were small patches in Beötes and a quiet narrow arch, greenish with a faint rose tinge on lower edge, brightness 3, running from near Arcturus, on the northern horizon between Castor and Pollux, and ending in the clouds near the Hyades. This had entirely faded at 4.17, when a broad sinuous band rapidly developed from the N. running from near Arcturus, through Ursa Major, Ursa Minor, Cassiopeia, and Taurus, toward the SE, horizon. This moved rapidly towards the W., reaching Cygnus in two minutes and quickly fading there, the southeast end in the meanwhile having broken into irregular streaks. At 5 a, m, the aurora was faint and pale yellowish green, in the form of two streaks running through Leo, Gemini and Cancer. At 6 a. m. a broad bright sinuous band crossed the sky from N. to S., passing through the zenith and moving rapidly toward the E. Brightness 3. The sky then became cloudy. A large magnetic disturbance lasted through the aurora, with decrease of all three elements.

September 30, 1882, 1.17 a. m. to 4.30 a. m.—The aurora was fully developed at 1.17 a. m., when

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the clouds broke away sufficiently to allow it to be visible. It was very pale (0 to 1) and in the form of a sheaf of narrow, quiescent, white, hazy bands, stretching neross the sky in the NE. from a point near Arcturus in the N. through Ursa Major, Auriga, and Perseus. At 2.17 the clouds were merely open enough to show traces of aurora in the form of pale streaks in Ursa Major, in the N. and overhead. At 3 a. m. the sky was quite clear, and only pale, quiet, white bands, radiating from a point in Boötes near the NW. horizon and converging to a point in Taurus near the SE. horizon, covered nearly the whole sky. The light was much dimmed by the full moon. At 3.17 and at 4 the aurora was essentially unchanged, though some bands faded and others were formed, and the whole was much obscured by haze at 4. At 4.17 there was rapidly developed near the southern horizon, dimly visible through the haze, a twisted horizontal band with a rapid aution and indications of color which must have had a brightness of 3. The stars near it were invesible. After this the aurora faded, none being observed at 5 a. m.

October 8, 1882, — to 8.30 a.m.—The sky was alternately clear and overcast during the early part of the night, but no aurora was noticed until 4.45 a.m., when bright bands, white and motionless, crossed the zenith from N. to S. The sky soon clouded and no aurora was observed at the 5 a.m. observation. At 6 a.m. a quiet yellowish band had passed up from Orion on the SE, horizon nearly to Cassiopeia, then declining towards Andromeda (brightness about 1). At 7 a.m. a small yellowish patch in Taurus (brightness about 1) was all the aurora visible. At 8 a.m. another pale yellowish green arch stretched from the N. to the E. point of the horizon, reaching an altitude of about 20°. At 8.30, though the sky was perfectly bright and clear, no aurora was to be seen. Neither the galvanometers nor magnetic instruments indicated any disturbance.

October 10, 1882, 2 a, m, to 6 a, m.—Light snow fell during most of the night, but the sky cleared at intervals. At 2 a, m, traces of aurora were visible through the hazy clouds, in the form of a quiet band running across from N, to SE, near the zenith. At 4 a, m, the sky cleared 50, showing a bright patch in Aries near the S, horizon with some horizontal bands in SW,, brightness 2 to 3. At 4.17 bands, brightness 2, beginning in Lyra and passing through Cygnus. There was no rapid motion or vibration, only a slow drifting and breaking of the bands, which quickly faded and new ones developing, especially one somewhat twisted and undulating from Lyra, through Cygnus and Andromeda, to Aries on the S, horizon. At 5 a, m, the arch was in the SW,, running from W, to S, yellowish in color and vibrating rapidly, also twisting up and down vertically. At 6 a, m, a bright band passed from NE, to SE, with a rapid lengthwise vibratory motion, several times parting in the middle. The clouds then became too thick for the aurora to be seen. A considerable magnetic disturbance commenced at 6 a m., continuing twelve hours.

October 11, 1882, 3 \(\epsilon\), m, to 4.30 \(\alpha\), m.—Light snow was falling up to 3 \(\alpha\), m, when the hazy nimbus cloud broke rapidly away, disclosing a white hazy band (brightness 0 to 1), quiet, stretching across from Herenles in the N., through Cygnus, Lyra, Cassiopeia, and Andromeda, ending in clouds near Aries in SE. This was a little brighter at the SE, end at 3.47, when the horizon again thickened up. At 4 \(\alpha\), m, the sky was again clear, but the aurora had faded to a pale band on the edge of the clouds in the SW,, and in 10 minutes there was only a vague luminosity in the E, and SW. During the rest of the night the sky was cloudy.

October 12, 1882, 12 midnight, October 11, to 9 a.m.—The sky cleared suddenly, disclosing an arch in the NE, with its crown in Andromeda, and its extremities buried in the clouds. Its brighters swas 2, and it continued to rise and spread till, at 1 a.m., a broad, bright simous band ran from the N. to SE. horizon, occupying mostly the constellations Corona Berenices, Usar Major, Camelopardalis, Persens, and Aries. Until 1.17 the only change was a slow spreading and undulation, maying from the zenith eastward and slowly back again. The N. and SE, ends remained quiet, the SE, end the brightest, while the center changed into one, two, and three bands of vertical streamers and back again to wavy bands. The brightness of the band was from 3 to 4, and the ed, a were tinged with rose and green. There was a magnetic disturbance, with increased decliration and decreased horizontal force. At 2 a.m. there was merely a quiet atch, with streamers

running from Leo, on the N. horizon, reaching its greatest height above a Geminorum, passing through the Hyades and ending at a point below these on the SE, horizon. This had faded almost completely at 2.17, and a few pale streaks crossed the zenith from N. to SE. The aurora was similar in character to this at 3, but the arch passed between Castor and Pollux. The magnetic needles had in the mean time returned to their normal readings since the disturbance at 1 a, m. At 4 a. m. a broad hazy band stretched from Boötes close to zenith through Cygnus and Lyra to the SE, in Aries. At 5.17 this began to spread and break up, rapid gyratory motion commencing in Cassiopeia, and spreading in a few minutes all over the sky except the NE. There was an indescribable confusion of smoke-like wreaths, whirls, curtains, and shooting streamers. The motion was all gyratory, or motion of translation, very rapid and in no given direction. A special center of gyration, whirling from N. to S., developed rapidly and as rapidly disappeared in Perseus. The display reached a brightness of 3 to 4, and showed rather faint colors-green, rose, and peach-blessom. In about 5 minutes all became suddenly pale and quiet, but showed sign of breaking out again. At 5 a. m. a pale yellowish band ran from N, to SE, horizon, reaching an altitude of about 40°, quiescent (brightness 1 to 2). At 6 a. m. three arches were observed forming a triangle (brightness 1 to 2). At 7 a.m., one broad band crossed the zenith from NW, to ESE, (brightness 1 to 2). No aurora was observed at 8, but at 9 a, m, a pale, arched band (brightness 0 to 1) was observed low in the SW. (26° altitude), running from Canis Minor in the SE, to the lower part of Taurus, through Orion. This was the end of the aurora, fading before daybreak.

October 13, 1882, 2 a. m. to 9.50 a. m.—The haze which overspread the sky was quite thin at 2 a. m., and a hazy, quiet, arched, and slightly simuous band, white in color, passed from a point in Taurus on the SE, horizon to a point in Coma Berenices on the northern. The arch slowly rose; the crown being just above Castor and Pollux at 2, close to Capella at 2.10, and when last observed at 2.17 just above Capella and still rising, the band spreading slightly (brightness 1, rising to 2 at the N, end at 2.10). At 3 and 4 this aurora was replaced by a few vague traces. Up to 9 a. m. no aurora was observed, the weather being hazy. At that time a white, quiet arch was observed passing from the ESE, through Canis Minor and Taurus to the WNW., about 2° in breadth, altitude 50° brightness 2. At 9.20 there was a second arch about 2° above and parallel to the first, not continuous, but consisting of a series of luminous patches resembling long-drawn cirrus clouds, motionless, and similar in brightness to the first arch. At 9.40 a. m. the western extremity of the first and broader arch was observed to slowly change form until it resembled the folds of a curtain, when the whole slowly drifted southward and disappeared about 9.50 a. m.

October 14, 1882, 2 a. m. to 9.46 a. m.—At 2 a. m. a narrow and barely perceptible band, perfeetly straight, ran from the SE, horizon through Andromeda nearly to the zenith, paler than the Milky Way. This was perceptibly brighter at 2.20, and there was a pale glow along the horizon in the NE. At 3 this had developed into a slightly sinuous band running from the SE, horizon through Pegasus across the sky through Cygnus and Lyra to the NNW. (brightness 1). Also a pale arched band, much curled at the east end, from Taurus through Auriga, running close to the Dipper and fading in the N. The main arch drifted to the SW, slowly and beamed brighter (1 to 2), dividing longitudinally into three bands, while the eastern aurora faded. At 4 a. m. three bands crossed the southwestern sky, united at the horizon, and spreading at the center from the SE, to NW. Altitude about 20°, breadth at broadest part 10°, brightness 2 to 3, occupying constellations Pegasus, Delphinus, Aquila, and Ophiuchus. Upper band somewhat broken into streamers, especially at SE, end. This was all fading rapidly at 4.20. At 5, two luminous yellowish bands (brigh(ness 2 to 3), passed from SW, to NW, through Delphinus and Serpens. At 6, one arch, with bright streamers moving from W. to E. and vibrating, passed from Orion through Ursa Major and ended in Boötes (brightness 3). At 7, a band (brightness 2 to 3) ran from Cancer through Ursa Minor. At 8, a band with bright streamers at the north crossed the zenith from NNW, to SSE. (brightness 3 to 4). The whole moved slowly southward. At 9, a broad, broken, vaporous arch from N. to S. crossed the zenith. This changed its form a little but not its position, until it faded about 9.46 (brightness 0 to 1).

October 15, 1882, 12.5 a.m. to 10 a.m.—The aurora commenced as a narrow pale band, beginning near the Pleiades and running along the horizon fading in Gemini. This was a little brighter at 12.20. At 1.20 it extended across the zenith from Aries on the SE, horizon to Leo on the

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northern, consisting of several sinuous bands, shifting and somewhat wavy, occupying Taurus, Persons, Cassiopeia, Ursa Minor, and Ursa Major (brightness 3 to 4), color white, with tinges of green and yellow; motion undulating and rather rapid. At 2 a. m. the aurora passed through Boötes to Leo Minor and to Gemini. At 3, two bands rose together from Serpens near the horizon, one passing through Pegasus and Cygnus, and the other through Andromeda and Lacerta, while an arched band crossed the eastern sky from Boötes in the N. to Taurus in the SE., massing through Ursa Major. Both sets of aurora were quiet and yellowish (brightness 3 to 4). At 4, a broad, quiet, white band (brightness 2) crossed the zenith from Leo Minor through Ursa Major, Ursa Minor, and Cygnus, ending in Sagitta. At 5, three bands (brightness 3) crossed the zenith, occupying Lyra, Cygnus, Cassiopeia, Pegasus, and Taurus, with a few bright streamers in the NNW. At 6 a. m. an arch (brightness 2) ran from Boötes through Canes Venatici and Lynx, ended in Gemini, while a double arch (brightness 0 to 1) lay about 10° above the SW, horizon, running from NNW, to ESE. This arch was still in the same position at 8 and had become a single band at 10. At 7 there were pale patches of yellowish light in the NNE, near the horizon. Between 9 and 10 the arch in the SW, was bright, quiet, and well defined, with tremulous streamers (brightness 3 to 4), colors bright green, yellow, and rose. Extensive magnetic disturbance.

October 16, 1882, 12.40 a. m. to 4 a. m .- Streamers flashed up in the E., forming a low arch from Taurus in the SE, to Leo in the N., with the crown in Gemini (brightness 1). At 1 a. m. there was a definite narrow arched band with one end in Leo in the N, and the other in the lower part of Aries in the SE., with the highest part in Auriga and Perseus. From the northern end numerous long quiet streamers ran up as high as Ursa Major (brightness 1). The whole was rising slowly when last observed at 1.20. From 2 to 2.20 the aurora was in the form of a broad band, narrow at the ends and spreading, and crossed the zenith from Pisces in the SE., near the horizon, to a point in Boötes, near the northern horizon. It occupied chiefly the constellations Andromeda, Perseus, Cassiopeia, Ursa Minor, and the western portion of Ursa Major. The band was slightly sinuous, and by imperceptible degrees changed its shape without changing its position, breaking into several bands, and consolidating itself into one again, its brightness increasing from 1 to 2. An eastern band joining this at the ends passing through Auriga was well defined at 2.17, and almost wholly gone at 2.20. At 3 the aurora was in the same place, but had grown paler and more diffused, while at 3.15 the eastern band was again well developed and the aurora was spreading westward as far as Cygnus. At 4 the sky was so hazy that only the brightest stars were visible, but through the haze twisted bands of aurora in rapid motion were to be seen. After this the cloud thickened up and no more aurora was observed. A magnetic disturbance commenced at 3 and lasted till 7 a.m., with decrease of horizontal force from .530 to .215, while the declination increased 60 07', the vertical force being but slightly affected.

October 17, 1882, 11 p. m., October 16, to 10 a. m.—Before the stars were definitely visible a twisted band of aurora was observed across the zenith from the NNW, to the SE, (brightness 1). At 2.17 there were three bands nearly overhead, running from NW, to SE, through Ursa Major, Ursa Minor, Cepheus, Canes Venatici, and Boötes. These bands were white, tinged with greenish (brightness 2), with undulating motion, the ends shifting and disappearing. The magnets were slightly disturbed. At 1 a. m. there were two small horizontal curtains in Taurus, from whose western end rose a broad, spreading, sinuous band across the zenith to Boötes in the N., occupying Andromeda, part of Cassiopeia, and Ursa Major, spreading W. into Cygnus and Lyra (brightness 2), with slight wavy motion. This was breaking up and paler at 1.10, and had become a single twisted band, with a tendency to divide lengthwise at 1.17. At 2 the aurora was in essentially the same position, but the western part was brighter, and had sunk lower in the SW., passing through 3 Cygni and Vulpecula. This portion reached a brightness of 3 at 2.17, while the rest had paled considerably. At 3 there was a twisted mass of light in Taurus, and a narrow bright (3) band running along the SW, horizon through Aquila, extending about 90° in azimuth. At 3.17 a brilliant dispiay began, which was observed up to 3.25. The aurora developed from the SW, up to the zenith and a little past it with great rapidity in the form of whirling, circling bands and smoke-like wreaths, mingled with pale streamers, which latter formed an imperfect corona at 3.20 in Cassiopeia at the zenith, which disappeared quickly. The motion was very rapid, and the light reached a brightness of 3 to 4. The light was mostly yellowish-white, but tinged on the lower edge with

H. Ex. 41-49

greenish and rose. The magnets were violently disturbed, with great decrease of borizontal force, At 4 a. m. three bands ran along the SW. from Orion to Aquila at an altitude of about 25°. These reached a brightness of 3 at 4.15, and then quickly paled, while the aurora developed from Orion and spread over the eastern sky in broad, sinuous, undulating bands (brightness 1 to 2), which formed a very transient, imperfect corona. This aurora was brightest in Ursa Major, and spread over the whole sky at 4.20. The motion was comparatively slow, and the magnets less disturbed. At 5 there were two quiet greenish bands (brightness 2), one in the NE, through Gemini, Leo Minor, and Coma Berenices, and the other in NW, from Boötes through Hereules and Aquila. At 6 a pale broad band ran from the western to the southern horizon, and at 7 a similar band in the NE, ran from Gemini through Ursa Major and ended in Boötes. At 8 there were numerous streaks (brightness 2 to 3) in the NE, moving rapidly westward. No aurora was observed at 9, but at 10 there were traces of a pale arch extending from the NNW, to ESE, at an elevation of about 12° above the southern horizon. The extremities were lost in the baze and cloud which obscured the horizon.

October 21, 1882, 7 a. m. to 8 a. m.—Up to and during the 6 o'clock a. m. observation the sky was clouded over and it was snowing; but at 7 a. m. it was clear, and a stationary yellowish white band of aurora was observed running from Hercules in the WNW, through Pegasus to Taurus in the SSE. At the WNW, end there were vertical streamers, vibrating upwards rapidly (brightness 2 to 3). At 8 a greenish band without motion crossed the zenith from Boötes through Ursa Minor to Triangulum (brightness 2 to 3), while at 9 a. m. the same band, somewhat paler (2), passed beyond Triangulum into the haze on the eastern sky. Magnetic instruments showed no signs of disturbance.

October 22 and 23, 1882, 10.30 p. m. to 10.20 a.m.—As soon as it was dark enough for an aurora to be seen, a slightly sinuous, narrow, hazy band was observed crossing the zenith from N, to the SE., passing straight up through the middle of the Dipper. In the twilight it appeared a pale rosy color, and a slight wavy motion was observed (brightness 0 to 1). Next observed at 11.15 in the shape of a broad, waving band from the NNW, to SE, not reaching the horizon at either end, passing through Ursa Major, Draco, and Cygnus (brightness 1), color yellowish. At 12.15 a.m. October 23 it was a narrow arch from the NW, to SSE, through Vulpecula, Delphinus, Cygnus, and Lyra to Boötes, with little or no motion (brightness 1). At 1 a. m. a low arch (brightness 2), somewhat tinged with yellow, lay in the SW., taking in about 40° in azimuth and reaching an altitude of about 20° near a Aquilæ. All the stars on the SW, horizon were obscured by the bright moonlight. This arch had not changed its position when last noticed at 1.20, while at 1.10 an additional hazy, wavy 1 and had developed in the NE., running from Taurus in the SE, through Auriga to Coma Berenices in the N. (brightness 1). At 2 a. m. the starting point of the aurora was in Taurus, near the SE, horizon. From this ran a band of streamers to the NNW, through Aries, Pegasus, highest in Cygnus, near \( \beta \) Cygni, through Lyra and Hercules round to Bo\( \beta \) to 21, and also bands (brightness 1) across zenith passing through Cassiopeia. From 2.10 to 2.20 the western band became brighter, with considerable motion, and gradually faded, while the eastern bands, still pale, spread eastward into Auriga, developing a bright patch in Canes Venatici. The magnets were slightly disturbed. At 3 a, m, the western streamers were replaced by a pale (0 to 1) band, and another band couldly pale crossed the zenith from the same starting point. At 3.10 to 4 an additional sinuous band (1 to 2) developed in the E, from Orion just rising in the SE, through Gemini, Leo Minor, and Canes Venatici to a point in Boötes, now just above the northern horizon.

From 4 to 4.10 there was an extensive display, which would have been brilliant had it not been for the moonlight. Starting from Orion it spread into Taurus, Aries, and Auriga in the shape of twisted forks, one streak crossing the zenith to NNW., with a band nearly in the position of the western band seen at last observation. This latter band had risen about 10° at 4.10. No rapid motion was observed (brightness 2 to 3). The whole was fading rapidly at 4.17. There was a great magnetic disturbance, the horizontal force falling too low to be read, and the declination rising. At 5 a. m. only one pale (0 to 1) band was visible running from Leo to U1sa Major, resembling hazy cirrus cloud. At 6 a. m. there was a pale arch over the NE, horizon, and at 8 a. m. another similar arch (brightness about 1). At 9 and 10 a. m. there was simply a trace of aurora in the form of an arch closely resembling the twilight curve, spanning the southern horizon at an

altitude of about 40°, the extremities hidden in the baze which obscured the horizon. This had wholly disappeared at about 10.20 a. m.

October 27, 1882, 1 a. m. to 4 a. m.—The clouds which had covered the sky broke away about ! a. m., having a few patches of fleecy circus stratus clouds hiding the stars in the SE. At the 1 a. m, observation two hazy, narrow, sinuous bands crossed the zenith from this bank of clouds, ending near Arcturus in the NNW., about 15° above the horizon, passing through Cassioneia, Cepheus, and Draco. At 1.17 the top of the arch had drifted west to Cygnus and Lyra, the ends remaining axed, while the arch itself showed a tendency to split lengthwise (brightness 1); brightest in Boötes. where it had a faint ruddy tinge. There was a slight magnetic disturbance. At 2 a. m. an arched narrow band (brightness 2) stretched from a point in Serpeus about 10° above the NW, horizon to the bank of clouds in the SSE,, reaching an altitude of about 30° near a Aquilae. There was a faint suggestion of green and rose color at the northern end. At 2.10 to 2.19 the band faded slightly, and at 2.17 the crown rose about 2°, while at the same time there were also faint traces of a band in the position of the one observed at 1 a.m. From 3 to 3.17 there was a broad aurora running from a point in Boötes W. of Arcturus just above the northern horizon up through Ursa Major, Ursa Minor, and Perseus, ending in the clouds near Taurus (brightness 1 to 2). It consisted of broad, hazy, waving bands and twisted streaks fading and reappearing quickly, with slight motion, shifting rather to the westward. At 2.10 there were whirls approaching the curtain shape in Canes Venatici, and a low ill-defined arch in the NE, in Leo Minor, and at 2.17 also a faint band through Cygnus in the W. The magnetic disturbance increased in violence, all the elements being much diminished. From 4 a. m. onwards the sky was obscured by thin clouds. During the whole time the aurora was visible its brightness was much dimmed by the exceedingly bright moonlight.

October 27 and 28, 1882, 10.30 p. m. to 1.17 a. m.—As soon as it was dark enough for the aurora to show, a bright patch with bright streamers was observed in the SE., about 20° above the horizon. At 11.13 the aurora was in the form of a hazy arch, with its crown passing through Cygnus and Lyra, and its extremities hidden in the haze NW, and SE. At 12.13 the sky was so hazy and the moonlight so brilliant that the position of the aurora among the stars could not be definitely traced. It had the form of a faint arch of hazy light. The crown of the arch bore SW, at an altitude of about 30°. Extremities bore SE, and W, by N. At 1 a. m. only the brightest stars were visible through the haze. One broad band made up of transverse streamers, moving rapidly westward with quick undulations from N, to S., crossed the zenith from the N, ending in the clouds in the SE. Several paler secondary bands W, of the main band. The whole aurora was paler and much broken at 1.10. At 1.17 it had almost wholly faded, but quickly reappeared in the N, in the form of curled streaks, covering a large extent of sky. A large magnetic disturbance commenced at 10 p. m., continuing all night. The horizontal force ranged through .517, the declination through 2° 54′, and the vertical force through .088. At 2 a. m. the sky was clouded, and no more aurora was seen.

October 29, 1882, 5 a.m. to 11.30 a.m.—Up to 5 a.m. the sky was covered by thin, patchy, stratus clouds, through which the moon shone; after this the sky cleared off. Soon after dusk faint traces of aurora were seen through the clouds. At 2.13 a.m. a bright streak showed through the clouds in the NNE, the base about 20° above the horizon and running up towards the zenith. At 3 to 3.10 the sky was clear enough near the zenith to expose a band crossing from the N. when it was visible through the clouds to the SE. It could be seen to pass through Lyra and Cassiopeia. At 5 a.m. a band, partly covered with clouds, ran from Boötes through Draco, ending in Andromeda. It was pale and hazy (brightness 0 to 1), and moved slowly to the W. No more aurora was visible till 9 a.m., when a band passed from Ursa Major through Camelopardalis, ending in Cassiopeia (brightness 1). At 10 a.m. a band ran from Leo Minor to Perseus, passing through a Aurigæ (brightness 2). At 11 a.m. a patch was visible in Gemini. A violent magnetic disturbance commenced at 3 a.m., lasting all night. The horizontal force fell too low to be read.

November 2, 1882, 12.30 a. m. to 4 a. m.—From 12.30 to 12.45 a pale, glowing segment, resembling the twilight curve, was discernible in the NE., extending from N. to SE., and reaching an altitude of about 30° in the NE.—It was very pale, a little brighter in the N., and continued indistinctly visible until 3, when it developed into two or three definite, but wayy, pale (0 to 1) bands crossing

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November 3, 1882, 12.17 a, m, to 8 a, m,—Streamers of a slightly vellowish tinge (brightness) to 2) shot up all round the horizon, being brightest in the NW, and SE. At 1 n. m. they had arranged themselves in the form of an arch of streamers (brightness 1), running from Taurus in the ESE, through Auriga to Ursa Major in the N. This had faded a good deal at 1.10 and was replaced by a pale arched band at 1.17. At 2 there was a vertical streak in the N. in Boötes. running up from near the horizon into Draco, and a few additional streamers were to be seen in Ursa Major at 2.10. This had faded at 2.17 and there appeared a pale arched band in Leo in the NE. At 3 a. m. there was a pale glow in the S. and SW., and at 3.10 a definite band (brightness 1) from Aries in the SE, up through Perseus and Andromeda to Cassiopeia near the zenith. At 3.17 there were merely patches of pale glow in the N. and NE. At 4 a. m. these bands (brightness 1 to 2) ran from the SE, to the NNW,, not reaching the northern horizon (brightest in the SE.); one (the brightest) from Orion through Taurus, Perseus, Cassiopeia, Cygnus, and Lyra; a second (paler) through Aries and Andromeda and just above a Aquila; and the third (palest) close to the horizon. These bands were in essentially the same position and a little brighter at 4.10, but had faded to 0 to 1 at 4.17. At 5 a, m. there was a pale band (0 to 1) in the NE, through Leo and Gemini. At 7 a. m. two bands (brightness 1) of a slightly greenish tinge crossed the zenith from Serpens to Cassioneia and Camelonardalis. At S a, m, there was an arch of very pale light over the SE, horizon, and after this no more aurora was observed.

November 4, 1882, 4,10 a, m. to 9.30 a, m.—The sky was covered with rather thin hazy stratus clouds which cleared away more or less at intervals. At 4.10 a.m. there was a quiet arch (brightness 1) visible through the clouds in the NE. There were no stars visible near this, so it could not be charted. The crown bore NE, altitude about 30°, and the extremities NNE, and ENE, altitude about 10°. This was wholly observed at 4.17. At 9 a. m. the sky was clear and a faint arch (brightness 0 to 1), extending from NNW, to ENE, with an altitude of about 30°, was observed lasting until 9.30.

November 5, 1882, 1 a, m, to 6 a, m.—At 1 a, m, there was an arched bank of clouds in the NE. on the horizon, and above this a pale steady glow gradually fading into the starlight. At 2 a.m. this glow had faded, but at 2.10 a broad definite band (brightness 1) crossed the NE, sky, white and motionless, from a point in Orion near the ESE, horizon, reaching its greatest height at Castor and Pollux in Gemini and ended in the upper part of Leo in the NNE. Its altitude was about 5° less at 2.17. Clouds and haze obscured the aurora till 6 a, m when an arched band was observed, with essentially the same bearing, running from Orion through Auriga to Ursa Major (brightness 2) and color slightly greenish, sometimes varying slightly in color and brightness especially in the SE., where a few streamers were observed. No more aurora seen.

November 6, 1882, 7 a. m. to 7.15 a. m .- Up to 7 a. m. the sky was not clear enough to allow any aurora to be seen. An arch of pale yellowish green was then visible through the haze, running from Orion to Leo through Gemini (brightness 0 to 1). This was invisible at 7.15 and no

more was observed.

November 7, 1882, 4.17 a, m. to 11.20 a, m,—The weather was stormy and the clouds thick during the early part of the night. At 4.17 a, m. an arched band was visible through the clouds in the SW, at an altitude of about 40°, quickly disappearing, while a similar streak in the NW. moved rapidly towards the zenith. No stars were visible at this time. There was a slight magnetic disturbance, with a decrease of horizontal force and declination and an increase of vertical force. The earth currents were notably increased in strength. At 11 a.m. the sky was comparatively clear, and a band was observed stretching from Andromeda through Ursa Minor to Canes Venatici, characterized by frequent flashes from W. to E. and a rapid vibratory motion. At 11.10 a. m. it had moved further toward the NE, and extending from N, to E, through Cygnus, Draco, and Boötes. It now consisted of a broad regular arch formed of streamers about 10° in length and perpendicular to the magnetic meridian. The streamers were agitated by a vibratory motion and a motion of translation to the E. (brightness 2). The aurora disappeared about 11.20 a.m.

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uds thick he clouds the NW. ght magff vertical comparato Canes At 11.10 s, Draco, in length y motion D a. in. Norember 8, 1882, 4 a. m. to 10:35 a. m.—During the early part of the night the sky was covered with thick clouds, but at 4 a. m. these had thinned away sufficiently to allow a few of the brightest stars to be seen, and broad bands of aurora, apparently in rapid motion, were observed crossing the zenith from the NNW. to ESE, spreading out at the zenith to a trail some 10° in width. No more aurora was observed until 9.10 a. m., when it appeared for about twenty minutes in the form of a quiescent faint band across the zenith from NW. to SE, with the extremities lost in the haze. At 10.10 a. m. a band (brightness 0 to 1) encircled the entire horizon, about 10° in breadth, and resting on a dark band of uncertain character (apparently hazy and stratus cloud) of about the same breadth. At the same time a second similar band formed an arch intersecting the first in the SE, and N., with its crown at an altitude of about 45°. At about 10.35 the sky clouded over and no more aurora was observed. A magnetic disturbance commenced about 4, chiefly affecting the horizontal force, which was largely decreased.

November 9, 1882, 12:30 a. m. to 7:30 a. m.—At midnight no aurora was observed, but at 1 it was already well developed in the form of a brilliant zone (2) from a point in Taurus in the ESE. horizon into Ursa Major and Leo Minor on the N. In the NE, it did not reach lower than Gemini, but extended also into Auriga. The zone consisted of three or four bands changing rapidly, but not moving fast, forming sometimes whorls and streamers, and had spread into Perseus and Andromeda at 1.10. At 1.17 it had faded a good deal, while two streamers started up in the N. and ESE., meeting across the zenith, while a large whorl formed in Canes Venatici. At 2 a. m. the zone was still broader and contracted at the horizon, ran from Hercules in the N. to Taurus in the SE, mostly west of the zenith, occupying Pegasus, Cassiopeia, Cygnus, and Lyra, drifting westward with rapid shooting and circling motion from SE, to NW. It had faded a little at 2.10. and was quiet, while quiet glowing banks of light replaced the 1 o'clock aurora. At 2.17 the western aurora had almost wholly faded, and the eastern developed into a regular arch, which test its regularity in a few minutes. At 3 a.m. the eastern zone had developed again from Orion in ESE, to Bootes in NNW., narrowing at the horizon, in the middle stretching from Gemini up to Ursa Minor (brightness 3), made up of sinuous bands, sometimes narrow, sometimes broad, with some longitudinal motion from N. to S., spreading a little towards the W., and not so bright at 3.17. At 4 there was a similar broad band or zone, but quiescent (2 to 3) from a point in Monoceros in the ESE, through Orion, Taurus, Pegasus, Cygnus, and Lyra, to a point in Ophiuchus near the NNW, horizon, also spreading eastward in paler bands to Ursa Major, growing paler at 4.17. At 5 a. m. two parallel bands 4° to 5° apart crossed the zenith from Taurus, through Persens and Cassiopeia, to Corona (brightness 2), drifting slowly S., with a rapid waving motion from W. to E. At 6 a band with a few streaks above it, moving slowly to the S., stretched from Orion through Gemini to Leo Minor. 7 a. m. saw a luminous band stretching round close to the horizon, without motion, extending from Pegasus to Serpens. Haze then began to cover the sky, and soon became clouds. A magnetic disturbance, affecting the horizontal force, and to a less degree the declination also, commenced at 2 a. m., and continued several hours after the end of the aurora.

Norember 10, 1882, 3 a. m. to 9.10 a. m.—The sky was cloudy during most of the night. When it cleared, at 3 a. m., no aurora was observed. A faint glow in the N. and NW. may have been auroral. At 5.15 a. m. the clouds again broke away sufficiently to show an arch from Taurus through Pegasus to Lacerta from SE, to SW., partly hidden by clouds and haze (brightness 1). At 8 a. m. the sky partly clouded again, disclosing a motionless band from Orion to Leo, about 5°-8° above the horizon, showing through haze (brightness 0 to 1). At 9.10 a. m. a few faint traces of aurora were visible through the haze and clouds. The magnetic needles were very slightly affected.

November 12, 1882, 3 a. m. to noon.—During the early part of the night a furious storm of wind and snow was raging, accompanied by a violent magnetic storm affecting all three elements, which lasted several hours after the aurora disappeared. Through a break in the clouds at 3 a. m. sinuous bands and streamers (brightness 2) were observed in the N., in and near Ursa Major. At 3.17 the sky was nearly clear, and sinuous bands from the NNW, to ESE, occupied most of the western sky, the ends of the bands being lost in haze, while an incomplete corona formed E, of the zenith (brightness 2). Accurate observation was rendered impossible by the violence of the weather. From this time on the storm moderated. At 4 a, m. a whirling band ran up from Orion's belt in

the SE, towards the Pleiades, and two arched and nearly parallel bands ran along the SW, horizon the upper band the broader and brighter, through Taurus, Cetus, and Pisces into the lower part of Pegasus below the square (brightness 2). It had faded considerably at 4.10, but at 4.17 had developed into two bands of curtains and streamers, with rapid vibration and play of colors, yellow. green, and rose (brightness 3), intermittent, sometimes sinking to 2 or rising in places to 4. At 5 a. m. two yellowish green bands ran from WSW, to WNW, through Aquila to Hercules, with a few streamers on the WNW, end (brightness 1 to 2). At 6 a, m, there were several bands and streamers in the northern sky, the streamers vibrating from W, to E. At 7 a pale arch with stream ers ran from the SE, to SW., about 9° or 10° above the horizon (brightness 1). At 8 there was a sheaf of beams in the NNE, from Leo to Camelopardalis, with slow lateral vibration, changing in brightness from 1 to 2. At 9 a, in, the horizon was encircled by a band of pale quiet white light 10° in breadth, from which arose a perfect fringe of streamers, some approaching the zenith, most of hem, however, not exceeding 10° or 15° in length, and apparently motionless. This display continued for nearly an hour, with but slight change, when a broad white band (brightness 0 to 1) was observed to start from the luminous base in the W. through the Pleiades and Ursa Major. stopping at a point about 30° E, of the zenith. No further change was observed till 11 a. m., when a second like arch was formed about 6 -80 in breadth and 600 in diameter, having its crown in the zenith. From this band streamers shot out and formed a complete corona. At this time the mag netic listurbance was particularly great. The corona continued apparently unchanged and motionless until it faded before the dawn.

November 12 and 13, 1882, 9.30 p. m. to 11.30 p. m .- As soon as the sky grew dark enough to an aurora to be visible, it appeared well developed and probably a continuation of the preceding aurora. At 10.17 p. m. a waying band of light extended across from SE, to NW., bright st in the SE., where it had the curtain form, with the streamers in the same direction. At 11.17 there was a faint streak (brightness 1) through Andromeda, Cassioneia, Draco, and Boötes, with bright cm tains in Pegasus and Cygnus. At 12.17 there was an arch whose extremities bore SE, and NW., and below this, on the horizon, a well marked dark segment, with wavy faint streamers above it. and faint patches of light in Andromeda and Cassiopeia. At 1 a. m. there was a broad bright zone occupying nearly all the western sky, and extending east of the zenith, from Boötes, in the NNW., through Ursa Major, round above Capella to Taurus, in the ESE. The zone was composed of several broad sinuous bands, converging near the horizon, and sometimes developing streamers (brightness 2 to 3). It drifted westward, and had passed the zenith at 1.10, in motion especially on the edge, in the N., and at the zenith, waving and vibrating, with some slight display of colors, yellow, green, and rose. There was a particularly bright portion in the SE. The whole had sunk low in the SW, at 1.17. From 2 to 2.17 a, m, the aurora was reduced to two bands lying low in the SW, from Ophiuchus in the NW, through Aquila to Pegasus in the S., with streamers from the upper band, all growing gradually smaller (brightness 2 to 3). At 3 a.m. a broad bright zone of the usual type crossed the zenith from Orion and Taurus in the SE, to Boötes, with streamers forming a half corona E. of the zenith, centering in Cassiopeia (brightness 2). At 3.10 the half corona was W. of the zenith, with the bands as before, developing wavy curtains at the zenith. At 3.17 there were bands low in the NE., running from Procyon through Leo Minor and Canes Venatici to Boötes, made up of streamers flashing rapidly from N. to S., and showing beneath them a well-marked dark segment (brightness 2 to 3). At 4 a.m. these bands had become curtains; there was a broad band (1) in the S, and sinuous streaks covered most of the sky at right angles, roughly speaking. to the magnetic meridian, converging towards the horizon in the NW, and SE. At 4.10 to 4.17, radiating from Aquila in the NW., near the horizon, and Canis Major, near the SE., bands, streaks, and streamers covered most of the sky, constantly changing and shifting, with much flickering motion. There was a special center of activity in the N., where curtains were developed. At 5 the aurora consisted of two bands, with yellowish streamers. At 6 it was an arch made up of curtains and streamers in rapid motion (brightness 2 to 3). At 7 there were only faint traces around the horizon, while at 8 no aurora was visible, but it broke out again at 9 in the form of a white striated band (brightness 2 to 3), about 30° in width, passing from the SE, to NW., about 3° to 5 SW, of the zenith. There was much wave-like motion from W, to E., with considerable change of form, but not of position. The horizon was fringed with streamers, generally about 260 long and W. horizon. e lower part at 4.17 had olors, vellow. s to 4. At 5 cules, with a bands and with stream there was a changing in white light zenith, most This display itness 0 to 1; Ursa Major, a. m., when crown in the

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motionless. From 10.15 to 10.30 the aurora filled almost the entire southern half of the sky, passing from SE, to NW, north of the zenith. The lower half of the sky was filled with curtains brilliantly colored, green, yellow, and red predominating, in narrow bands parallel to the magnetic meridian, the whole in rapid motion from E, to W, (brightness 2). At 11.20 there was a perfect corona, with curtains in the S, and a luminous band on the northern horizon from the SE, to NW, sending up streamers to the zenith, white and quiet (brightness 1 to 2). At 11.17 the corona still continued, and the whole aurora was of the same general type, but moving slightly. It faded about 11.30 a. m. The magnetic needles were but slightly disturbed up to 3 a. m., when the disturbance became very violent, not subsiding until about 5 p. m. All these elements were affected, especially the horizontal and vertical force, the former decreasing and the latter increasing so much that it was frequently impossible to measure them, while the declination ranged from 310 to 519.

November 13 and 14, 1882, 11.17 p. m. to 1,20 p. m.—The aurora commenced at dusk and was first observed (11.17 p. m.) as a wavy band through Pisces, Perseus, Auriga, Leo Minor, and Coma Berenices, whence a faint streak rose to the Pole star, through Ursa Major. At 11.17 a. m. the same or a similar band passed through Perseus, Draco, Lacerta, Ursa Major, and Canes Venatici, with faint streaks also in Cygnus. At 1 a. m. a rather broad arched band (brightness 0 to 1) extended from Taurus in the ESE, through Auriga to Ursa Major below the Dipper and Canes Venatici, brightest at the northern end, and sending off one or two long streamers at the ESE, end. This had faded greatly and become much broken at 1.10. At 1.17 a broad zone of the ordinary type of sinuous bands crossed the zenith from a point in Bootes, near the northern borizon, to Taurus in ESE. This zone was pale, only reaching a brightness of 1 in a few places. At 2 a.m. this had condensed into a twisted band 4° to 5° wide (brightness 2) from Eridanus on the ESE. horizon through Taurus, where it was much twisted like a smoke wreath, Perseus, close to Cassi opeia, through Ursa Minor and Draco to Corona Borealis. The whole was drifting slowly west ward, having reached Cygnus and Lyra at 2.17, changing but little in character. At 3 a. m. there was a pale band low in the SW., while another zone crossed the zenith, spreading over the eastern sky with the bands much twisted, and forming something like curtains, varying in brightness from 1 to 3, with slight motion, and some faint rosy orange tinges in SE. The extremities were in Monoceros in the ESE,, where it had a curdled appearance, and reached a brightness of 3 at 3.17. At 4 a.m. the aurora was of the same character, but paler (0 to 1), and lying more in the SW. At 4.17 there was a well-pronounced zone, which only reached a brightness of 1 in places, radiating from points in the lower part of Orion in the ESE, and Serpens in the NNW, so broad as to cover most of the sky, arching above the square of Pegasus in the SW. At 5 a. m. two arches ran from Orion through Andromeda to Cygnus, with bright streamers of various colors from yellow to red, blue and green, vibrating rapidly from W. to E. (brightness about 3). At 6 there was an arch from S. to W., with green streamers at the western end. At 7 there were simply traces around the horizon, and at 8 only faint traces. At 9.17 there was a broad, quiet, white nebulous band from Orion through Gemini, Ursa Major, and Canes Venatici to Boötes (brightness 1). At 10.20 there was a corona of pale, white, quiet streamers from the horizon to the zenith (brightness 0 to 1). At 11.10 a. m. pale, white, quiet striated bands running E, and W., filling the sky from about 10° west of Polaris to the southern horizon. Only faint traces were visible at 12.17 p. m., and continued to be visible, especially in Ursa Major and the NW., till broad daylight. The magnetic needles were but slightly disturbed up to 9 a.m., when a disturbance of great violence set in. This had not ended at midnight.

November 14 and 15, 1882, 9 p. m. to 12.15 p. m.—While the twilight was still bright the aurora appeared as pale, vertical streamers in the ESE, in Perseus and Andromeda at about 26° above the horizon, and at 10 p. m. had developed into an arch of streamers still pale (0 to 1), from Leo Minor, some distance above the northern horizon, through Auriga ending in Trangulum, maintaining essentially the same position and character up to 11 p. m., though growing brighter. At 12, midnight, a twisted band 4° or 5° wide passed from Boötes in the N. through Ursa Major and Trsa Minor to Pegasus, and there were also faint bands in Cassiopeia, Andromeda, and Draco. At 1.17 a zone of the usual type crossed 4° or 5° W. of the zenith, from a point low in Tannus in the ESE, through Aries, Triangulum, Andromeda, Cygnus, Lyra, and Corena Borealis to Boötes,

close to the horizon in the NNW. This zone was much twisted in the N. (brightness 2), showing a faint rose tinge in the N. and SE. At 2 a. m. it was in the form of two bands, one from Canes Venatici through Ursa Minor to Andromeda, the other across the zenith from Ursa Major to Taurus (brightness 3). Between this observation and the next the aurora reached its maximum, being a great display of the usual type, bands, curtains and streamers covering the whole sky, with much play of colors, and vibration, fading rapidly. At 3 a. m. there were three bands with streamers, two from Aquila in the NW., through Cygnus and Hercules, and one arch from Pegasus to Aries (brightness 1 to 2), displaying yellow, green and pale blue colors, and vibrating rapidly. Between this observation and the next the aurora was again brilliant, but at 4 a. m. had faded to a quiet band (brightness 0 to 1), round the horizon, and at 5 there were two similar bands from NW. to SE. At 6.17 there was a faint illumination in the southern horizon, and quiet curtains in the N. At 7 a. m. there was a faint band in the SW., from Pegasus through Taurus to Gemini, with pale streamers moving slightly at the western end, and also several patches in Lacerta, Cassiopeia, and Cepheus. At 8.15 there were a few pale, white, quiet streamers between the N. and SE., and no aurora was seen at the next observation; but at 10.15 there was a faint arch from the SE. to SW., with an altitude of about 20°, with the lower edge well defined and showing a dark segment. At 11.15 there were faint streamers in the E., passing from the horizon through Canes Venatici, Coma Berenices, Boötes, and Lyra, and converging to a point just above a and 3 Ursa Majoris. At 12.15 there were very pale streaks in Ursa Major, nearly reaching the zenith, and traces of aurora in the NW, obscured by clouds. The magnetic disturbance of yesterday continued pretty violent up to about 6 a. m., since which time the instruments have been comparatively quiet.

November 16, 1882, 12.15 p. m. to 11.20 a. m.—The aurora did not begin till some time after dark, first appearing as a faint streak of light in Leo Minor. At 1 a. m. there was a pale glow all around the horizon, brightest in the N., when at 3.17 three vertical streaks had developed, the largest running from near Arcturus to Draco, very pale (0 to 1). At 2 a.m. there was a narrow hazy band (brightness 0 to 1) across zenith from a point in the lower part of Taurus in the ESE. through Perseus, Triangulum, and Cassiopeia to Draco, brightest close to the SE, part, where it reached brightness 1 at 2.17, the crown having drifted westward to Cygnus and the band broadened a little, running down closer to the NNW, horizon in Corona Borealis. At 3 a. m. there was a broad, pale zone, much broken (brightness 0 to 1) from the same points in the NNW, to SE., from the SW, horizon to an altitude of about 200, beginning to brighten and develop streamers at 3.10. At 3.17 it was rising in the form of an arch of streamers, approaching the curtain form, till it reached the square of Pegasus, Cygnus, and Lyra, where it began to fade and then develop into a paler zone of sinuous streaks. There was some vibration from E. to W. and a faint green tinge on the upper edge, shading through yellow to pale rose. There was a similar but smaller arch in the E. in Gemini and Cancer, and another in Leo. At 4 a. m. there was a broad zone of the usual type (brightness 2 to 3) from a point in Monoceros close to the ESE, horizon to a point in Serpens in NNW. occupying Orion, Taurus, Auriga, Perseus, Andromeda, Cassiopeia, Pegasus, Cygnus, and Lyra. The eastern edge was the brightest and much twisted. The aurora in the E. was essentially unchanged. There were additional streamers from the tail of Ursa Major to the zenith at 4.10. At 4.17 the bands of the zone were separating and growing paler except the westernmost (brightness 3). At 5 a.m. there was a band with motionless streamers from Canis Minor through Orion to Pisces about 5° to 8° above the horizon, and a paler band shaped like a horseshoe from Orion to Leo. At 6 a. m. a bright band crossed the zenith from Lyra through Ursa Minor to Gemini, moving slowly to the south. At 7 there were two faint arched bands around the horizon. At 8 there was a corona, with its center a little W. of the zenith, covering almost the whole sky. From the center beams extended to bands and streamers. It was nearly gone at 8,20 a, m. (brightness 1 to 2). At 9.17 there was a broad white quiet band (brightness 1) from Andromeda through Cassiopeia, Camelopardalis, and Ursa Minor, ending in Boötes, with also a faint glow on the southern horizon. The band had disappeared at 10.17, and the glow had developed into an arch with its corona at an altitude of about 20°, with short streamers from the arch. There were also streamers 450 long in the NE., E. and S. about 290 above the horizon. At 11.20 there were a few faint quiet streamers in the NE. The needles were but slightly disturbed; most so about 4 a. m.

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November 17, 1882, 12.15 a.m. to 12.30 p.m.-At 12.15 a.m. faint streamers were observed in the N., partially obscured by clouds. At 1 a. m. there was merely a pale glow all around the horizon, but ten minutes after there was rather a broad arched streak (brightness 1) running up from close to Arcturus in the N. near the horizon, through Canes Venatici and Ursa Major, ending close above Castor and Pollux. At 1.17 there was a twisted band from the same point in the Nup to Ursa Major. From 2 to 2.17 there was a pale glow all around the horizon, with occasional faint streamers close to the horizon in the SE. At 3 a. m. there was a pale band (brightness 1), divided lengthwise, so the ends overlapped at the zenith, crossed the zenith from Auriga high in the ESE., through Cassiopeia to Draco, reaching down towards Boötes at 3.10 and fading at the E. end. There were also traces in the E. in Orion, Cancer, and Leo Minor, developing into a pale arch of streamers at 3.17, while the rest of the aurora faded. At 4 a.m. there were pale bands and streamers in the NE., developing at 4.17 into a twisted vertical band in the NE. (brightness 1), occupying Leo Minor and the whole of Ursa Major, and spreading pale and hazy toward the zenith. The horizontal force fell suddenly with the development of this band. There was also a pale band in Lyra in the NW. At 5 a.m. there was a pale arch from Hercules to Serpens, and three or four bunches of streamers in Cygnus, Lyra, and Corona Borealis (brightness 0 to 1), and no At 6 a.m. there was a quiet band from Pegasus, through Triangulum to Taurus, with no This was almost hidden by haze at 6.20. After this the sky became covered with clouds, only clearing at intervals. Traces of aurora were observed at 9.17 and 10.17, at the latter observation giving indication of an extensive aurora behind the clouds. Traces were again vistible at 11.20 through the clouds. At 12.15 p. m. the sky cleared, and was observed to be encircled by a broad band of white, quiet light. In a few minutes the sky from the NE, to SE, points became colored a bright rosy red, the color fading away towards the zenith. About the same time a large white curtain formed across the rest of the sky, remaining nearly motionless for several minutes, and then gradually disappeared, while the red color spread farther S., and bright rays shot up towards the zenith, forming a perfect corona, which continued about forty minutes. The streamers of the corona were white and motionless. When the red color first appeared the light was striated with the rays parallel to the magnetic meridian, and several stars were visible showing through the colored portion with undiminished brilliancy. At 1 a. m. traces of aurora were observed in Boötes. The magnetic were almost undisturbed up to 6 a. m., when a violent disturbance commenced, still going on at daylight.

November 18, 1882, 7 a. m. to 12.17 p. m.—The weather was stormy during most of the night, but the clouds thinned away from 7 a. m. to 12.30 p. m., permitting portions of the aurora to be seen. At 7 a. m., a band of streamers vibrating up and down, and also from E. to W. (brightness 1 to 2) was seen stretching from Orion through Aries to Pegasus, while another band without streamers ran from Orion through Perseus and Cassiopeia to Cygnus, moving slowly towards the SW. At 8 there was a faint arch (brightness 0 to 1) from Orion to Pegasus. Traces were seen through the clouds at 9.17 and at 10.17 in the E. and SE. At 12.17 there was a quiet white nebulous band (brightness 0 to 1) from the SE. to the N., reaching an altitude of about 40° above the horizon, in the S.

Norember 18 and 19, 1882, 9.15 p. m. to 9.17 a. m.—During most of the night the sky was covered by thin hazy stratus clouds, through occasional breaks of which traces of aurora were observed from time to time, beginning as early as 9.15 p. m. on the 18th. At 10.15 the sky was clear enough to display a waving band (brightness 1) from Coma Berenices in the NNW, through Canes Venatici, Ursa Major, Ursa Minor, Cassiopeia to Pegasus in the ESE. It was brightest in Ursa Major, where it was broken into streamers. At 11.15 an arch was observed through the haze, very dim and wide in places, broken into three parallel bands, with its extremities bearing NW, and SE. The next hour it was cloudy, but the clouds appeared luminous here and there. At 1 a. m. on the 19th there were traces of aurora through the clouds in the N., and at 3 a. m. traces of bands crossing the zenith from NW, to SE, were seen through the clouds. At 4 similar traces were seen in the NE, and at 8 and 9.17 a. m. in the S. and W., and at the last hour also at the zenith. There was considerable magnetic disturbance during the whole night.

November 19 and 20, 8 p. m. to 11.17 a. m.—Just before the 8 p. m. observation, the sky being clear and the twilight still bright, pale streaks of aurora were observed in the N., high up in the

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8ky. No aurora was recorded at the 8 p. m. observation. The sky then clouded over and did not clear again until 1 a. m. on the 20th, when there was visible a band from near [s] Ursa Majoris in the NNW, across the zenith to Cassiopeia, with a corresponding band in the ESE, running up towards it but not meeting it, from Tourus through Aries and Andromeda (brightness 1). There were pale broken bands in the W. and an arch low in the NE, in Canis Minor and Leo. The SE. part of the band was gone at 2.17, the eastern aurora was paler, and there was an additional streak in Ursa Major. At 2 a. m. there were two broad streamers in Ophiuchus in the NNW., about 50 above the horizon (brightness 1); pale and shifting at 2.10 to 2.17. At 3 a. m. there was a pale band from the same point in the NNW, to Eridanus in the SE, passing close to  $\beta$  Cygni and through Pegasus. This developed rapidly into a band of curtains and streamers, forming an incomplete corona, which centered near a Cygni at 3.10. These streamers vibrated rapidly from E. to W. and from W. to E. The curtains were 2 to 3 in brightness, the streamers were 1, brightest in the NW.; and brightly colored yellow and green, succeeding one another in the order named, from the horizon up. At 3.17 there was a rosy glow in the NW, and a broad zone across the zenith, made up of writhing, twisting bands of streamers in exceedingly rapid motion, both rotating and shooting from N. to S. and the reverse. There were the usual green, yellow, and red colors, bright, and the brightness was 2 to 3, possibly 4 in places, though much dimmed by the bright moonlight. The magnetic disturbance which had hitherto affected only the horizontal force now extended to the declination, which fell over 6°. At the same time a semi-corona was formed from Ursa Major to Andromeda. At 4 there were streamers all around the horizon except in Andromeda (brightness 1 to 2), white, about 45° long and 10° or 15° above the horizon. The whole faded rapidly. having nearly disappeared at 4.17. The declination increased about 13°. At 5 a.m. there was another complete corona (brightness 1 to 2), centering in Camelopardalis, a few degrees SW. of the zenith. At 6 there were several yellowish-green arched bands with streamers from Gemini through Cepheus, Cassiopeia, Andromeda, and Lacerta to Cygnus, slightly vibrating. At 6.15 the whole had moved a few degrees southward (brightness 1 to 2). At 7 there were two faint arches (brightness 0 to 1), one from Taurus to Pegasus, and the other from Hercules to Boötes. At 8 there was a short, broad, yellowish-green band (brightness 1 to 2), from Monoceros to Taurus in the S., sending up motionless streamers. At 9.17 there was another perfect corona, with the rays brightest and most numerous in the SE., S., and SW., apparently motionless, and white (brightness 1 to 2). The corona still continued at 10.17 a.m., but its rays in the NE. no longer sprang from the horizon, but from a bright arch whose extremities were in the SE, and NW,, and its crown about 40° northeast of the zenith. The rays vibrated slightly; traces of aurora were still to be seen through the clouds at 11.17 a. m., but after that the sky was completely covered. The magnetic disturbance continued during the night, though its maximum was reached between 3 and 9 a.m.

November 21, 1882, 4 a. m. to 12.30 p. m.—The early part of the night was cloudy, and when it cleared at 4 a. m. there was only a pale glow in the N. and NE., and two or three very faint arched streaks close to the southern horizon, which wholly faded away. The sky became clouded at 9, clearing partially at 11.17, when traces of aurora were visible for an instant only through the clouds, apparently without color or motion. At 12.17 a. m. a corona was observed (brightness 3 to 4) in the form of a circle all round the horizon, fringed with short rays, centering towards the zenith, but not reaching it, lasting only a few minutes. Its color was white, and the streamers vibrated slightly. At 12.30 another corona was observed in the form of an ellipse, with its longest diameter E. and N., with long streamers converging to the zenith, and fringed with streamers on the outer edge, col ored bright rose, with interspaces of bright myrfle green (brightness 3 to 4). There was considerable rapid E. and W. vibration, and the display lasted only a few minutes. The magnetic needless were exceedingly quiet up to about 8 a. m., when a disturbance commenced, lasting till 10 p. m., especially affecting the horizontal faces and declination, reaching its maximum at the time of the formation of the corona.

Norember 25, 2 a, m, to 12.17 p, m.—When the sky cleared at 2 a, m, there was observed a forked vertical band in the N, from near the horizon towards the zenith, starting at a point in Buötes, one branch running to the NE, through Ursa Major, the other up through Ursa Minor to the zenith (brightness 0 to 1). This had faded at 2.15, and a hazy arched band (brightness 1) ran from Hercules high in the NW, through  $\beta$  Cygni and the square of Pegasus, disappearing in the

moonlight in the S. At 3 a.m. there were traces of aurora in the NE., which at 3.15 had developed into an arched band (brightness 2) with faint tinges of red and yellow from a point in Monoceros close to the horizon in the ESE, through Leo to a point in Boötes near the N. horizon. At 4.10 there was an arched band (brightness 1), curved into an ellipse in the NE, some 10° or 15° above the horizon, in Canis Minor, Cancer, Leo Minor, and Canes Venatici. This had nearly faded at 4.15, and none was observed at 5 a. m. At 6 an arch crossed the southern horizon from SE. to SW. with streamers on the SE, half, running from Canis Minor, through Orion and Taurus, to Andromeda. The streamers crossed rapidly from W. to E., with play of colors, yellow, green, and red (brightness about 2). At 7 a.m. there was a band (brightness 1 to 2) from Cygnus through Corona Borealis to Boötes, but at 7.15 there was only a faint small arch in Ursa Major. At 8 there were merely faint traces over the NE. horizon, and no more was observed till 12.17 p. m., when there was a corona of long, slender white streamers, a few of them brighter than the rest, stretching about 30° above the horizon (brightness 0 to 1). The whole aurora was much dimmed by the exceedingly brilliant moonlight. The magnetic needles were almost undisturbed up to 7 a.m., when a disturb ance, chiefly affecting the intensity with decrease of horizontal and increase of vertical force, commenced, lasting till 3 p. m.

November 26, 12:30 a. m. to 4 a. m .- Preliminary evapescent streamers were noticed in Ursa Major high in the NNE, at 8.45 p. m. (3.30 local); but no more aurora was seen till at the 1 a. m. observation, when pale streaks were observed in the N., developing at 1.15 into a pale zone of the ordinary type, white and quiet (brightness 0 to 1), across the zenith, converging at points in Boötes in the NNW, and Cetus in the SE, close to the horizon. There were three main bands in the zone, one through Ursa Major and Auriga, one through Ursa Minor, and one through Cassiopeia and Andromeda. At 2 a. m. the western band alone of this zone still remained, and there were besides three or four arched bands of short bright streamers in the NE. in Canis Minor, Cancer, Leo, and Coma Berenices, with considerable vibration from N. to S. (brightness 2 to 3), tinged with green, yellow, and red, while pale streaks and streamers near the zenith moved rather rapidly, tending to form an imperfect corona. At 2.10 the eastern aurora had subsided into pale bands, and one serpentine streak (0 to 1) ran from Ursa Major through Polaris to the square of Pegasus approximately parallel to the magnetic meridian. There was considerable magnetic disturbance with increase of the horizontal force and slight diminution of the other two elements. The aurora had mostly faded at 2.15. At 3 a.m. there was a pale band in the place of the eastern aurora described at 2 o'clock. At 3.15 to 17 there was an arched band with a reversed curve at the SE, end from Canis Minor through Gemini into Ursa Major, gradually breaking into streamers at the northern end. The magnetic needles were comparatively quiet. At 4 a. m. the sky was overspread with polar bands of cloud, which allowed only indistinct traces of aurora to be seen, and during the rest of the night similar clouds prevented the observation of aurora. The aurora was much dimmed by the moonlight.

November 27, 1882, 3 a.m. to 4.10 a.m.—At 3 a.m. part of the pale, narrow, quiet band was observed through the thin clouds in the NE. at right angles to the magnetic meridian. At 4 a.m. there was a broad hazy band (0 to 1) from the NW. to SE., visible only from Cygnus through Cas siopeia, and had moved 20° eastward at 4.10, leaving only traces through the clouds at 4.15. At 5 a.m. a pale yellowish band (0 to 1), motionless, ran from Leo through Ursa Major to Draco. At 6 there was a pale motionless areh from Cygnus through Andromeda to Perseus, and a patch in Auriga (brightness 0 to 1). Clouds prevented further observation. The magnetic needles were comparatively quiet most of the night. There was a slight disturbance at 3.05, the horizontal force rising and then falling below the normal, and another at 10.12, the horizontal force falling slightly.

November 27 and 28, 1882, 9.15 p. m. to 1.15 p. m.—At 9.15 p. m. on the 27th there were faint horizontal streaks through Taurus, Gemini, and Leo in the NE. No more aurora was observed, the sky being partly obscured by streaks of cloud, until 1 a. m., when the sky was clear, and streaks were noticed in the N. and E., which developed at 1.15 into a broad hazy twisted band (brightness 1) from a point in Boötes below Arcturus close to the horizon NNW, through Draco, Ursa Minor, Perseus, and the Pleiades, ending in the lower part of Taurus close to the horizon ESE. From 2 to 2.15 a. m. there was a rather broad zone of the usual type (brightness 2) from a point in Serpens close to the horizon NNW, to a similar point in Orion ESE, occupying Lyra,

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Cygnus, Andromeda, Cassiopeia, Aries, and Taurus. At 4 a. m. the zone was rather lower, occupying Aquila and the square of Pegasus, and much brighter (3) with motion beginning to develop at the ESE, end. It rose rapidly, being at 3.10 at the position of the 2 o'clock aurora, with very rapid waving and gyratory motion (brightness 2 to 3). At 3.15 it crossed the zenith, reaching each to Ursa Major and Oemini, much paler (1 to 2) and quieter. There was a large magnetic disturb ance, chiefly affecting the horizontal force, which fell very low. At 4 a. m. only traces of aurora were visible. At 5 a. m. there was a band (brightness 2) from Lyra to Ursa Major across the NE., and at 6 a. m. a broad band ran from Pegasus through Cygnus, Cepheus, and Ursa Major to Leo. Another band of the same color and brightness (1 to 2) from Andromeda through Cassiopeia and Auriga to Gemini, both having a rapid lengthwise motion from W. to E., resembling steam or smoke driven by a brisk wind. From 7 a. m. to 1.15 p. m. there were merely traces of aurora visible, though the sky was clear. The traces a 1.15 were low in the SSE, and developed into a pale streak neross the zenith, fading at dawn.

Norember 28 and 29, 1882, 10 p. m. to 10.15 a. m.—The whole night was clear. At 10.15 an arch was observed in the northeast with an altitude of about 25°, its extremities being NNW, to E. by S. The color was a faint yellow (brightness 1). At 11.15 the arch was in a similar position, but somewhat higher. At 12.15 it was still in the same position, but had developed streamers at the NNW, end reaching to Ursa Major. No aurora was visible at 1 a. m., but at 1.10 to 2.15 there was a marrow arched band (brightness 1) from a point in Boötes near the horizon N, through Leo Minor, ending in Gemini below Castor and Pollux, at an altitude of about 25°. From this time to 5 a. m. there was no aurora, but at 5 a band (brightness 0 to 1) crossed the zenith from NNW, to S., from Vulpecula through Cygnus, Cassiopeia, Cepheus, and Camelopardalis, ending in Auriga and Lynx. At 6 the arch was yellow and made of streamers, waving from E. to W., and varying slightly in brightness (1 to 2). Faint traces only were visible at 7 a. m. from Hercules to Boötes. At 8 a. m. there was a motionless band from Pegasus through Taurus and Orion to Canis Minor. Traces only, soon disappearing, were visible at 10.10 a. m., and no more aurora was seen. The magnetic needles were comparatively undisturbed all night.

November 30, 1882, 12.15 a. m. to 11.30 a. m.—The whole night was clear. About midnight, Washington time (between 7.30 and 7.40 p. m. local), there was a low arch in the NE. (brightness 1 to 2) from Taurus, where it was very faint through Gemini, Leo Minor, where it was brightest, and Coma Berenices, sending up faint streamers in the last two constellations. At 1 to 1.15 a.m. there was a broad twisted band, white and quiet (brightness 2 to 3), from a point in Taurus near the horizon in the ESE, across the zenith, through Andromeda, Cassiopeia, Cepheus, and Draco, to a point in Bootes, close to the horizon in the NNW. At 2 a, in the aurora was unchanged in bearing. altitude, and brightness, but started from Orion in the ESE,, and was split in two parts, one on each side of Polaris, while from the southeast end a band was beginning to shoot up towards the northeast. This had developed into an arched band through Gemini and Ursa Major, at an altitude of about 40°, reaching Boötes in the N., while the western bands had almost faded out. At 2.15 these bands had developed into a zone of the ordinary type from the same points of the horizon, reaching W. to Cygnus and Lyra and E. below Gemini. The eastern bands were the brightest (2 to 3), and in the ESE, showed a faint yellow and rose tinge. At 3 a, m, the zone was mostly reduced to a broad band, brightest in the lower edge (2 to 3), along the SW. horizon, with an altitude of about 25° at its highest point, running from Orion's belt below the square of Pegasus to a point in Serpens in the NW. This continued at 3.15, and in addition a zone of paler bands (1 to 2) covered most of the sky as far E. as Ursa Major and Gemini. The southeast base of the zone was very broad, some 20° of the azimuth. 4 a.m. found the aurora in essentially the same position, but much paler (0 to 1), and it was still more faded and broken at 4.15. At 5 a. m. there were two bright (2 to 3) yellowish bands from Pegasus in the NW., one through Cygnus, Cassiopeia, and Gemini to Canis Minor in the S, across the zenith; the other through Taurus to Orion in the SW,, but showing rapid motion from NW. to S. At 6 there was a quiet, greenish band (brightness 1) from Pegasus, through Pisces, to Orion. Traces only were visible at 7 a.m., but at 7.15 a brilliant corona (2 to 3) formed, with its center a little N. of the zenith. The streamers were bright yellow, and moved round the center, vibrating from W. to E. and from E. to W., keeping the same relative position. Other bands and streamers moved in almost every direction. Traces of this corona were still visible lower, occug to develop a, with very eaching east stic disturb es of aurora oss the NE., ajor to Leo. ssiopeia and ug steam or aurora visi-

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November 30 and December 1, 1882, 9.15 p. m. to 10.30 a. m.—The aurora began as a few vertical streaks in the ESE, in Aries and Perseus, and developed into a regular arch of streamers (1), crossing through Gemini and Ursa Major into Boötes in the NNW. This had faded at 10.10, and the aurora was the same as at the beginning, with a few additional streaks in Lynx and Auriga. At 11.15 there were traces only of aurora in the S. near the horizon. At 12.10 a bright band crossed the zenith from a Tauri to Hercules, slightly tinged with yellow, and vibrating. At 1.15 a narrow, twisted streak crossed the zenith from ESE, close to the horizon, to the NNW, through Orion, Auriga, Camelopardalis, Ursa Minor, Draco, and Corona Borealis (brightness 1 to 2). From Orion it was broken up into streamers. There was also a pale, hazy, perfectly quiet and regular arch in the SW., reaching an altitude of about 25%. At 2.15 traces only were visible in Orion, and 3.15 traces of bands crossing the zenith from NW, to SE, were seen. At 6.15 two pale white bands (brightness 1) extended from ESE, to WNW., the larger from Gemini, through Auriga and Lacerta, to Cygnus, about 12° or 15° south of the zenith, the second being somewhat shorter and about 10° below the first. At 7.15 several yellowish bands (brightness 2 to 3), vibrating rapidly from W. to E., extended from Andromeda, through Cassiopeia, Camelopardalis, and Ursa Major to Leo and Coma Bereuices. The whole drifted slowly southward. At 8.17 a broad, irregular band of white, quiet light extended from Leo Minor, through Ursa Major and Draco, to Cygnus (brightness 2). At 9.15 two bands (brightness 0 to 1) extended from Aries, through Gemini, to Canis Minor and Cancer, and only faint traces were visible at 10.17. There was a slight magnetic disturbance from 7 to 10 a.m., but otherwise the needles were remarkably quiet.

December 1 and 2, 1882, 9.15 p. m. to 10.17 a. m .- At 9.15 p. m. there was a faint patch of light in Aries in the ESE. After this preliminary flash no more aurora was seen till 12,15 a. m., when there were very faint streamers in Coma Berenices and Canes Venatici, and a broad, low, hazy arch from Coma Berenices, through Boötes, Hercules, Aquila, and Delphinus, to Pegasus, The dark segment was quite strongly marked below the arch. From 1 to 1.15 there were faint horizontal bands low in the NE. from Orion through Canis Minor and Lee, and a very evanescent band from a Boötis to the tail of Ursa Major, and at 1.15 a very faint band across the zenith from Lyra to Taurus (brightness 0 to 1). At 2 to 2.15 the aurora was essentially the same, with the addition of some well-defined streamers (0 to 1) in Leo and Leo Minor. There were also very faint traces crossing the zenith. At 3 a.m. there were very faint traces of a band from Cygnus across Pegasus in the western sky and traces in the east and south. At 3.10 there was a patch of streamers (1) in Coma Berenices and Boötes in the NNE., one reaching up to Ursa Minor. These had faded to traces at 3.15. At 4 a. m. there was a bright (2) yellowish band crossing up through Canes Venatici in the NE., then across through Ursa Major to Lyra near a Lyra, and a corona of streamers (brightness 1) reaching down about 40° from the zenith, incomplete from Ursa Major and brightest in the NNW. Only this portion remained at 4.10, and the band in the north was reduced in size and brightness. The whole was fading to traces at 4.15. At 5 a. m. there were merely faint traces over the horizon from W. to S. At 6 a, m. a yellowish-green quiet band (brightness 1) extended from Andromeda through Aries and Gemini to Canis Minor. At 7 a yellowish band (brightness 1 to 2) with streamers vibrating slowly from E. to W. stretched from Pisces through Taurus and Orion to Canis Major. At 8 an arch (brightness 1 to 2) ran from Cygnus through Cassiopeia and Auriga to Cancer, moving slowly towards the zenith. At 9.17 there was a broad, white, quiet band (brightness 0 to 1) from Coma Berenices through Lynx and Auriga to the Pleiades, and at 10.17 there was a broad, irregular, striated band, white and quiet brightness 1), from Corona Borealis through Ursa Major to Taurus. The magnetic needles were unusually quiet all night, being slightly disturbed about 11 a.m.

December 3, 1882, 4 a. m. to 12.30 p. m.—The first traces of aurora were seen at 4 a. m. shining through the fog, in the form of the upper portion of a pale, regular, quiet arch in the SW., reaching an altitude of about 45°, and an arched streak in the NE. at an altitude of about 60°. The sky gradually became much clearer, and at 5 a. m. a yellowish-green band extended from Andromeda through Aries and the Pleiades to Canis Minor (brightness 1). At 6 a. m. there was a bread, yellowish, quiet band (brightness 1 to 2) across the zenith from Pegasus through Andromeda,

Auriga, Cassiopeia, and Camelopardalis to Leo. At 7 the aurora had the same position and character as at 5. At 8 a.m. an arch (brightness 1) extended from Boötes through Draco and Cygnus to Pegasus. At 9.17 there were two white and quiet bands (brightness 0 to 1) started together from Boötes in the SE, and met in Taurus in the W., one running about 30° above the southern horizon and the other crossing the zenith. At 10.10 the lower band had disappeared, but the one across the zenith remained unchanged, while another band appeared extending from the Pleiades to Persens, Cassiopeia, and Cepheus to near Hercules. At 11.17 there was a white, quiet band (brightness 0 to 1) from the SE, to NW, through the Pleiades and Coma Berenices and close to Ursa Major. Only faint traces were visible at 12.17 p. m., and these had wholly disappeared at 1 p. m. The magnetic needles were unusually quiet, only showing signs of disturbance at 9 a. m and 12 and 1 p. m.

December 3 and 4, 1882, 9.15 p. m. to 1.15 p. m.—At 9.15 p. m. the aurora commenced as pale lines of light in NE, through Gemini and Taurus, with faint streamers in Lynx. At 10.15 there was a quiet arched band (brightness 0 to 1) through Taurus, Gemini, Leo Minor, and Const Berenices, with streamers in Leo Minor and Ursa Major. It was brightest in Leo Minor and Very faint in Gemini. For several hours the bearing of the aurora was unchanged, but it appeared in different constellations as they rose. At 11.15 there were no streamers. At 12.15 the arch passed through Orion, Gemini, Leo, Leo Minor, Coma Berenices, with streamers in Coma and Ursa Major (brightness 1). At 1 a. m. there were merely traces along the eastern sky from the E. to ESE... but these soon developed into an arch of pale streamers (brightness 0 to 1) from Orion's belt in the ESE, through Canis Minor, Cancer, and Leo, ending close to a Boötis, here sending off long streamers towards the zenith. From 2 to 2.15 a.m. there were two principal arched bands, the upper sending off short streamers, starting from a point in Monoceros close to the horizon in the ESE, and meeting at a point in Serpens similarly close to the horizon in the NNW, (brightness 1 to 2), through Gemini, Lynx, Ursa Major, and Canes Venatici, rising slowly and sending off vale narrow bands from the northern end, which gradually stretched up towards the zenith. At 3 a.m. streaks and envel bands, varying in brightness from 1 to 3, covered most of the sky. The start ing points were in Serpens in the NNW, and Monoceros in the ESE. It was brightest in Cygnus and Pegasus, when it formed an irregular ellipse, with its longest diameter N. and S., with consid erable whirling motion, and across through Canis Minor, Leo, Leo Minor, Canes Venatici, Ursa Major, and Hercules, where it was a band of streamers vibrating rapidly from N. to S. The brightest part was slightly tinged with greenish-yellow and rose. At 3.10 it was broken and paler and the eastern band had split into three, and was fading at 3.15, still brightest in the NE. At 4 a. m. there was a faint, low, quiet, and regular arch in the SW. from the NW. to S., reaching an altitude of about 15°, and bright, curling, wreathing bands (2 to 3), which in 10 minutes spread over most of the sky, coming up from a point in Serpens near the horizon in the NW., one main branch crossing the zenith and spreading out to Ursa Major and Gemini; another through Pegasus. There were also bright disconnected whorls in the NE. The main band moved slowly with a waving motion to the west. At 4.15 it was more spread out and not so bright. At 5 there was a bright corona, yellowish in color (brightness 3 to 4), centering a little south of the zenith. The northern streamers of the corona vibrated rapidly in every direction. The corona had disappeared at 5.20, leaving the sky covered with faint luminous bands resembling stratus clouds. There was a magnetic disturbance. At 6 a. m. there were two motionless arches (brightness 1), one through Taurus and Orion to Canis Minor and the other from Sagitta to Boötes. At 7 there were only faint traces of bands. At 8 a band (brightness 0 to 1) extended from Cygnus through Draco, Ursa Minor, Ursa Major, and Cassioneja to Leo Minor and Gemini. At 9 there were merely a few traces over the southern horizon. No aurora was seen at 10, but at 11 a.m. there were two yellowish-green arches (brightness 1), one through Orion and Canis Minor to Leo, and the second from Taurus across the zenith to Coma Berenices. At 12 m. there were only traces of aurora, and at 1.15 p. m. the last of the aurora appeared as a narrow band (brightness 2) extending from Cassiopeia through Perseus to Gemini. The needles were considerably agitated at 3 and 4 a.m., much disturbed at 5 a.m., the horizontal force being too small to register, and again at 12 m. The other two elements were but little affected.

December 4 and 5, 1882, 9.45 p. m. to 1.15 p. m.—A very evanescent streak appeared in Auriga

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about 9.45 p. m. After this there was a pale glow around the horizon, beginning to take the form of horizontal bands in the S. and SW. at 1 a. m. At 2 a. m. there was a belt of two or three streaks, white and quiet (brightness 0 to 1), from a point in Monoceros in the ESE, to one in Bastes in the NNW, through Gemini and Ursa Major. At 2.15 the belt was slightly higher, brighter, and more homogeneous. It was brightest in the NNW. At 3 a. m. there was a broad zone of the usual type, but very pale (brightness 0 to 1), with its stationary points in Monoceros in the ESE, just below Procyon and in Serpens in the NNW. The eastern edge passed through Canis Minor, Cancer, Leo Minor, Canes Venatici, and Boötes, the western through Canis Minor, Gemini, Auriga, Camelopardalis, the upper part of Cassiopeia, Cygnus and Lyra, Draco and Hercules. It was somewhat broken and pale at 3.15. At 4 the zone was reduced to two very pale (0 to 1) bands starting together from a point in Hydra c'ose to the ESE, horizon, one crossing about 207 E. of the zenith, and the other through Orion to near the horizon in the SW. At 3 there were merely traces around the horizon. At 6 a pale yellowish-green band (brightness 0 to 1) stretched through Andromeda, Perseus, and Auriga to Canis Minor. At 7 there were two similar arches one above the other from Pegasus through Pisces, Taurus, and Orion to Monoceros. At 8 a, m, a bright band (1 to 2) with streamers waving slowly from W, to E, extended from Pegasus through Cygnus, Lyra, and Hercules to Boötes. At 9 there were merely traces in Cygnus, Lyra, and Hercules. No more aurora was seen till 1 p. m., when there was an arched band (brightness 1) from Andromeda through Lacerta and Cygnus to Lyra. This had faded to traces at 1.15. The magnetic needles were comparatively undisturbed, though up to 5 a, m, the horizontal force was rather greater than usual.

December 5 and 6, 1882, 12.55 p. m. to 8 a. m.—At 11.55 p. m. five pale streamers were seen in Coma Berenices and Canes Venatici in the NNE. These were seen again in the same position at 1 a. m. but very much paler. At 1.15 there were two faint arched bands (brightness 0 to 1) in the E., one from Orion to Gemini, the other from Canis Minor through Cancer. From 2 to 2.15 there were two hazy and quiet bands (brightness 1) stretching from a point in Monoceros low in the ESE, to one in Serpens in the NNW, through Gemini and Ursa Major. The upper band was the broader, and the light was brightest in the ESE. At 3 a. m. there was a broad, pale (0 to 1) zone of the ordinary type with its starting point in the ESE, and NNW, in Monoceros and Hercules, below a Lyrae, about 10° or 15° above the horizon, crossing the zenith and extending west to Cassioneia, Cygnus, and Lyra. It was brightest in ESE., where it also sent off a broad band (brightness 2) through Leo, Leo Minor, and Canes Venatici to Corona Borealis in the N. This band was paler and somewhat broken at 3.15. At 4.15 the aurora was unchanged in character but had spread westward to the Pleiades and the square of Pegasus, with a slow drifting provement to the west. At 5 a. m. there were two arches (bright. i), without motion, one from Cygnus through Cassiopeia and Gemina, and the other from La through Ursa Major to Leo Minor. At 6 there was a pale (0 to 1) yellowish-green arch in the SW, from Andromeda through Aries and Taurus to Canis Minor. At 7 a.m. the aurora was brighter (1 to 2), and formed an arch, with streamers vibrating slowly, extending from Hercules through Corona Borealis and Boötes to Coma Berenices. There was another pale, motionless arch close to the horizon from the SW. to SSE. The weather was hazy at 8 a, m. but traces of aurora were still visible. After this the sky became overcast, preventing further observation. The magnetic needles were unusually quiet, though the horizontal force was rather higher than usual.

December 7, 1882, 3 a. m. to 1.30 p. m.—Though the sky was partially clear at 3 a. m. no aurora was visible except a pale glow along the southern horizon. At 5 a. m. a pale yellowish band crossed from Cygnus through Draco to Canes Venatici, motionless (brightness 0 to 1). Clouds prevented the 6 a. m. observation. At 7 a. m. there was another extensive aurora crossing the zenith. The western and southern limits ran from Pegasus through Auriga and Gemini to Leo, the eastern and northern from Ursa Major through Draco and Cepheus and Lacerta. It was a belt of arches without streamers, varying slightly in brightness (1 to 2). No motion was noticed, but at 7.15 a. m. the position was a little changed. At 8 two yellowish-green bands, motionless, and brightness 1 to 2, extended from Taurus through Orion to Canis Minor and Monoceros. At 9.17 there was a broad, quiet, white arch of diffused light from the SE. to NNW., having at the crown an altitude of 25° or 30°. At the same time a large portion of the sky northeast of the zenith

was filled with bands which united with the first in the SE, and NNW. (brightness 0 to 1). At 10.17 nothing remained but traces of the arch in the southwest. At 11.17 the southern horizon was mottled with faint, white spots, and at the same time a band of white, quiet light (brightness 0 to 1) passed from the NW, horizon through the Pleiades and Gemini a short distance southeast of Ursa Major. At 12.10 p. m. there was an extensive aurora of parallel bands, white and quiescent, running ESE, and NNW., and extending from the southern horizon to a point about 15 north of Cassiopcia. The aurora was unchanged at 1 p. m. but had faded to traces at 1.15. The magnetic needles were somewhat disturbed from 11 a. m. to 1, p. m., the horizontal force being diminished and the declination and vertical force increased.

December 8, 1882, 3 a. m. to 10.15 a. m.—There was a faint glow along the horizon as the twilight faded, and at 3 a. m. there appeared faint traces of streamers in the ESE, below Procyon, At 4 a. m. there was a somewhat sinuous white and quiet band (brightness 1) from a point in Hydra low in the ESE, up through Cancer, Leo Minor, Ursa Major, and Draco, ending near α Lyrae in the NW.—At 4.15 it was brighter (2) in the ESE, more sinuous, and spreading a little, with an additional pale band reaching to β Cygni.—At 5 a. m. a motionless band (brightness 1) extended from Pegasus in the NW, through Aries, Taurus, and Orion to Canis Minor in the SE. This band was in the same position at 6 a. m. but brighter (J to 2).—At 7 a. m. bright bands (1 to 2) extended from Vulpecula to the zenith and N. and E. of the zenith through Cygnus, Lyra, Draco, Hercules, Boötes, and Ursa Major to Leo.—No motion was noticed.—At 8 a. m. a pale band (0 to 1) stretched from Andromeda through Perseus, Auriga, and Gemini to Cancer.—At 9.15 a. m. a broad, bright (1 to 2) band, white and quiet extended from Canes Venatici through Ursa Major and Cassiopeia to Andromeda.—At 10.15 traces only were visible and no more was observed.—The magnetic needles showed no signs of disturbance.

December 8 and 9, 1882, 10,45 p, m, to 2 p, m,—At 10,45 p, m, there was a faint (0 to 1) but definite arch of streamers low in the NE, in Gemini and Caneer. Nothing but a pale glow on the horizon was seen until 12.15 a. m., when there were bright streamers in Canes Venatici and Coma Berenices, and three wavy bands, one through Taurus, the Pleiades, Perseus, Ursa Major, and Boötes, the second through Taurus, Auriga, Ursa Major, and Boötes, and the third through Taurus, Orion, Gemini, Leo Minor, and Coma Berenices. These bands were all pale except in Boötes, where they reached a brightness of 2. At 1 a, m, there was a broad zone crossing a little SE, of the zenith, with its starting points in Serpens in the NW. and Monoceros in the ESE., the eastern edge passing through Cassiopeia and the western through Cygnus and the square of Pegasus, with considerable motion on the eastern edge. At 1.15 the whole of the sky from Pegasus in the SW, to Gemini in the NE, was covered with serpentine bands and streamers, one starting from Cygnus in the NW, and running towards the SE, through Cassiopeia to the Hyades, where it turned on itself and ran along the NE, sky through Auriga and Ursa Major, here blending into a bright mass of curtains and whorls in the N. There was considerable motion, both twisting and vibratory, the whole moving westward rapidly. There were faint colors and a brightness of 2 to 3. The declination fell about a degree and a half. At 2 a.m. the western portion was nearly gone, and the eastern formed three or four bands from Serpens through Ursa Major and Canes Venatici to Gemini and Cancer, where they curled round into curtains (brightness 2). There was a magnetic disturbance specially marked by a high horizontal force. At 3 a, m, nothing was left except faint traces of a band from the same starting points across the zenith through Cassiopeia. The magnetic needles were nearly back to their normal position. At 4 a.m. these traces appeared as at the last observation, and had nearly disappeared at 4.15, while a patch of aurora was beginning to develop in the lower part of Leo, low in the NE. At 5 a.m. there were merely traces in the N. At 6 several vellowish-green bands extended from Pegasus through Triangulum, Aries, Taurus, Orion, Auriga, Gemini, and Canis Minor to Cancer, with some quiet streamers in Cancer (brightness 1). At 7 a, m, a zone of yellowish-white bands crossed the zenith through Cygnus, Cassioneia, Perseus, Camelopardalis, and Lynx to Leo, with a rapid waving motion (brightness 1 to 2). At 8 a. m. there was a faint (0 to 1) motionless band through Hercules, Lyra, and Draco to Boötes and Coma Berenices. At 10.10 and 12.10 p. m. there were faint traces only visible. At 1.10 p. m. a band (brightness 1) extended from Leo Minor through Ursa Major and Ursa Minor to Cepheus' and faint streaks ran from Gemini towards Ursa Major. Patches of aurora were also visible s 0 to 1). At thern horizon ht (brightness nce southeast ite and quies. int about 15" at 1.15. The d force being

on as the twielow Procyon. om a point in nding near a ading a little. brightness 1) or in the SE. it bands (1 to lygnus, Lyra, n. a pale band At 9.15 a. m. h Ursa Major served. The

t (0 to 1) but e glow on the tici and Coma sa Major, and rough Taurus, pt in Boötes, a little SE, of ., the eastern e of Pegasus, egasus in the starting from ides, where it blending into twisting and ness of 2 to 3. nearly gone, anes Venatici as a magnetic t except faint a. The magppeared as at as beginning ices in the N. ries, Taurus, meer (brights, Cassiopeia, I to 2). At 8 o Boötes and t 1.10 p. m. a to Cepheus, also visible

through breaks in the clouds in the N. At 2 p. m. there were still traces in Auriga and Gemini. There was another magnetic disturbance between 11 a, m, and 2 p, m., the horizontal force falling

December 9 and 10, 9 p. m. to 11.10 a. m .- At 9 p. m. the aurora began as a taint band in the E. in Taurus, Gemini and Lyra. At 10.15 there was an arch from Taurus through Orion, Gemini, Cancer, Lyux and Leo Minor to Coma Berenices. It was very faint, except in Taurus, Coma Berenices and Leo Minor, and in the latter constellation was broken into streamers, brightness 1. At 11.15 there was merely a faint arched streak through Cancer, Gemini and Lynx. At 12.15 a.m. the faint arch was in nearly the same position, but extended through Orion, Cancer, Leo Minor and Coma Berenices. There were also two stationary streamers (brightness 1) in Coma Berenices and Canes Venatici. At 1 a. m. the pale arch (brightness 1) extended from Orion's belt in the S.E. up through the lower part of Gemini, Leo Minor, Lynx, Canes Venatici and Boötes, ending below Boötes in the N. It was much paler at 1.15. At 2 a. m., there was in the E. a belt of two or three pale bands, the third and lowest very indistinct, starting from a point in Monoceros in the ESE, near, but not on, the horizon, through Gemini, Lynx and Ursa Major to Boötes in the N. (brightness 1). At 2.15 it was condensed to a single band (brightness 2), the lower end passing through Canis Minor, Leo Minor and Canes Venatici to Boötes. It was brighter in the ESE. From 3 to 3.15 there was an arched, slightly sinuous, band from a point in Hydra low in the ESE, through Leo, Coma Berenices and Boötes to a point in Hercules in the NNW, where it sent up a pale streamer into Draco. It was somewhat convoluted in the ESE, (brightness 1). At 4 to 4.15 an arched band (1) starting low in Leo in the E. ran through Coma Berenices and faded out high in Boötes in the NNE. It was fading slowly, and there were also traces in the S. At 5 two short bands brightness 0 to 1) extended from Pisces through Triangulum to Perseus, and the other from Pegasus through Cygnus and Lyra. At 6 there were merely traces on the southern sky, but at 7 a band of streamers (brightness 2 to 3) in rapid motion from W. to E., and changing color from vellow to green and red, extended across the western sky through Pisces, Andromeda, Perseus, Auriga, Taurus and Orion to Canis Minor. At 8 there was a quiet yellowish arch from Pegasus through Cygnus and Draco to Boötes high in the NE.; 9.10 a. m. showed a broad, low, quiet, white arch on the southern horizon from the SSE, to WNW, with a segment of an arch in the north and a quiet corona of faint white streaks at zenith. The arch in the S, was still visible at 10.10, but the aurora had faded to mere traces at 11.10. The magnetic needles were comparatively quiet all night, though both horizontal and vertical intensity read somewhat higher than usual.

December 11, 1882, 2 a. m. to 2.10 p. m.—At 2 a. m. a broad band (brightness 2) showed across the zenith from NW, to SE,, while the clouds were still so thick as to allow but one or two stars to be seen. This was wholly gone at 2.15, but there were traces of a similar band at 3, which was much brighter and better defined at 3.15. At 4.15 broad, bright, shifting, and sinuous streaks in capid motion across the zenith. This must have been a very brilliant aurora, as it showed brightly through the clouds and was accompanied by a large magnetic disturbance, with decreased intensity and increased declination. After 8 a. m. the sky cleared, but only traces were observed (at 10.10 a. m.) until 1 p. m., when there was a pale (0 to 1) zone of five distinct bands running NW, and SE.; two of them from Gemini to Boötes, one through Leo Minor, and the other through Ursa Major, two from Auriga to Corona Borealis, one through Ursa Minor, and the other through Cassiopeia and Cepheus, and the fifth from Perseus to Hercules through Andromeda and Lacerta. The middle band was the brightest. At 2 a. m. there were faint traces at the zenith, which were wholly gone at 2.12. Besides the disturbance already mentioned there was a lesser one just before

and during the zone aurora last noted.

December 11 and 12, 1882, 9.15 p. m. to 1 p. m.—At 9.15 p. m. an arch surmounted by streamers extended from Cetus through Taurus, Auriga, Gemini, Cancer, Lynx, and Leo Minor. It was very faint, except in Taurus, where the streamers reached a brightness of 2, with the light constantly varying in brilliancy. At 10.15 a similar arch extended through Taurus, Orion, Gemini, Cancer, Leo Minor, Leo, and Coma Berenices to Boötes, with a brightness of 1, except at the ends, where it was 2. There were also faint bands extending, one through Boötes, Draco, Cepheus, Cassiopeia, Andromeda, and Pisces, and the other through Corona Borealis, Lyra, Cygnus, Pegasus, and Pisces with a large mass of luminous haze in the SW., extending from Boötes to Aquila. There was little

H. Ex. 44----51

or no motion. At 11.15 there was an arch through Orion, Gemini, Leo Minor, and Coma Berenice. (brightness 1), with streamers in Coma Berenices and Caues Venatici. At 12.15 there was a simi lar arch through Orion, Gemini, Lyny, Ursa Major, Canes Venatici, and Boötes, and a streak in the N, shooting up from Boötes through Corona Borealis and Draco to Cepheus. At 1 a. m. a sinnon band (brightness 2), starting from the lower part of Orion in the ESE., extended through Gemini, Ursa Major, Canes Venatici to a point low in Boötes in the NNW, with a band below it not quite so bright going only half way to the west, and a still more indistinct third band. The middle band was the brightest at 1.15, and what had been mere traces of bands starting from the same point and crossing west of the zenith had developed a brightness 1. At 2.15 the band (brightness 1 to 2) now started in Monoceros in the ESE, and passed through Canis Minor, Cancer, Leo Minor and Canes Venatici to Boötes, with the western band very faint, and brightest in the NNW. At 3 a. m. most of the sky was covered with luminous haze somewhat segregated into bands from the NNW, to ESE, one brighter than the rest (nearly 1) from Hercules across the zenich, one from Hercules to Orion through Lyra, Draco, Cepheus, Camelopardalis and Auriga. The eastern band of the last observation had paled to 1, and the whole was fading at 3.15. At 4 there were several faint bands, the most distinct (brightness 1) in NNW. from Hercules in the NNW, up through Lyra, Draco, Ursa Major, and Leo Minor to Leo in the ESE. This had moved west about 15° and had faded to a trace at 4.15, and the only distinct band (0 to 1) was in the south from Monocerc to Orion's belt. At 5 a. m. several bright (2 to 3) yellowish green bands moving slowly, one band composed of streamers vibrating rapidly from W. to E. extended from Pisces through Cetus. Aries, Taurus, Orion, Gemini, and Canis Minor to Cancer. At 6 a.m. there were several patches of faint streamers (0 to 1) in the E. and N. At 7 a.m. quiet bands (brightness 1) ran from Cygniss through Andromeda, Cassiopeia, Auriga, and Gemini to Leo and Cancer. At 8 a.m. a quiet band (brightness 1) extended through Cygnus, Draco, and Böotes to Leo. At 9.10 a, m. a faint white quiet band lay along the horizon from the NE, to the W., and from NE, to NW, a (0 to 1) quiet band at an altitude of about 25°. The band on the horizon continued at 10, but had faded somewhat, and there were traces of (0 to 1) aurora in the NNWW, and NNE. The aurora was the same at 11.10 with the addition of faint patches in the NE, and ENE. At 12.17 the entire southern half of the sky was covered by broad parallel bands running from the NE, to SW., with a broad band on the northern side at an altitude of about 48°. The magnets were considerably diturbed. At 1 p. m. pale bands running from ESE, to WNW, covered the sky from Leo Minor to Andromeda, but at 1.12 there were only traces in the SE, and faint traces of several bands through the zenith and Ursa Major. Apart from the disturbance above mentioned the needles were very quiet, though early in the evening the horizontal force was rather high.

December 12 and 13, 1882, 11.15 a, m, to 1 p, m.—At 11.15 p, m, there was a faint flush in the NE, in Cancer and Gemini, but the sky soon became overcast and did not clear again till 6 a, m, when there was a broad, faint (0 to 1), motionless band from Persens through Auriga, Camelopan dalis and Ursa Major to Leo Minor and Coma Berenices. At 7 a faint (0 to 1) band ran from Auriga through Cassiopeia, Cepheus, Cygnus, and Corona Borealis to Boötes. Clouds interfered greatly with the observation of the rest of the aurora, though traces were observed through the haze and clouds at 8, 9, 10, and 10.10 a, m.—At 1 p, m. patches of pale white light were seen through breaks in the clouds near the southern horizon and at the zenith. The magnets were comparatively quiet, though the horizontal force was high early in the evening and lower toward midnight.

December 14, 1882, 2 a, m, to 12.10 p, m,—Beginning with the darkness there was more or less pale glow along the NE, horizon, but no definite aurora till 2 a, m., when there was an arched band (1) from α Canis Minoris through Caneer to Leo Minor, where it disappeared in the clouds. This was much fainter at 2.15. At 3 there was a broad hazy (0 to 1) band starting in Monoceros in the ESE, up through Canis Minor, Caneer, Lynx, and Ursa Major, where it faded out. At 3.15 it extended on to Hercules in the NNW. At 4 it had merely risen slightly, but at 4.15 it had developed into a broad, hazy, and somewhat sinnous band (1 to 2) from Hydra in the ESE, to Hydra in the NNW, through Caneer, Gemini, Lynx, Auriga, Camelopardalis, Ursa Minor, Cepheus, Draco, Cygnus, and Lyra, slowly drifting westward. At 5 a, m, a motionless band (brightness 1) extended from Pisces through Taurus to Orion. At 6 there were two motionless yellowish green

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December 15, 1882, 1.12 a. m. to 12.15 p. m.—More or less pale glow and very faintly luminous haze was noticed earlier, but no definite aurora till 1.15, when there were traces of faint streamers in the NE., in Cancer and Canis Minor. At 3.15 there was a faint luminous band extending from tanis Minor, through Gemini to Lynx, and a faint band of motionless streamers through Lyra, Hercules, Draco, and Ursa Major to Canes Venatici (brightness 0 to 1). At 4.15 there was a quietyllowish arch from Leo through Lynx, Camelopardalis to Persens and to Triangulum. At 5.15 traces only were visible. At 6.17 traces of a band running 8E, and NW, were visible through the clouds. At 10.15 there was a white, quiet arch (brightness 0 to 1) spanning the SW, horizon from 8E, to NW., with an altitude of about 10°, and also a few bright (0 to 2) streamers in the NE. At 12.12 p. m. there were traces of a band running from Tanrus to Boûtes, between Gemini and Auriga, and traces of patches near the northern horizon. The needles were quiet till 12 m., when the horizontal force began to fall, going very low between 3 and 4 p. m., and then gradually rising, the other two elements meanwhile reading slightly higher.

December 15 and 16, 1882, 8.10 p. m. to 2.45 p. m.—At about 3 p. m. of the local day, while the sky was still quite light, there appeared stretching across the zenith from SE, to NW, a broad hazy hand running through Pegasus, Andromeda, Cassioneia, Cepheus, Ursa Minor, and Ursa Major. Its color was a deep, clear crimson, paling somewhat toward the extremities. It was brightest in Cassiopeia and then faded and became brightest in Ursa Major (brightness 1 to 2), but was wholly gone in about 15 minutes. At 9.15 ruddy streamers, particularly rosy in the N. and S., filled the whole eastern half of the sky centering in Cepheus. These also soon disappeared. At 10.15 they had reappeared as before with some additional streamers on the west, forming a cape round the zenith. These showed rapid motion shooting from the zenith, and faded soon. At 11.15 there was simply a belt of streamers showing only a faint rosy tint across the eastern sky from Boötes to the Pleiades and Perseus. At 12.15 a band (brightness 1) bearing short streamers at intervals pacced through Orion, Gemini, Lynx, Ursa Major, and Canes Venatici across the NE, sky. There were streamers in Boötes and one long one from Corona Borealis, through Cepheus and Draco. Nearly the whole sky was covered at 1 a. m. In the NE, were three bands of streamers from NNW, to ESE,, the highest passing a little east of the zenith, breaking in on the corona which centered near Polaris, its streamers reaching down to Cygnus and Lyra, and forming curtains in the W. which reached down nearly to Pegasus. The brightest was 1 to 2, constantly changing while the band and streamers shifted, continually twisting and waving slowly. At 1.15 the corona was mostly east of the zenith and the western aurora had assumed the form of a broad zone from Orion to Hercules, the highest part taking in Cassiopcia, Andromeda, and part of Pegasus. When the light reached a brightness of 2 it was tinged with green and rose. At 2 a. m. it was all west of the zenith in a broad zone of three main bands from Orion in the SE, to Serpens in the NW., the highest through Andromeda and the lowest below the square of Pegasus. These bands were made up of streamers flickering rapidly from the W. to E. At 2.15 there were four bands in the east, the highest extending along from Canis Minor to Orion and converging in the N. The lowest passed through Gemini and Ursa Major while the rest filled the eastern sky nearly to the zenith, when they were succeeded by a broad zone with the same origin as at 2 a. m., passing through Cassiopeia. The color was greenish, with tinges of rose (brightness 2 to 3), and they shifted and waved slowly. At 3 a. m. the main body of the aurora was in essentially the same position but had paled to 1, was somewhat more diffused, with a convoluted

mass of curtains in the NW, in Delphinus and Vulpecula. At 3.15 it was more broken and still paler with some bright patches in the NE. At 4 a.m. the eastern end of the zone stretched from Leo in the E. to Canis Minor in the ESE., but the whole converged to Serpens in the NNW. The upper band passed through Leo and Gemini and below Cassiopeia, while the remaining four or five bands filled the whole southern and western sky nearly to the horizon. They were all single ous (brightness 2 to 3) and the upper band was beginning to develop coronal bands, which vibrated rapidly, north of the magnetic meridian S. to N., south of it N. to S. The bands were more broken and paler at 4.15 and a large corona was rapidly developing. At 6 a, m, five bands covered nearly the whole sky, some made up of streamers in rapid motion, others motionless (brightness | to 2) At 7 there were three bands, yellowish, and brightness 2 to 3, one from Cancer through Ursa Major and Draco to Cygnus, one from Gemini to Cygnus across the zenith, and the third from Cauis Minor to Andromeda through Perseus. At 8 a. m. there was a faint arch from the S. to SW, from Leo to Orion and a few patches in the E. (brightness 0 to 1). At 9.15 there was a white and oniet semi-corona in the S. from E. to W., and from 10° above the horizon to the zenith (brightness 1 to 2). At 10.15 there was very little change in the character of the aurora except that it had anproached nearer the zenith on the southern side, and a broad band with streamers extended along the southern horizon from E. to W. There were also a few streamers on the northern side forming a nearly complete corona. At 11.15 the band along the horizon had disappeared and the main body of the aurora shifted north of the zenith, and grown paler (1). There was slight motion. At 12.15 p. m, there was a white, quiet arch on the southern horizon from the SSE, to the W, with but 10° altitude, a band from the SE, through Boötes, Canes Venatici, near Ursa Major, through Auriga to Taurus, and streamers in the SE, and W. The whole was white and quiescent (brightness 0 to 1); At 1 p. m. the band on the southern horizon was unchanged and there was a complete corona. At 2 n. m. there were faint traces in Cassiopeia and Auriga, but at about 2.30, although the sky was quite bright, streaks fully I in brightness flashed up in the NW, and crossed the zenith to the SE, while streaks and streamers forming almost a corona in very rapid motion, both circling and vibrating appeared and disappeared round the zenith with great rapidity. A magnetic disturbance of considerable violence commenced about 10 p. m. December 15, and lasted till 5 p. m. De-

December 17, 1882, 3.15 a, m, to 11.15 a, m,—A faint streak or two was noticeable in the S, and SE, at 12.15 and 2 a, m., but there was no definite aurora till 3.15, when there was a pale band of streamers (brightness 0 to 1) in the E, from Regulus to Procyon and a still paler band from Procyon in the ESE, to Hercules in the NNW, passing through Ursa Minor close to the zenith. At 4 a, m, there was a partial corona (brightness 1) centering near the zenith extending in azimuth from Auriga in ESE, to Cygnus in NNW, with its streamers longest, about 50 degrees long, in the constellation Ursa Major. There was also a fan-shaped bunch of secondary streamers in Leo in the E.—It had faded at 4.15, except the lower streamers in the E, and NE.—At 5 there were merely access in the SW, and S, and no more was seen till S a, m, when there were two faint bands from Andromeda to Orion, and the other from Taurus through Orion to Hydra (brightness 0 to 1). From 9.15 to 11.15 there were merely faint traces of aurora through the clouds which obscured the horizon. The magnetic needles were comparatively quiet all night.

December 17 and 18, 1882, 11.15 p. m. to 7 a. m.—At 11.15 p. m. there was a faint arch without streamers, motionless, in the NE., passing through Gemini, Lynx, Leo Minor, Canes Venatici, and Coma Berenices. Between 11 and 12 pale shifting streamers developed above this arch, but were gone at 12.15, when there was a waving band of pale, hazy light passed through Orion, Gemini, Auriga, Lynx, Ursa Major, and Canes Venatici, and also streamers in Ursa Major, Camelopardalis, Ursa Minor, Draco, and Cepheus (brightness 0 to 1). No more aurora was seen except faint traces at 2 and 7 a. m.—The magnetic needles were undisturbed all night.

December 18 and 19, 1882, 10.15 p. m. to 2.12 p. m.—At 10.15 there was a band of waving white light from SE, to NW, nearly overhead through the constellations Corona Borealis, Hereales, Draco, Cygnus, Andromeda, Cepheus, Triangulum, and Pisces (brightness 1 to 2). At 11 p. m. there was only a faint patch of light in the south in Pegasus, Vulpecula, and Delphinus. At 12 there was simply a narrow arch in the south with its extremities bearing SE, and SW, and its crown at an altitude of about 25 degrees (brightness 0 to 1), but at 12.30 it had developed into a

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vaving white is, Hereales, At 11 p. m. inus. At 12 SW, and its doped into a

brilliant display, beginning as four or five bands of streamers across the western sky, from Orion in the ESE, to Hercules in the NNW., the highest through Cassiopeia and the lowest close to the horizon (brightness 3 to 4). The streamers were in rapid motion, vibrating in alternate bands from N. to S. and vice versa, with the rapidity of lightning, while the changes in color and brightness were almost instantaneous. The colors were green, yellow, and rose (one of the party says he saw blue), the latter especially bright and approaching a peach-bloom color. The motion was mostly confined to the middle of the bands and most violent near the zenith, where smaller bands and coronal streamers were shooting and twisting. It soon spread east of the zenith, developing from the NW, in one specially brilliant band of streamers in rapid vibration through Ursa Major and Gemini. Other bands developed across the NE, sky, while the western aurora faded, and globes of red light shot up from the NW, at 12.50-55. At 1 the bands in the east were twisted and carled into spirals and fading at 2 in brightness and the two bands through Ursa Major and Cassiopeia still remained motionless, and brightness 1 to 2. At 1 all had faded to brightness 1 and become hazy and the colors were very faint. Polar bands of cirro-stratus clouds were distinctly seen across part of the aurora when the display was at its height. There was a magnetic disturbance with high easterly declination and rather low horizontal force. At 2 a. m. there was nothing left but three or four bands starting in the clouds in the ESE,, two of them reaching Hercules in the NW., one through Canis Minor, Gemini, Lynx, and the upper part of Ursa Major, and the other through Orion, Taurus, Perseus, Andromeda, Lacerta, Cygnus, and Lyra, and a slightly brighter band in the W. from Aquila to Pegasus (brightness 1). All were slightly brighter (1 to 2) and somewhat broken at the NW, end. The needles were very near their normal position, At 3 a.m. the sky was nearly covered with polar bands and between them were traces of the auroral bands as before, brightest (nearly 2) in the NW, and NE. The declination was reading very low. At 4 a. m. the bands overhead were very pale, with a bright patch in the ME, and a similar one in the NNW. At 4.15 the needles were nearly back to their normal position and remained undisturbed the rest of the night. There were traces seen at 5 a.m. and again at 10.10 a. m., but at 2.12 p. m. four narrow streamers (brightness 0 to 1) ran up from the NNW, horizon and met in Auriga vibrating very rapidly between Gemini and Taurus. This was the last seen.

December 19 and 20, 1882, 11.15 p. m. to 3 p. m.—At 11.15 p. m. there was a faint arch (brightness 0 to 1) in the NE, through Orion, Gemini, Leo Minor, Canes Venatici, and Coma Berenices; this latter growing gradually paler till nearly 12 midnight, but had faded at that observation. At 1.15 there was a yellowish, quiet, and regular arch (brightness 1), quite narrow, from Canis Minor in the ESE, through Cancer, Leo Minor, Lynx, and Canes Venatici, ending in Boötes in the NNW. At 2 a. m. there were rounded, hazy patches in Canes Venatici, and a "zone" of three or four bands from a point in the upper part of Serpens, in the NW., through Cygnus, Lyra, Cepheus, and Cassiopeia, and then dwindling to a single band through Perseus and Taurus, fading in Orion. The whole had faded to traces at 2.15. At 3 a. m. there was a bright sinuous yellow band in the NW. (brightness 2 to 3) from Serpens close to \( \beta \) Cygni and through Pegasus, fading under the moon. At 3.15 these had risen and developed into a very extensive zone (brightness 2), with its starting points in Orion in the SE, and Serpeus in the NW., stretching in breadth from Pegasus to Leo. The streaks were yellow and very sinuous, some spiral in Cygnus, with a rather slow writhing motion at the zenith. There was a sudden and violent magnetic disturbance, the horizontal force falling too low to read and the eastern declination increasing over 1°. From 4 to 4.15 there was a sinuous, broken arched band, rather narrow and yellowish (brightness 1 to 2), from Leo in the E., through Coma Berenices and Boötes, to Hercules in the NNW., and at 4.15 also a pale streamer up into Lyra. The magnets had become quiet. At 5 a.m. there was a faint, motionless band (brightness 0 to 1) above the southern horizon, and at 6 merely traces in the SW. At 8 a.m. there were traces of a very faint corona, resembling luminous clouds, and the needles were very much disturbed, the E. declination increasing 5°. At 9.10 there were only faint traces of aurora, but the disturbance continued. There were also traces at 10.10 a. m., after which no more was seen till 1 p. m., when there were two quiet bands (brightness 0 to 1), one from Cassiopeia through Cygnus and Lyra to Hercules, and the other from Gemini through Leo Minor and Canes Venatici to Corona Borealis, and a corona in Ursa Minor (brightness 0 to 1), moving sluggishly. At 2.15 p. m. there still remained traces of the corona in rapid motion, and also traces of the northern band, and at 3 p. m. there

were still traces in the NW. This last appora was accompanied with a violent magnetic disturbance.

December 21, 1882, La. m. to 3 p. m.—At 1 a. m. there was a curved yellow band in the NW. (brightness?) from just below a Aquila towards Pegasus, but more or less obscured by the bank of clouds that lay on the western horizon, and still more obscured at 1.15. At 2.15 a. m. an arched band, somewhat sinuous (brightness 2), from Hercules in the NNW, through Corona Borcalis, Canes Venatici, Leo, and Leo Minor, ending in the haze. It was gradually breaking into streamers. It had risen at 2.15 about 52 higher, with considerable flickering vibration in the streamers, showing pale colors, green, yellow, and red, not rose (brightness 2 to 3); and there was also a zone (brightness 1 to 2), with its starting points in the SE, and NW, hidden by hazy clouds, and crossing the zenith W, of Polaris and drifting slowly westward. At 3 a.m. there was a rather pale band coming from the clouds near Cancer in the ESE, across the zenith from Ursa Major to Cassioneia and ending in the clouds in the NNW. At 3.15 it was partly faded, and finally obscured by clouds. At 4 a, m, there were only traces in the N. through the clouds which now covered the sky. At 5 a. m. bands with streamers vibrating from W. to E. and back, yellowish in color, and brightness 1 to 2, ran from Orion through Taurus and Aries to Pegasus. At 6 a. m. a quiet band (brightness 1) extended from Pegasus through Cygnus, Draco, and Ursa Major to Leo, while at 8 traces only were visible through the haze. At 9.10, 10.10, and 12.10 faint traces were seen. At 1 p. m. the aurora was extensive in bands and streamers (brightness 0 to 1), paling and vanishing quickly. The bands extended from Gemini and Auriga to Ursa Major, and from Hercules through Corona Borealis and Canes Venatici to Leo Minor; the streamers through Cygnus and Lyra and from Ursa Major to Ursa Minor, forming half a corona. There were also streamers up from Boötes. At 2.12 p. m. there was a sinuous band (brightness 0 to 1) in rapid motion, starting near Taurus and running through Persons and Cassiopeia to Cepheus. At 3 p. m. there were faint traces of a band and a few streamers in the N. and NNW. The needles were more or less disturbed during the whole twenty four hours, the disturbance being at its highest at 2 and 3 a.m.

December 21 and 22, 1882, 11 p. m. to 11 a. m .- At 11 p. m. there was a faint streak through Beötes, Coma Berenices, Leo Minor, and Gemini. At 12.15 a. m. there was a faint regular arch through Orion, Gemini, Leo Minor, Coma Berenices, and Boötes. At 1 to 1.15 a, m, the arch was still narrow and greenish (brightness I), from the ESE, to NNW, through Canis Minor, Cancer, Leo Minor, Canes Venatici, and Boötes to Serpens. At 2 a. m. there was a very pale and somewhat sinuous band (brightness 0 to 1) from Monoceros in the SE, through Orion, Taurus, Perseus, Cassiopeia, Cepheus, and Cygnus to Hercules in the NW. This had drifted W. to Andromeda at 2.15, and a short band had developed in the SE, from Canis Minor to Leo (brightness 1 to 2). This band was rather broad, and flared into short hazy streamers on the upper edge. At 3 a. m. there was a broad zone of the usual type across the zenith from Monoceros in the ESE, to the NW., where its base occupied 200 in azimuth in Hercules. The eastern boundary passed through Leo and Ursa Major, while the main zone spread west to Cassioneia, and the northwestern bands reached Andromeda and Pegasus. At 3.15 it was brighter (brightness 1 to 2) and had spread about 100 each way, showing faint tinges of color in the E. and broken into cloudlike masses in the SW. At 4 a. m. only the extreme western part of the eastern band remained, and the whole had faded to traces at 4.15. At 5 pale traces of bands crossed the zenith from N. to S. At 6 a, m. a yellowish, quiet band (brightness 0 to 1) ran from Pegasus through Perseus, Auriga, and Gemini to Cancer. At 7 a. m. there were quiet bands (brightness 0 to 1) from Crion through Taurus, Auriga, Lynx, and Ursa Major to Leo and Coma Berenices. Faint traces were seen over the southern horizon at 8 a. m., and the last faint traces were noticed at 11 a. m. The needles were quiet up to 3 a. m., when they were considerably disturbed, the horizontal force being most effected. This dis turbance lasted three hours, and there was another slight disturbance at 5 and 6 a.m.

December 22.and 23, 1882, 11.55 p. m. to 2 p. m.—At 11.55 p. m. there was a pale, regular arch in the NE. from NNW. to ESE., the altitude of the crown being about 25°. This had wholly disappeared at 12 midnight. Nothing more was observed till 2 a.m., when there was a broad, hazy band across the zenith from Monoceros, in the ESE., to Hercules in the NW., through Gemini, Auriga, Camelopardalis, Ursa Minor, Cepheus, Cygnus, and Lyra. This had drifted west and faded to a trace at 2.15, and in the NE, there had developed three or four sinuous and somewhat convo

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December 24, 1882, 1.15 a. m. to 10.10 a. m.—At 1.15 there was a hazy band (brightness 0 to 1) from Hercules through Corona Borealis, Boötes, Ursa Major, Lynx, and Gemini, quickly fading and appearing again. It was invisible at 2, but well developed at 2.15, and passing through the same constellations in the N., but a little higher, and through Cancer instead of Gemini to Canis Minor. At 3 there was a bazy band (brightness 0 to 1) up through Cygnus in the NW., Cepheus, Cassiopeia, and Perseus, ending in Auriga, and a trace in Monoceros in the ESE. At 3.15 the whole was very faint and the main band had risen a degree or two. At 4 there was a broad, rather hazy belt in the NE. (brightness 1) from Boötes to Leo, and a quiet, regular arch in the SW. from the lower part of Pegasus to Orion's Belt. This arch still remained at 4.15, but the eastern belt had faded to a trace. Across the zenith, from Cygnus to Auriga, was a broad, convoluted band, with considerable withing and twisting motion. There was a slight magnetic disturbance. At 5 a. m. there were faint, motionless bands, yellowish green (brightness 1), from Orion, through Canis Minor, to Leo, and from Leo to Ursa Major and to Draco, and from Draco, through Cygnus, Lacerta, and Andromeda, to Pisces. Traces were seen at 8 and again at 10.10 a. m. In addition to the disturbance already mentioned there was quite a considerable one from 8 to 11 a. m.

December 25, 1882, 2 a. m. to 2.15 a. m.—Clouds covered the sky during the greater part of the night, but at 2 a. m. they were sufficiently thin and broken in the N. and NW, to show pale streaks in the NW, streaming up towards the zenith. These streaks were near α Lyræ, which was the only star visible in that part of the heavens. At 2.15 there was a simons streak (brightness 1 to 2) visible through the clouds from near the horizon in the NW, to a point about 10° west of the zenith, where it ended in the clouds. No more aurora was seen. There was a slight magnetic disturbance at 4 a. m. and again at 7 a. m.

December 26 and 27, 1882, 10.15 p. m. to 9.10 a. m.—There was a bunch of scarcely discernible streamers in the NE, at 10.15, and at 11.15 a faint patch in Gemini. At 12.15 a, m, there was merely a faint flush in the NE. At 1 a.m. there was only a portion of a pale (0 to 1) arch lying low in the NE, in Coma Berenices and Leo, and at 1.15 there were also two or three shifting streamers of the same brightness in Boötes and Corona Borealis. At 2 there was a sinuous band (brightness 1) in the NE, from Cancer t'grough Leo, Canes Venatici, Boötes, and Corona Borealis, ending in Hercules in the NNW. At 2.15 it was brighter (1 to 2), and a second band had developed above it through Cancer, Leo, Leo Minor, Canes Venatici, Ursa Major, close to  $\eta$  Boötis, Corona Borealis, and Hercules. Streamers in Hercules stretched from the lower band through the upper. The upper band was observed to break gradually into short streamers, with considerable flickering from the N. to S. There was also a hazy patch (brightness 0 to 1) in Orion and Taurus, SSE. At 3 a. m, a broad zone of the common type crossed from Canis Minor in the SE, to Cygnus below & Cygni in the NW. The western edge, which was the brightest, ran through the head of Orion, Aries, Taurus, Triangulum, as d. Andromeda, the top of Pegasus and Vulpecula, and the eastern, which was very pale west of the zenith, through Gemini (inclosing δ Geminorum), Auriga, Camelopardalis, Ursa Minor, and Cepheus. At 3.15 it had condensed into a single rather broad band in the position of the western edge of the zone (brightness 2 to 3), tinged on the upper edge with green and with rose on the lower. This band was unchanged in position at 4, but was a little paler, and the constellation had set through it a little. It had regained its former brightness at 4.15 and had

risen to the position of the middle of the former zone, while incipient sinuous and convoluted bands were developing in the E. from Hydra through Leo and Coma Berenices. At 5 there were two faint, quiet bands (brightness 1), one through Cygnus, Cassiopeia, Auriga, Gemini, and Caneer, and the other through Leo Minor, Ursa Major, and Draco. At 6 there was a quiet band (brightness 0 to 1) from Canis Minor through Orion, Taurus, and Aries. At 7 there were traces of a faint band from the W. to NW., and at 8 faint traces in the SW. The last traces were seen at 9.10 a.m. The magnetic needles were practically undisturbed all night.

December 27 and 28, 10.15 p, m, to 9.10 p, m,  $\rightarrow$  At 10.15 p, m, there was an arch in the NE, with its curve at a Geminorum, altitude about 30°, and extremities being NNW, to SE, passing through Taurus, Gemini, Lynx, Leo Minor, and Coma Berenices. It was narrow, except in Coma Berenices, where it was broken into 5 streamers. At 11.15 there was a band like a half arch, passing through Gemini, Leo Minor, Coma Berenices, and Boötes (brightness 1), and a faint streak from Cygnus to Cassiopeia. At 12.15 a. m. there was an arch in the NE. through Orion, Gemini, Lynx. Ursa Major, Canes Venatici, and Boötes, very broad in Ursa Major, with streamers in Boötes (brightness 1). This had risen at 1 a. m. into a broad zone (brightness 1), with its bands very sinuous and broken and in motion across the zenith from the NNW, to the ESE,, the extremities rising from the haze. The western edge ran through Orion, Taurus, Andromeda, Pegasus, and Cygnus, and the eastern through Gemini and Ursa Major. At 1.15 it was quieter and narrower, being confined to the part west of the zenith. The aurora was still in the form of a zone at 2 a. m., with its starting points in Monoceros ESE, and Hercules NNW, It consisted of three main bands. The western and brightest (brightness 1 to 2) band was in rapid waving motion, and ran through Orion, Taurus (not inclosing the Hyades or Pleiades), Persens, Cassioneia, Cepheus, close to δ Cygni and Lyra, the eastern barely reaching Gemini and Ursa Major. At 2.15 it was quieter and spread about 15° each way. At 3 the zone still continued (brightness 1 to 2), with its starting points in Monoceros ESE, and Aquila NNW., stretching west to the square of Pegasus and east to Canes Venatici, with additional bands in the NE. through Leo, Coma Berenices, and Boötes. It was quiet and brightest in Cygnus. At 3.15 it was in the same position but paler (brightness 0 to 1); 4 a. m. showed only traces of the extreme east and west bands, but at 4.15 the eastern traces had developed into convoluted bands (brightness 1) through Leo, Coma Berenices, Boötes, and Corona Borealis. At 5 there were only traces over the horizon from NW, to SE. At 6 there were two motionless bands (brightness 1), one through Pegasus, Perseus, Cassiopeia, Camelopardalis, and Lynx, and a short band from Ursa Major to Boötes, At 7 a, m. there was a band (brightness 0 to 1) from Pisces through Aries, the Pleiades, and Orion through Canis Minor, At 8, 9, 10, and 10,10 a, m, there were still faint traces. The horizontal force read high during the early part of the evening, and was somewhat agitated at 2 and 3 a. m., while at 6 and 7 there was a lively disturbance, the force falling too low to be read. The other elements were slightly or not at all affected,

December 28 and 29, 1832, 11.10 p. m. to 2.12 p. m.—Though the sky was completely covered with clouds at 11.10 p. m., bands of aurora, which must have been very bright, appeared across the zenith from NW, to SE, in rapid sinvous motion. At 2 a, m, the sky was partially clear, and broad diverging bands (brightness 1), radiating from Cygnus in NW., stretched across zenith towards the SE, At 2.15 a bank of clouds about 15° high lay along the western horizon, and above this nearly to the zenith the sky was covered with almost parallel broad bands from the NW, to the SW. The lowest resting on the banks of clouds was the brightest (brightness 2 in NW.), and the highest brightness (1) ran through Cygnus, Cassiopeia, and Leo, ending in the clouds. At 3 portions of bright bands could be seen through the clouds in the NW, and SE, at an altitude of about 40° At 3.15 a broad bright band could be seen across the zenith from NW to SE, through the hazy clouds. At 4 there were broad hazy bands across the zenith from NW, to SE, apparently in motion, but much obseured by haze, and also a brighter band lower in the W. All was obscured by haze at 4.15 except traces of the last band. No more was seen till 7, when the clouds partially cleared again, and a broad band (brightness 0 to 1), and motionless, through Lyra, Corona Borealis, Boötes, and Coma Berenices, was visible. At 8 the sky was wholly clear, and two or three bands (brightness 1 to 2), with streamers, some of them reaching the zenith and all vibrating rapidly from W. to E. Their color was yellowish, and they occupied Taurus, Orion, Auriga, Camelopardalis, Gemini, Lynx, Leo, duted bands re were two Cancer, and (brightness a faint band 0 a.m. The

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overed with s the zenith oad divergrds the SE. early to the The lowest brightness right bands 3.15 a broad At 4 there it much ob-4.15 except gain, and a , and Coma ness 1 to 2), o E. Their Lynx, Leo,

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and Hydra. There were a few traces in the NW, and E. at 9.15. The 10.15 observation showed aluminous patch (brightness 0 to 1) in Taurus in the NW, horizon, and extending through Auriga, and another similar patch in Cygnus. At 11.10 a narrow white band (brightness 1) extended from the SE, to the W., with its crown at an altitude of about 20°, its western end being somewhat broader. A white, quiet band also extended from the horizon SW, to Polaris. At 12.17 p. a. there was an aurora reaching the horizon in the NE, and W. (brightness 1), white and quiet. At 1 p. m. there was a zone of the usual type, with its starting points NNW, and SSE, starting from Lacerta and reaching to Leo Minor. This was reduced to traces at 1.12, and faint traces were still discernible at 2.15. A magnetic disturbance began at about 2 a. m. and reached its maximum at 8 a. m., the horizontal force falling too low to be read, and the eastern declination increasing over a degree. The disturbance was large again at 1 p. m.

December 19 and 30, 1882, 10.15 p.m. to 3 p.m.— At 10.15 p.m. there was a low arch (brightness 1), with its extremities bearing E. by S. and N. by W., passing through Orion, Gemini, Lynx, and Leo Minor, and faint recurved streamers in Coma Berenices and Canes Venatici. At 11.15 the arch was irregular and waving (brightness 2), and passed through Orion, Gemini, Leo Minor, Lynx, Coma Berenices, and Boötes. At 12.12 a, m, there was an irregular and waving arch, very low in the NE., through Canis Minor, Leo, Coma Berenices, and Boötes, with a few faint streamers in Boötes (brightness 1). The arch had risen at 1 into a broad zone, with its starting points in Hercules in the NNW, and Monoceros in the ESE. The western band (brightness 1) crossed through Cassiopeia, but faded before reaching Monoceros. The next band only reached Ursa Major, while the eastern. which was the brightest (brightness 2) and yellowish in color, passed through Corona Borealis, Boötes, Canes Venatici, Leo Minor, and Cancer, and there were also below this two or three paler partial bands. At 1.15 the whole had faded to traces except the band in the E., which now ran through Leo. At 2 a.m. there was an arched band in the same place (byightness 1) and a streamer from the NNW., and reaching into Lyra. This streamer was gone at 2.15, the band was paler, and there was a streamer in the ESE. From 2 to 3.15 there was a broad zone (brightness 0 to 1) of hazy bands, broad and somewhat shifting. The starting points were in Hercules in the NNW, and a line in Monoceros and Hydra from the SE, to the ESE,, and the sky was covered by the zone between Leo in the NE, and the lower part of Pegasus in the SW., except between the zenith and Ursa Major. At 4 the zone had nearly all faded except the eastern band and another about 20° broad through Cassiopeia. This had shifted westward into Perseus and Andromeda at 4.15, and was fading rapidly. At 6 there was a motionless band (brightness 2) in the SW, through Canis Minor, Cancer, Gemini, Orion, Taurus, and Pisces. At 6 a. m. an extensive zone (brightness 4 to 2) covered the sky. The starting points were in Pegasus WNW, and Leo ESE, the edges running through Aries, Gemini, Coma Berenices, Boötes, Corona Borealis, Lyux, Cygnus, and Lacerta. There was a slow waving motion, and some of the bands were broken into streamers. At 7 there was a faint band (brightness 0 to 1) through Delphinus, Hercules, and Boötes. At 8 a band (brightness 2 to 3) with streamers in rapid motion, colors changing from yellow to green and red. ran through Triangulum, Aries, Taurus, Perseus, Auriga, Gemini, and Leo. At 9.10 there was a bright patch in the E, and NE, at an altitude of about 20°, with long faint streamers extending to Polaris. It was white and quiet (brightness 2). At 10 there were a few faint traces, but no more was seen till 1 p. m., when the aurora revived as a sigmoid band (brightness 0 to 1) extending from Leo Minor in the SW, to Boötes in the S. A twisted band ran through Ursa Major from Gemini to Hercules, while a crown of the same brightness, fading very rapidly, was found in Ursa Minor. At 2 there was a broad band (brightness 0 to 1) in the NE., through Cygnus, Perseus, Lacerta, and Auriga, and faint traces of coronal streamers and of streamers in the SW. The last faint traces were still visible in the NE, at 3 p. m. The hor izontal force instrument was agitated between 2 and 4 a. m., and there was considerable disturbance, chiefly affecting the horizontal force, from 8 a, m, to 3 p, m,

December 30 and 31, 1882, 10.15 p. m. to 2 p. m.—The aurora began at 10.15, with a flush in the NE., continuing but little changed at 11.15. At 12.15 a. m. it had developed into a definite though pale band, through Gemini, Leo Minor, and Canes Venatici. From 1 to 1.15 the eastern horizon was much obscured by haze, and there was a regular but rather narrow arch in the NE., with its crown apparently in Coma Berenices, at an altitude of about 25°, with its extremities about N.

H. Ex. 44----52

and ESE. At 2 the horizon was still obscured and the arch was higher and brighter (brightness 1 to 2) with its extremities ESE, (observed to be near Regulus) and NNW. There was also a broad forked hazy band (brightness 0 to 1) from the NNW, end up through Lyra and Cepheus. The arch only remained at 2.15. At 3 the arch was somewhat irregular (brightness 1) from the ESE, to the NNW, passing through Leo, Leo Minor, Ursa Major, Draco, and Lyra to Aquila. At 3.15 if was brighter (brightness 1 to 2) and an additional band (brightness 0 to 1) through Ursa Minor connected it into a zone. At 4 a. m. there was a broad hazy zone (brightness 0 to 1). with its starting points in Hydra ESE, and Aquila NNW, passing through Caucer, Gemini, Anriga, Persens, Cassiopeia, Andromeda, Pegasus, and Lacerta, and a band (brightness 1 to 2) in the NE, from starting points through Leo, Coma Berenices, Boötes, Corona Borealis, Hercules, and Serpens. This band was in the same place, but the zone was farther E. and narrower and passed through Ursa Major and Ursa Minor. At 5 a. m. a quiet yellowish band (brightness 1) passed from Pisces through Taurus, Orion, and Monoceros. At 6 there was a band (brightness 1) waving slightly from W. to E. through Aries, Taurus, Gemini, and Canis Minor. There were faint traces at 7 and 8. also at 10.10 and 12.10. There was a demite aurora at 1 again; a narrow band (brightness 0 to 1) passing between Gemini and Auriga, through Ursa Minor to Cygnus in the ESE. Faint traces were still visible in the NW, and in Cassiopeia at 2 p. m. There was a disturbance, not very great, with decrease of horizontal force and increase of the other elements at 7 to 8 a.m., and again much less violent at 1 to 2 p. m.

December 13, 1882, January 1, 1883, 10.15 p. m. to 12.17 p. m.—At 10.15 there were faint bands surmounted by very faint streamers in the NE., passing through Gemini, Lynx, and Leo Minor, This had faded at 11.15 to a more hazy streak just above the NE, horizon, with its extremities bearing N. by W. and E. This disappeared again before the next observation; was beginning to develop again at 1 a.m. At 2 there were three faint, ill-defined arches (brightness 0 to 1) in the NE., from Hercules to Leo, through Corona Borealis, Boötes, and Coma Berenices, with a faint streamer running up into Draco at the NNW, end. There were three or four additional streamers in the same place at 2.15. At 2 the arches had risen and become a broad hazy zone (brightness, 0 to 1), brightest on the edges, with its starting points in Hydra ESE, and Aquila NNW. The highest point of the eastery edge passed through the top of Canes Venatici and of the western through the lowest part of Andromeda. This zone lasted two hours, with its starting points having the same bearing, of course changing its relations to the constellations as they moved through it, and its band carying slowly in brightness (from 0 to 1 to 1 to 2) and position. At a there were two bands (brightness 1 to 2), one short with streamers on the western end, and a long one below it with streamers in the E., vibrating slowly from W. to E., running through Pegasus, Lacerta, Cygnus, Lyra, Draco Corona Borealis, Boötes, and Coma Berenices. At 6 a quiet band (brightness 0 to 1) ran from Pegasus to Hercules and Boötes. A similar but brightness 1) band at 7 a. m. passed through Canis Minor, Orion, Taurus, Aries, and Pisces. At 8 a. m. a comparatively narrow zone (brightness 1 to 2) crossed the zenith from Pegasus to Leo Minor, through Cassiopeia, Ursa Major, and Ursa Minor. There were besides two bands S, of the zenith from Leo to Andromeda through Cancer, Gemini, Auriga, and Perseus, with several patches of streamers between the bands vibrating rapidly, and a few beams of light from Ursa Major towards the S. (brightness 1 to 2). At 9.17 there was a broad band (brightness 1 to 2) from the SE, to NW., with a smaller band meeting it at its SE., and in Canis Minor in the W., about 5° apart in the middle, with white and quiet streamers above and from the smaller band extending towards the zenith. Traces of aurora continued visible till 12.17 p. m. The magnetic needles were remarkably quiet up to 4 a. m., when there was a slight disturbance, lasting over two observations—a decrease of all three elements. They again became quiet at S a. m., the horizontal force suddenly fell too low to read, and gradually recovering itself during the next two observations, while the other elements were almost undisturbed, both rising slightly.

January 1 and 2, 1883, 10 p. m. to 7 a. m.—At 10 p. m. there was a patch of aurora in the NE, in Cancer and Leo Minor, forming an irregular arch, with ill-defined streamers. This had wholly disappeared in ten minutes. At 11.15 there was an example of a new form of aurora, two arches arranged longitudinally, one narrow and rather irregular from Boötes through Coma Berenices. Leo, and Cancer to Canis Minor, reaching an altitude of about 15° in the NE,, and the second

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paler and lower from Canis Minor to Orion's belt. At 1 a. m., there was a very faint arch (brightness 0 to 1) in the NE., with an altitude of about 10°, through Leo, Coma Berenices, and Boötes. Beneath was a well-defined dark segment. No more was seen till 4.17 a. m., when there was a band (brightness 0 to 1) from N. to E. through Coma Berenices and Corona Borealis. At 5.17 a yellowish-green band (brightness 1) ran from Cygnus through Lyra, Hereules, and Boötes. Faint traces were observed at 7 a.m., while clouds prevented observation during the rest of the night. The magnetic needles were comparatively undisturbed up to about 7 a. m., when a considerable disturbance began, which was still going on after daylight.

January 3, 1883, 3 a. m. 40 11.15 a. m.—A bank of clouds lay along the horizon all the early part of the morning, and above them there seemed to be considerable glow, though no definite aurora was seen till 3 p. m. (8.43 p. m. local time, January 2), when there was a broad hazy band (brightness 1) somewhat sinuous near the horizon, stretching across the zenith from a point in Hydra in the ESE, to Aquila NNW, through Cancer, Lynx, Ursa Minor, Cepheus, Draco, and Cygnus, This band was about three times as broad at 3.15, embracing also part of Gemini, all of Auriga, part of Perseus, all of Camelopardalis, Cassiopeia, and Cepheus, and part of Draco, Lacerta, and Sagitta. At 4 a. m. it had shifted west of Cassiopea, and was much broken, but a band rapidly developed through Cassiopeia from the SE,, waving gently. At 4.15 the whole sky was covered with broad bands winding in large sinuous curves, one especially from Lyra in the N. up to Cassiopeia, then to Aries and the Pleiades and to Auriga. There was a bright, hazy, irrregular patch of large extent in the NW. The brightness of the whole was I, and all shifted slowly, with gentle andulations. The intensity of the magnetic needle had been low for over twelve hours, and the horizontal force needle was now agitated. At 5 it had subsided into two broad, quiet bands, starting from Pegasus (brightness 1), one going S, to Orion, and the other N, to Hercules. At 6 there were only traces of a band from SE, to W., at an altitude of about 45°. At 7 a broad, yellowish-green band waving rapidly from W, to E, (brightness 1 to 2) ran from Pegasus through Andromeda, Cassiopeia, Camelopardalis, Ursa Minor, Ursa Major, and Canes Venatici. No more amora was seen till 11.15 p. m., when there were faint traces in the E. The intensity continued low, being consideraly disturbed at 9 a.m.

January 4, 1883, 3 a. m. to 8 a. m.—At 3 a. m. (10 p. m. local time) there was a very faint vertical streamer about 20° long running from near the horizon ESE. This was prolonged at 3.15 into a narrow band (brightness 0 to 1) from Hydra, through the top of Leo, Leo Minor, and U. Major, then burning very pale through Draco and fading in Lyra W. of a Lyrae. At 4 traces of the band were perceptible a little higher, and at 4.15 the traces crossed the zenith. At 5 a yellowish quiet band (brightness 0 to 1) ran from Cygnus in the NNW, through Lyra, Hercules, Corona Borealis, Boötes, and Coma Berenices. At 6 a. m. a broad, motionless band (brightness 1) extended through Aries, Taurus, Orion, and Canis Minor. After this traces only were noticed in the NE, at 7 and from the NW, to W. at 8. The magnetic intensity continued low, especially the horizontal component, but there was no disturbance.

January 5, 1883, 12.15 a, m, to 5 a, m,—There was a faint glow in the NE, at 12.15 a, m., which had developed at 1.15 into a regular, narrow, quiet arch through the haze in the NE. (brightness 1), with its extremities bearing ESE, and NNW, and its crown at an altitude of about 30°. The stars in the neighborhood were obscured by a bank of haze. There was also a band of the same brightness beginning in a bank of haze in the NNW, and running through Lyra, Draco, Ursa Minor, Camelopardalis close to 3 Auriga and Gemini, fading in a few minutes. At 2 a. m. there were two sets of auroral bands starting from nearly the same place in the haze in the ESE, and NNW., one a broad band, hazy and twisted, waving gently through Lyra, Cygnus, Cassiopeia, Auriga, and the western side of Gemini and Canis Minor, and the other a zone of three or four quiet bands in the NE., the highest through Ursa Major, and the lowest through Leo. The brightness of the whole was 1. At 2.15 the western band was gone, except its NNW, end, and the zone had increased to six or seven bands. At 3 a. m. a very broad hazy zone (brightness 0 to 1) covered nearly the whole of the sky. The starting points were hidden in the ESE, and NNW,, and the castern edge reached the hazy clouds close to the horizon, while the western passed through Cyg nus, Andromeda, Perseus, Taurus, the upper part of Orion, and Monoceros. It was very much faded at 3.15, though the eastern edge was growing bright. At 4 only that part of the zone which was NE. of the zenith remained, very pale and hazy, while at 4.15 it was very much broken and hazy, and traces of the western band were reappearing. The horizontal force was low and agitated. The haze and clouds continued increasing, and a few faint traces were seen at 5 a. m. The needles were hardly disturbed all night, though the intensity was comparatively low, much higher, however, than for the last twenty-four hours.

January 5 and 6, 1883, 10.15 p. m. to 2 p. m.—Flashes and streamers, very pale, began to appear in the NE, about 4.30 p. m. local time (9.15 Washington time), and at 10.15 had developed into a band of short bunches of streamers extending from the N. to E. through Orion, Gemini, Lynx, and Ursa Major (brightness 1). This soon disappeared, and no more was seen, the sky being partially ob. scured by haze till 2 a. m., when there was a motionless narrow band across the zenith (brightness 0 to 1) visible through the haze from the NNW, to ESE, near Gemini. This was wholly visible at 2.15. Several bands showed through the clouds at 3 a. m., one in particular in the NE, (bright, ness 2) at an altitude of about 40°. At 3.15 the band had reached an altitude of about 60° and the whole sky round the zenith was covered with waving bands. The sky then became completely obscured, only clearing partially at 8 a.m., when yellowish bands (brightness 0 to 1), waving slowly and partly hidden by clouds, were visible, running from Ursa Major through Auriga, Perseus, and Aries. The sky rapidly cleared at 9.17, and there was a quiet white band (brightness 0 to 1) near the southern horizon, running E. and W., sending up streaming patches through Leo and Coma Berenices, and at the W. end in and near Canis Minor. The aurora was unchanged at 10.17 except for additional patches in the N. in Triangulum, Pegasus, and Audromeda. Traces only were seen the next two hours. At 1 p. m. there were two bands (brightness 0 to 1) from Boötes to Cygnus, through Corona Borealis and Hercules, and a band through Ursa Major, Ursa Minor. Cepheus, and Cygnus. The last traces were seen at 2 p. m. close to the zenith and near Cassi. opeia. The horizontal force was unusually high about an hour before the aurora began, and a disturbance commenced at 4 a. m. lasting about twelve hours. It reached its maximum at 9 a. m. and had a second period of violence at 2 p. m., the horizontal force being most affected both times and falling low.

January 7, 1883, 12.15 a, m, to 11.17 a, m,—The weather was cloudy early in the evening, but the clouds began to break away at about 7 p. m. local time (12 midnight Washington); an auror. light was visible through the clouds in the NE. At I a. m. a zone (brightness I), and much opseured by the now breaking clouds, was observed passing about 15° west of the zenith from NW. to SE. At 1.15 the zone was more broken into separate bands, and the middle band, which was brightest, was observed to pass through Cygnus, Cassiopeia, Perseus, and Orion. The sky was rapidly clearing at 2, but the aurora was still much obscured. It appeared to be the same general form, but much broader and brighter, one bright streak in particular (brightness 2 to 3) across the zenith. At 2.15 the zone had sunk towards the NE, still hidden in the bank of clouds, with an altitude of about 60°. There was also a bright patch showing through the clouds in the NNW, close to the horizon. The sky was clear at 3, and starting from Aquila low in the NNW, came a broad band across zenith through Cygnus, Cepheus, Ursa Minor, Camelopardalis, and ending in Gemini (brightness 1), much twisted near the zenith, and a hazy band through Corona Borealis, and ending in a bright patch (1 to 2) in Boötes in the NE. At 3.15 there were four rather broad arched bands across the eastern sky, starting from the same place in the NNW, and ending in the clouds in the SE, near Leo, the highest through Ursa Minor and the lowest close to the horizon. These, however, only lasted a few minutes. At 4 the zone was very broad and consisted of three widely separated bands, broad and hazy (brightness 0 to 1); the starting points were close to a Hydra in the ESE, and  $\alpha$  Aquila in the NNW. The western band was narrow, and ran through Orion and the lower part of the square of Pegasus; the middle was broader and ran through Cygnus, Cepheus, Cassiopeia, Cameleopardalis, Gemini, and Cancer; and the eastern ran through Lyra and Ursa Major, going no farther than Leo. At 4.15 the middle and eastern bands were brighter (brightness 1), and the middle band had moved about 5° west. At 5 a. m. the whole sky was covered with bands running from Pegasus in the NNW, to Leo in the ESE,, the SW, edge being in Aries, Taurus, Orion, and Canis Minor, and the NW. in Coma Berenices, Boötes, Corona Borealis, Lyra, Cygnus, and Lacerta. The SW, half was quiet (brightness 1) with confluent bands, but in the NE, half there were several bands of streamers approaching the curtain form and vibrating h broken and low and agiat 5 a.m. The much higher,

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January 7 and 8, 1883, 10.15 p. m. to 7 a. m.—At 10,15 there was an arch of fine short streamers in the NE, with its extremities bearing NW, by NE, by S., and an altitude of about 30°. This faded, and none was seen till 12.15 a.m., when there was a zone, with its starting points in Orion and Serpens. Of these bands two were close together and parallel, passing nearly overhead, and the third through Serpens, Hercules, Cygnus, and Pegasus; thence to Orion it was broken into streamers. In Serpens and Boötes the band had the curtain form (brightness 1). The zone form continued at 1 a. m. (brightness 1), with its starting points in Monoceros ESE, and Hercules NNW. The main portion (three bands, two narrow and one broad, considerably twisted) ran through Lyra, Draco, Cepheus, Ursa Minor, Camelopardalis, Auriga, Gemini, and Canis Minor, and a paler band passed through Canis Minor, Lynx, and Ursa Major, then fading towards the N. This eastern band was brightest at 1.15. At 2 the starting points of the zone were just below a Leonis E. by S. and near 7 Aguille NNW. From a Leonis to Monoceros ESE, it was horizontal, and the eastern edge then passed through Cancer, Gemini, Auriga, Camelopardalis, Ursa Minor (W. of Polaris), Cepheus, Draco, and Cygnus, and the western through Canis Minor, Orion, Taurus, Aries, Triangulum, Andromeda, Pegasus, Vulpecula, and Sagitta (brightness 1 to 2). The horizontal portion was gone at 2.15. At 3 a, m, bands and streamers (brightness 1) approaching the curtain form, especially in Leo, filled the NE, sky from Leo ESE, to Hercules NNW, and from near the horizon to Ursa Major. This was broken and paler at 3.15 and a pale streamer was shooting up from the NNW, ending in Cassiopeia. The sky was half overcast with hazy clouds at 4, and at 4.15 traces were visible through the clouds in the N. At 5 there was a pale yellowish band (brightness 1) in the SW, from Monoceros and Canis Minor through Orion, Taurus, and Aries The sky then became more cloudy and traces only were observed in the S. at 6 a. m., and in the NE. at 7 a. m. The sky then became wholly obscured. The magnetic needles were comparatively quiet, being slightly disturbed from 3 to 8 a.m. and again from 12 m. to 2 p. m.

January 8 and 9, 1883, 10 p. m. to 2.12 p. m.—There was a glow in the NE, at 10 p. m. which at 10.15 had developed into a faint arch, with its extremities bearing N. and E. and its crown at an altitude of about 20%. This was gone at 11, but at 12.15 a.m. there was a patch of hazy light in the N. in Canes Venatici, Coma Berenices, and Ursa Major, and a line of faint streamers through Corona Borealis, Boötes, Ursa Major, and Lynx. At 1 there was a slightly sinuous arched band (brightness 4) in the NE, from Monoceros ESE, through Canis Minor, Cancer, the top of Leo, Leo Minor, the lower part of Ursa Major, Canes Venatici, Boötes, and Corona Borealis to Hercules in the NNW. The northern end appeared to be breaking into streamers. These had developed at 1.15 into a bunch shooting up into Draco, and the band had split into two. At 2 a. m. these started from Hercules in the NNW., three or four diverging bands stretching across the eastern sky growing paler towards the SE.; one through Lyra, Ursa Minor, Ursa Major, and Lynx; one through Corona Borealis, Boötes, Canes Venatici, Leo Minor, and Leo, and one or two between this and the horizon with traces of a band which was developed at 2.15 through Cygnus, Cepheus, Cassiopeia, Camelopardalis, and Auriga to Gemini, while the eastern bands were fading. The sky then became overcast. Traces of a zone across the zenith were visible through the hazy clouds at 3, and similar traces of a band at 4 a. m., which appeared to be moving W. Traces were seen again in the NE, at 6 a.m. The sky was partially clear at 8.17, and a quiet band (brightness 1) ran from Andromeda through Lacerta, Cygnus, Draco, and Boötes. The sky cleared off permanently after this. At 9.17 there was a broad, quiet, white band (brightness 1) along the southern horizon

from E. to NNW, and a similar band from SE, horizon through Leo to Canis Minor. A third parrower band, ran from E. to W. close to Ursa Major. There were faint streamers in Labor Cygnus, Lacerta, and Cassiopeia, also S. in Boötes, Coma Berenices, and Leo Minor, faint, when and onict. There were bright (brightness 2) streamers in the W. and NW. in Taurus, Pleinh. Persons, and Auriga. They were rose-colored and vibrating rapidly. At 10.17 there was a broad faint white band on the southern horizon, and a band across the zenith SE, to NW., white and quiet (brightness 0 to 1). At 11.17 there was a broad, quiet, white arch (brightness 0 to 1) is an E. to W., through Corona Borealis, Ursa Major, and Gemini. At 12.17 p. m. there were 3 such bands, one through Polaris and the lowest at an altitude of about 45°. At I p. m. these bands (brightness 0 to 1) started together from Gemini and ran as follows: One, the broadest and brightest, through Leo Minor, Boötes, Corona Borealis, and Hercules; one through Ursa Major, Draco, and Cygnus, and one through Ursa Minor to Cygnus. These bands were constant. shitting, rising towards the zenith and then receding sout', ward. The last traces were seen near the zenith at 2.12 p. m. The magnetic needles were quiet up to 9 a. m., when the horizontal force began to fail, culminating in a disturbance at 1 p. m., with very low horizontal force, high easter; declination, and almost undisturbed vertical intensity.

January 9 and 10, 11,15 p. m. to 1 p. m.—At 11,15 there was a hazy light in the NE, which of veloped into a faint pale arch, and faded completely before midnight. At 1 a. m. there was a pale glow in the NE. At 2 there was an extraordinary zone parallel to the magnetic meridian instead of at right angles to it as usual. It was so pale as to be scarcely perceptible. The starting points were in Coma Berenices NE, and Pisces SW, extending in breadth from the lower part of Draco to a Tauri. At 2.15 there was an arch in the NE. (brightness 1), across the base of the zone, through Leo, Ursa Major, Cames Venatici (including) a Boötis, Corona Borealis, and into Herenics. The sky then suddenly clouded over and remained cloudy until 6, when it cleared, and there was a faint band (brightness 0 to 1) from Boötes through Corona Borealis, Lyra, and Cygnus, and another from Pegasus and Andromeda to Cassiopeia. At 7 there was a quiet, bright band from Leo through Cancer, Genaini, Orion, and Taurus. The sky then became again overcast, and continued so until 12.10 when it was clear, and a few faint traces were observed near the zenith. At 1 the last faint traces were seen in the S. in Boötes and Canes Venatici. The magnetic needles were comparatively quiet all night.

January 10 and 11, 10.15 p. m. to 7 a. m.—At 10.15 p. m. there was a faint band of light in the NE. nearly parallel to the horizon and about 20° above it. At 11.15 this had developed into a low arch (brightness 1) with its extremities bearing NNW, and ESE, passing through Canis Minor, Cancer, Leo, Coma Berenices, and Boötes, sending up streamers in Boötes. The altitude of the crown of the arch was about 15°. At 12.15 a. m. it was reduced to a few very faint streamers in the NE. At 1 there was a very faint arched segment in the SW. There was a similar trace in the west at 2, also in the SE, at 2.15. At 3 there was a pale glow fading insensibly into the sky with a well-defined dark segment below it, lying close to the horizon, from E, to SSW. At 3.15 the whole sky appeared to be covered by the palest possible broad bands, separated by narrow dark spaces, parallel to the magnetis meridian and appearing to converge in the NE, and SW. There were slight traces at 4. At 5 a pale, yellowish band (brightness 0 to 1) ran through Boötes, Corona Borealis, Hercules, and Lyra to Sagitta. At 6 there were mere traces in the N., but at 7 a broad, quiet band stretched from Pegasus through Andromeda, Cassiopeia, Ursa Minor, Ursa Major, and Canes Venatici. This was the last seen. The magnetic needles were unusually quiet.

January 12, 1883, 1 a. m. to 1 p. m.—At 1 a. m. there was a quiet, regular, and narrow area (brightness 1) from the ESE, in Monoceros to the NNW, in Serpens, through Leo (a Leonis), Leo Minor, Ursa Major, just above a Canum Venaticorum, Boötes, and Corona Borealis. At 1.15 it was broader and somewhat sinuous. At 2 there was only a partial arch (brightness 1) from the ESE, in Hydra, through Leo (δ Leonis) and Coma Berenices ending in Boötes at an altitude of about 20°. This was fading at 2.15. At 3 and 4 the western horizon was obscured by haze, and traces only were visible. No aurora was seen at 5, but at 6 a quiet band (brightness 1) stretched from Andromeda, through Perseus, Auriga, Gemini, Cancer, and Leo. At 7 a similar band can through Cygnus, Lyra, Draco, Ursa Major, and Leo. At 8 there were simply traces in the N. At 10.10 there were traces in the E. and SE, and again at 11.10 in the NE. At 12.10 there was a

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January 13, 1883, 8 a. m. to 12.17 p. m.—There were faint traces of auroral light all round the horizon all the early part of the night, but no definite aurora till the 8 a.m. observation (quarter of 3 a.m., local time). There was then a quiet, yellowish band (brightness 0 to 1) from Taurus through Auriga, Gemini, and Lynx. At 9.17 there was a broad arch, white and quiet (brightness 0 to 1) from the ESE, to the W., with its crown at an altitude of about 20%, and a luminous patch similar in color and brightness in Corona Borealis. At 10.17 the arch had risen to an altitude of 35°, and faint luminous patches appeared between the arch and the horizon. At the same time there was a semi-corona of long, narrow, quiet streamers (brightness 2) which reached from the SE, extremity of the arch to Auriga in the W., and from Andromeda to a point near the zenith. This faded in a few minutes, leaving only the arch. At 41.17 a broad, irregular band, formed of patches of white, quiet light extended along the southern horizon from ESE, to W. There was also a narrow, quiet, white arch (brightness 0 to 1) from the E. to NNW, through Sagitta, Vulpecula, Lacerta, Andromeda, Triangulum, Aries, and the Pleiades. From the northern end of the arch streamers extended up through Perseus. At 12.17 p. m. there were three pale white, striated, parallel bands running from the ESE, to the W., the lower, narrow, through Bootes and Coma Perenices; the middle, broad, through Leo Minor and Canes Venatici to Hevcules, and the upper band from the ESE, through Lyra, Draco, Ursa Major, Leo Minor, and Cancer. Paint streamers filled the space between the southern horizon and the lower band. There was also a white, quiet, semi-corona (brightness 1) extending from Lyra though Cygnus, Cepheus, Cassiopeia, and Camelopardalis to Ursa Major. This was all gone at 1 p. m. There was a slight disturbance of the magnetic instruments at 11 a. m. and 12 m.

January 14, 1883, 2,15 a, m, to 1,17 n, m,—Faint, indefinite light, probably auroral, was visible in the Encelose to the horizon, as soon as the twilight disappeared, but the first definite aurora west noticed at 2.15 a.m. (about 9 p. m. local), having developed since the 2 a.m. observation. It was a rather narrow, arched band (brightness 0 to 1) in the NE, from the NNW, in Hereules near herizon to the E. by S. in Cancer, through Lyra, Hereules, Draco, Ursa Major, Leo Minor, and Let (a Leonis), with a short broader band shooting up from the NNW, end through Cygnus. At 3 a. m. a rather broad sinuous band (brightness 2) extended from the ESE, in Hydra to the NNW, in Aquila, passing W. of the zenith, through Canis Minor, Gemini, Auriga, Perseus, Andromeda, Lacerta, Cygnus, and Vulpecula. It was fading slightly at 3.15, and had drifted W., now passing through Monoceros, Canis Minor, Orion, Taurus (: Tauri and Pleiades), Aries, Andromeda, Pegasus (¿Pegasi), and Delphinus. At 4 a. m. there was a rather broad zone. The middle portion was the brightest (brightness 2), and was made up of narrow, twisted streaks, and the edges of about the same breadth were paler (brightness 1). The starting points were ESE, in Hydra and NNW, in Pegasus. The eastern edge passed through Leo, Leo Minor, Ursa Major, Ursa Minor, Cepheus, Andromeda, and Pegasus; the western through Leo, Cancer, Lynx, Auriga, Perseus, Andromeda, and Pegasus. At 4.15 the whole had drifted about 10° westward and was breaking into separate bands and growing paler (brightness 1). At 5 it was reduced to a quiet, yellowish band from Pegasus, through Andromeda, Cassiopeia, Camelopardalis, Ursa Major, Leo Minor, and Leo. At "there was a band in the SW. (brightness 0 to 1), through Pisces, Auriga, Gemini, and Cancer, At 7 a belt of bands (brightness 1) passed through Aries, Taurus, Orion, Gemini, Cancer, Canis Minor, and Hydra. This was reduced at 8 to traces over the southern horizon. At 9 these traces had developed into an arch, spanning the horizon from ESE, to NNW,, with its crown at an altitude of about 15°, white and quiet (brightness 0 to 1). At the same time a broad, irregular arch extended from the ESE., through Corona Borealis, Draco, Cepheus, Cassiopeia, and Perseus, to the Pleiades, in the NNW. It was in rapid whirling and vibratory motion, and at times was tinged with a bright rose color (brightness 4), and lasted but a few moments. At 9.17 there was a very broad arch (brightness 0 to 1) from the ESE, to the NNW., with its corona at an altitude of about 48°, and fringed on the upper edge with very short pale streamers, and at the same time a white, quiet band ran from the E., through Hercules, Lyra, Cygnus, and Lacerta, to Leo. There

was a band in the S, side from Corona Borealis, through Ursa Major, to Gemini, with a slight fringe of streamers, and streamers in the E., N., and W., forming with the band in the S. a well-defined corona. There was no motion except a slight vibration of the streamers in the N. At 10.17 the arch on the southern horizon was still visible, but its streamers had faded. There were faint streamers, quiet and white (brightness 0 to 1), in the NE., in Sagitta and Cygnus, and in the NNW., in Triangulum and Aries. At 11.17 there was a quiet, faint, white arch on the southern horizon from ESE, to WNW. At 12.17 a narrow band (brightness I) extended from ESE, to WNW., through Herenles, Ursa Major, Lynx, and Gemini, with luminous spots also in Cygnus, Lacerta, and Cassiopeia. At I p. m. a band (brightness 0 to 1) ran from Aquila, in the ESE, through Ursa Minor, to Gemini, in the WNW., and the last faint traces were seen at 1.17. The magnetic intensity was slightly increased at 5 a. m., and there was a slight disturbance at 1 to 5 p. m.

January 15, 1883, 5,17 a, m, to 12,17 p, m,—At 5,17 a motionless band (brightness 1) crossed the sky from NW, to ESE,, west of the zenith, through Pegasus, Andromeda, Cassiopeia, Camelo, pardalis, Ursa Major, Leo Minor, and Leo. At 6.17 series of white curtains (brightness 1) with gentle motion covered the sky from the eastern horizon to Auriga and Perseus in the W., and from Leo Minor in the S. to Cygnus in the N. There were also luminous patches in Draco, Pegasus, Triangulum, Aries, and Taurus. At 7.17 yellowish-green bands (brightness 1 to 2), waving slowly trom W. to E., extended from Pegasus through Lacerta, Cygnus, Lyra, Hercules, Corona Borcalis, Brötes, and Coma Berenices. At 8.15 a broad arch spanned the southern horizon from ESE, to W., with its crown at an altitude of about 15. A broad band extended from the western and through Gemini and Leo Minor to Ursa Major, and a narrow irregular band from the ENE, through Cygnus, Lacerta, Andromeda, and then through Cepheus, Cassioneia, and Perseus. The whole was quiet and white. At the next hour there were merely traces in the S, and NW. At 10.17 a white and quiet arch lay over the southern horizon from ESE, to WNW,, with its crown at an altitude of about 15°, with a narrow band from the ESE, through Corona Borealis, Ursa Major, and Gemini. At 11.15 there was a large patch of luminous haze in the S<sub>0</sub> and at 12.17 there was a zone brightness 0 to 1), with its starting points ESE, in Aquila and WNW, in Gemini, extending in breaith from Boötes SSW, to Cassiopeia NNE. Streamers of the same brightness as of the zone ran from Taurus in the NW, up into Perseus. The horizontal force and declination were more or less disturbed from 7 a, m, to 12 m., the force decreasing and the eastern declination increasing.

January 16, 1883, 2.15 a. m. to 7 a. m.—Vague arched bands, which could not with certainty be distinguished from cirro-stratus clouds, were visible at times early in the evening, but there was no definite aurora till 2.15 a. m. (about 9 p. m. local), when there was part of a pale arch in the ESE, in Leo, running from below α to β (brightness 0 to 1). At 3 two croad bands (brightness 1 to 2), nearly straight, slanted up from E. by S. in Leo through Cona Berenices, Boötes above α Boötes, into Corona Borealis. At 3.15 it had changed to a narrow arch (brightness 1) from the E. in Leo through the same constellations, fading in the NNE. At 4 there were only evanescent traces over the southern horizon. At 5 a quiet band (brightness 0 to 1) passed from Cygnus through Lyra, Hercules, and Serpens to Boötes. At 6 there were merely traces in the SE. At 7 a yellowish band (brightness 1) with a few vibrating streamers ran from Pisces through Aries, Taurus, Otion, and Gemini to Cancer. The haziness now increased, and traces only were observed at the next two observations, after which the sky clouded over and the weather became stormy. There was a slight magnetic disturbance at 6 a. m.

January 17, 1883, 9.10 a.m. to 12.17 p.m.—The storm began to break about 9 o'clock p.m., local time. At 9.10 a.m. (Washington time) the sky was clear enough to exhibit a white, quiet arch (brightness 1 to 2) from the ENE, to the NNW., through Sagitta, Vulpecula, Lacerta, Cygnus, and Andromeda to Triangulum, with faint light, partly masked by the clouds in the southern horizon. Traces only were visible at 10, though the sky was clear. The weather then became stormy again, and only traces of the aurora could be observed. Traces of a corona at 11.15 and a few white and quiet traces at 12.17. A disturbance of all three elements commenced at 4 a.m. and lasted till 12 m., reaching to maximum at 11 a.m.

January 18, 1883, 12.15 a. m. to 1.17 p. m.—At 12.15 there was a waving band of curtains (brightness 1) crossing near the zenith from SE, in Canis Minor to NW, in Hercules, through

it, with a slight in the S. a well. in the N. At ed. There were gaus, and in the on the southern d from ESE, to also in Cygnus, la, in the ESE, en at 1.17. The turbance at 1 to

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themini, Lynn, Ursa Major, Draco, Ursa Minor, and Lyra. At 1 a. m. there was a small zone of two bands in the NE. (brightness 1). The starting points were in Hydra ESE, and Hercules NNW., with the upper band through  $\alpha$  and  $\beta$  Ursae Majoris, and the lower just above  $\alpha$  Canum Venaticum. At 1.15 the zone was condensed to a single rather singuous band (brightness 1 to 2). from the same starting points, running through Leo, Leo Minor, Ursa Major, Canes Venatici, below α Boötis and Corona Borealis At 2 there were two irregular bands in the NE, from the ESE, in Hydra to the NNW, in Aquila, reaching their greatest altitude near a Ursar Majoris, and a shifting band developing from the same starting points through Ursa Minor, At 2.15 the lower bands were in nearly the same place, and the upper band starting below Procyon ran through Gemini, Auriga, Camelopardalis, Cassioneia, Cepheus, and Cygnus (brightness of all 1 to 2). At 3 there was a broad belt of two or three yellow shifting bands (brightness 2 to 3) low in the SW., from NW. in Aquila to SE, in Monoceros, through Pegasus, Triangulum, Aries, Taurus, and Orion, gradually beginning to wave. Traces of these bands still remained in the NW. at 3.15, while a band (brightness 2 to 3) crossed the zenith from NNW, in Aquila to ESE, in Monoceros. North of the zenith the band was composed of short streamers vibrating rapidly from N, to S., and south of the zenith of serpentine streaks waying from S, to N., all shifting rapidly. The lower edge of the band was tinged with rose. At 4 there were only traces in the NE. At 5.15 quiet bands (brightness 0 to 1) ran from Leo through Canes Venatici, Ursa Major, Corona Borcalis, and Hercules. At 6.15 a broad, yellowish band (brightness 1), with streamers moving slightly in Cygnus and Draco, ran through Cygnus, Lyra, Draco, Corona Borealis, Ursa Major, Coma Berenices, Leo, and Leo Minor. At 7.15 there were merely traces in the NE., and none were seen at 8. At 9 and 10 faint traces began to appear, and at 11.15 a white, quiet band (brightness 0 to 1) ran from ENE, to NNW, through Hercules, Draco, Ursa Minor, and Gemini. At 12 a similar band, but broad, ran from the ESE, to NW., through Corona Borealis, Canes Venatici, Leo Minor, Cancer, and Canis Minor, with luminous patches near the southern horizon. The last faint traces were observed at 1 p. m. The magnetic instruments were slightly disturbed from 3 a. m. to 2 p. m., the disturbance reaching its maximum at 1 p. m.

January 19, 3,45 a. m. to 1,25 p. m.—At 3,15 there was a vertical twisted streak in the E., starting in Virgo close to the horizon and running up into Leo, where it blended into two nearly straight bands through Coma Berenices and Boötes, growing pale towards the N. (brightness 1 to 2). The streak waved and shifted slowly. At 4 none was perceptible, but at 4.15 there were faint traces close to the eastern horizon. No more was seen till 7.15, when there were two bands, one from Andromeda through Lacerta, Cygnus, Lyra, Hercules, Corona Borealis, and Boötes, and the other and upper band through Draco and Canes Venatic., waving slowly towards the zenith (brightness 1). There were faint traces over the northern horizon at 8.15. At the next two observations there were faint traces over the southern horizon. At 11,15 a zone of broad bands crossed from ESE, to WNW., white and quiet (brightness 1), covering most of the sky from Boötes in the S. to Cassiopeia in the N. This remained essentially unchanged at the next observation, except that the bands were narrower and more clearly defined. At 1 p. m. a band (brightness 0 to 1) ran from the NW, in Gemini to the E. in Sagitta, through Auriga, Perseus, Triangulum, and Andromeda, and there were faint streamers in Cassiopeia. At 1.17 traces were still visible passing through Cassioneia, but were wholly gone at 1.25. There was a slight disturbance of the magnets, affecting almost wholly the horizontal force, and reaching its maximum about 7 a. m.

January 20, 1883, 2 a. m. to 1.17 p. m.—Arched traces began the aurora lying low in the NE, at 2 a. m. At 3 there was a broad, hazy, and indistinct zone (brightness 0 to 1), which was brightest in the NW, and on the eastern edge. The starting-points were near the horizon, ESE, in Leo, and NNW, in Aquila. The western edge ran through Leo, Lynx, Camelopardalis, Cassiopeia, Cepheus, Cygnus, and Vulpecula, and the eastern through Coma Berenices, Boötes, Corona Borcalis, and Lyra. At 3.15 it had spread a little further west, hazy and indefinite. At 4 there was a rather narrow, regular arched band in the NE, from NNW, in Delphmas to the ESE, in Virgo, through Cygnus, Lyra (α Lyra), Corona Borcalis, Boötes (α Boötis), and Coma Berenices (brightness 1), with two or three incomplete bands below it. This had changed at 4.15 into two broader and more irregular bands, starting from the same points, but reaching a greater altitude, through Cygnus, Lyra, Draco, Boötes, Canes Venatici, and Coma Berenices (brightness 1 to 2). At 5 a quiet band

H. Ex. 44---53

(brightness 0 to 1) ran through Cygnus, Lyra, Draco, Corona Borealis, Boötes, Coma Berenices, and Leo. At 6.15 a similar band (brightness 1) ran through Cygnus, Lyra, Hercules, Boötes, and Virgo, At 7 there were merely traces on the northern horizon. At 8 a quiet double band (brightness 0 to 1) crossed from Ursa Major and Leo to Auriga and Persens. At 9.15 there were faint traces near the zenith and in the ESE, and NW. At 10.15 a. m. a white, quiet arch (brightness 1) ran from the ESE, to the WNW, with its crown at an altitude of about 155, while there were also long, quiet streamers in the E., passing through Corona Borealis, Draco, Hercules, and Lyra, with a luminous bar from Lyra through Cygnus, Cepheus, and Cassiopeia. At 11.15 there was a zone of broad bands (brightness 0 to 1), with its starting-points ESE, and NNW, reaching in breadth from Boötes to the zenith. At 2.15 there was a broad, quiet, white, and diffuse arch from ESE, to WNW. There were also streamers in the ESE, E., and ENE, in Sagitta, Lyra, Aquila, Delphinus, Vulpecula, Cygnus, Pegasus, and Lacerta. The last faint traces were seen in the E. near Aquila and near the zenith. The needles were slightly disturbed at 3 and 4 a. m. with high horizontal force, and from 8 a. m. to 3 p. m, there was a considerable disturbance, reaching its maximum at 11 a. m.

January 20 and 21, 1883, 11.15 p. m. to 11.15 a. m.—The aurora began at 11.15 p. m. as a faint streak in the NE, through Ursa Major, Lynx, and Gemini. At 12.15 a. m. there was a zone of two bands with its starting points W. by N. and E. by S., and passing, one through Canis Minor, Auriga, Cassiopeia, Cepheus, Lyra, and Hercules, the other through Canis Minor, Ursa Minor, Draco, and Hercules (brightness 1 to 2). It was brightest in the W, where the bands assumed the curtain form. At 1 a, m, there was a narrow, arched belt of three bands (brightness 4) from Hercules NNW., starting at an altitude of about 15° to near the horizon ESE, in Hydra, through Corona Borealis, Draco, Boötes, Ursa Major  $(\lambda)$ , and Canes Venatici (above  $\alpha$ ), Leo Minor, Leo, and Cancer. At 1.15 it was a little brighter in the NNW., twisted and spreading into Lyra. At 2 a.m. there was a broad, hazy, indefinite zone (brightness 0 to 1). The starting-points were ESE, in Hydra and NNW, in Aquila, and it extended in breadth from ε Ursæ Majoris to Cassiopeia (near ε). A: 2.15 it was brighter on the edges and spread farther west (into Perseus). At 3 there was a marrow zone (brightness 1) west of the zenith. The starting points were SE, in Hydra and NNW, in Aquila, stretching in breadth from close to Polaris to \alpha Arietis. At 3.15 it was much brighter (brightness 1 to 2) and had drifted W., so that the eastern edge passed through Cassiopeia, and the western took in α Orionis and α Tauri. At 4, three or four bands, broad and sinuoùs (brightness ! to 2), started from Pegasus in the NW., going straight up for about 15°, and then bending round through Cygnus, Lyra, Hercules, Draco, Corona Borealis, and Boötes (a Boötis). At 4.15 twisted streaks (brightness 2) forming a narrow zone from Pegasus NW., through Andromeda, Perseus, Aurig Cemini, Cancer, and Canis Minor, ending in Hydra ESE., with considerable waying motion near the cenith. At 5.15 a band (brightness 1) ran through Andromeda, Lacerta, Cygnus, Lyra, and Hercules. At 6.15 a quiet band (brightness 0 to 1) stretched from Pegasus through Vulnecala and Hercules to Boötes. At 7.15 a zone (brightness 1 to 2) crossed the zenith with its starting-points NW, and SEL, in Aries, Andromeda, Leo, and Canes Venatici. It reached SW, to Gemini and Auriga, and NE, to Corona Borealis and Lyra, where it had a few bands of streamers in rapid, waving motion (brightness 1 to 2). At 8.15 a, m, there were faint traces in the N. Traces appeared again i., the E, at 9.15 a, m, and at 11.15 in the SE. The magnets began to be agreated about 3 a. m. " d were not quiet again till 2 p. m., the disturbance reaching its maximum about 7 a. m.

J. vary 22, 1883, 6.15 a. m. to 11 a. m.—No aurora was seen till 6.15 a. m. (about 1 a. m. local time), when a band passed from Pegasus through Triangulum, Perseus, Cassiopeia, Cepheus, Drace, Ursa Minor, Ursa Major, Boötes, and Coma Berenices to Leo, and Leo Miner, with bright green and yellow streamers in Cassiopeia, Cepheus, and Draco, vibrating rapidly from SW, to NE, and pale streamers waving slowly in SE, (brightness 1 to 2). At 7.15 there was a quiet band (brightness 0 to 1) from Pegasus through Lyra, Hercules, and Corona Borcalis to Boötes. Traces were observed remaining in the N, at 8.15, in the ESE, at 10.15, and in the E, at 11 a. m. The magnets were somewhat disturbed from 6 to 8 a. m., and there was a slight disturbance from 1 to 4 p. m.

January 24, 1883, 9.15 a. m. to 1.17 p. m.—Most of the night was cloudy, but at 9.45 a. m. and at 1.17 p. m. traces of aurora were observed among the clouds.

January 25, 3 a. m. to 1,50 p. m.—Early in the evening there were indefinite streaks in the

NE., which may have been auroral, but the brilliant moonlight rendered it impossible to be sure of this. At 3 a. m. a rather broad, striated, hazy band (brightness 1) crossed the zenith from near horizon ESE, in Hydra to Vulpecula NNW., at an altitude of about 15%, passing through Cancer, Lynx, Camelopardalis, Cassiopeia, Cephens, Lacerta, and Cygnus (close to  $\varepsilon$ ). This was in the same position at 3.15, but was narrower, paler, and very sinuous and twisted. At the next two hours there were no traces of aurora, but at 6.15 there were two bands of yellowish-green streamers, starting from Boötes, one going N. through Corona Borealis, Draco, and Cygnus, and the other S. through Coma Berenices, Leo Minor, and Gemini. The streamers vibrated rapidly from W. to E. (brightness 1 to 2). At 7.15 there were faint traces in the S. At 8.15 two quiet bands (brightness 0 to 1) ran through Boötes, Canes Venatici, Ursa Major, Auriga, and Perseus. The aurora then died away to mere traces, which were wholly gone at 11 a, m., reappearing at noon, and gradually developing, first into sinuous streaks across the zenith with streamers in the SE., and then into a corona (brightness 0 to 1) centering in Ursa Minor. This was replaced by a narrow sinuous band at 1.17 running through Cygnus, Ursa Major, and Leo Minor. Traces of this band were still visible at 1.50, when the daylight was quite bright. A magnetic disturbance commenced at 3 a.m. and was still going on at 3 p. m. (10 a. m. local time), with one maximum at 6 a. m. and one at 2 p. m., both with very high eastern declination and very low horizontal force.

January 25 and 26, 1883, 10.15 p. m. to 1.17 p. m.—As soon as it grew dark enough for an aurora to be visible a faint arch appeared in the NE, with its extremities NNW, and ESE,, passing through Boötes, Canes Venatici, Ursa Major, Leo Minor, Lynx, and Gemmi. The altitude of the crown was about 50°. At 11.15 this had developed into a zone, with its extremities NW, and SE. The northern edge ran through Hercules, Draco, Ursa Major, Lynx, Gemini, and Orion, and the southern edge through Orion, Auriga, Perseus, Cassiopeia, Cepheus, Lyra, and Hercules (brightness I to 2). At 12.15 a. m. waving bands of curtains ran through Serpens, Cygnus, Lacerta, Andromeda, Taurus, and Orion, and there was also a hazy patch in Orion, Gemini, Cancer, and Leo. At 1 a. m. a broad, hazy, sinuous band, festooned and breaking into streamers and irregular patches in the NNW., ran from the ESE, in Monoceros to the NNW, in Hercules, through Canis Minor, Gemini, Lynx, Auriga, Camelopardalis, Ursa Major, Ursa Minor, and Draco. There was also a luminous patch in Taurus continued by an imperfect band through Cassiopeia, and a band in the E. from Leo through Leo Minor and Canes Venatici into Boötes (brightness 1). At 1.15 this was broken and mostly faded, except the band in the E. and streamers in the NNW. There was nothing left at 2 a. m. except a few streamers in the N. and NNW, in Lyra and Hercules, which had developed at 2.15 into four slightly diverging, sinuous bands (brightness 0 to 1), all ending in the clouds in the SE. One passed through Draco and Ursa Major, one through Draco and Ursa Minor, one fading near a Cygni, through Cepheus, Cassiopeia, and Camelopardalis, and one through Lacerta and Cassioneia. At 3 there were broken streamers in the N, and NW,, and one pale band across the western horizon through Pegasus, Aries, Taurus, and Orion. This was replaced at 3.15 by three bands, narrow and rather hazy, starting between Vulpecula and Pegasus NNW, to NW., the upper through Cygnus, Cassiopeia, Camelopardalis, Auriga, and Gemini, growing very pale; the next through Pegasus, Andromeda, Perseus, & Aurigae into Gemini, and the lowest through Pegasus, Triangulum, Aries, Taurus, and Orion, all fading in the moonlight in the SE. (brightness 0 to 1). At 4 a. m. there was a regular narrow arch (brightness 2) tinged with green and rose in the W., with an altitude of about 25°, running from the ESE, in Hydra (just below a) to the NW, just below γ Pegasi, through Monoceros, Orion (δ), the lower part of Taurus, Cetus (α), and Pisces. At 4.15 it was lower, passing through the nebula in Orion, and paler (1 to 2) with a band above it (brightness 1) through Canis Minor, Gemini ( $\gamma$ ), Taurus, and Aries ( $\alpha$ ). The needles were agitated. At 5.15 a yellowish band, waving very slowly, ran from Cygnus through Draco, Ursa Minor, Ursa Major, Leo Minor, and Leo to Hydra, while a second band commenced from Cygnus through Lyra, Corona Borealis, Canes Venatici, Boötes, and Coma Berenices to Leo (brightness 1). At 6.15 a quiet band (brightness 0 to 1) extended from Cassiopeia through Cygnus, Hercules, and Serpens to Boötes. Nothing remained at 7.15 except traces in the SW. At 8.15 a faint, quiet band ran from Taurus through Auriga, Gemini, and Leo. At 9.17 there was a small patch in the SF and a parrow, white, and quiet band running thence through Boötes, Coma Berenices, and Leo, and also a bright patch in the SW, in Gemini (brightness 1 to 2). At 10.15 a broad, irregular, white, quet

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band (brightness 1 to 2) ran from the E. through Hercules, Corona Borcalis, and Canes Venatici to Leo Minor, with a patch of the same character in the WNW, from Orion through Auriga. At 12.15 there were faint traces of aurora in the ESE, and S. At 1 p. m. traces of streamers appeared through Aquiba, Lyra, Ursa Major, and Boötes. The last faint traces were seen at 1.17 p. m. A magnetic disturbance commenced at 5 a. m. and lasted till 5 p. m., being most violent at 5 a. m., 9 a. m., and 3 p. m.

January 26 and 27, 10.15 p. m. to 12.15 p. m.—At 10.15 p. m. there was a faint and narrow arch in the NE, through Canis Minor, Cancer, Leo Minor, Coma Berenices Canes Venatici, and Boötes. At 11.15 this was broken up into a hazy mass in Canis Minor, Cancer, and Leo, and streamers in Serpens and Boötes, and at 12.15 was reduced to a faint flush in the NE. At 1 a.m. there were two bands of short, ill-defined streamers in the NE., the upper from Hercules in the NNW, through Corona Borcalis, Boötes, and Canes Venatici, and the lower through Leo ( $\rho$  and  $\delta$ ) and Coma Berenices, starting in Hydra and ending near a Beotes (brightness 0 to 1). These bands were essentially unchanged at 1.15, but a bunch of streamers had developed at the NNW, end reaching up into Draco. At 2 a. m. nothing remained but traces of the bands. These traces were better defined at 2.15, and there was a twisted streak (brightness 1) from close to a Vulpeculae (NNW.) through Cygnus ( $\beta$  and  $\delta$ ). At 3 a narrow arched and somewhat sinuous band (brightness 1) extended from NNW, in Vulpecula to ESE, in Hydra, through Cygnus ( $\beta$ )  $\alpha$  Lyra, Draco, the top of Boötes, Canes Venatici ( $\alpha$ ), and Leo ( $\delta$  and  $\theta$ ). At 3.15 this band was paler and formed an outlying band of a zone with the same starting points. The western edge of the zone ran through Leo, Gemini, Auriga, Perseus, Andromeda, and Pegasus, and the eastern through Leo, Leo Minor, Ursa Major, Camelopardalis, Ursa Minor, Cepheus, and Cygnus, while there was an arched band low in the E. from  $\beta$  Leonis to  $\alpha$  Boötes. At 4 a.m. there was a hazy zone (brightness 0 to 1) with its starting points in the ESE, in Crater and NW, below , Pegasi. The western edge ran through Leo, Leo Minor, Lynx, Camelopardalis, Cassiopeia, and Andromeda, and the eastern through Leo, Cancer, Gemini, the top of Orion, Taurus (a), and Aries. At 4.15 the zone was in nearly the same place, but its eastern edge had moved four or five degrees W., while a twisted streak (brightness 2 to 3), very sinuous and tinged with green and rose, began to move up from the ESE., spreading out and beginning to wave, at first slowly and then rapidly, as it approached the zenith, passing up through Ursa Major and Cassiopeia (where it stopped) in 2 or 3 minutes, while the zone faded. It was brightest near the horizon. At 4.17 and 4.18 a second similar band was beginning to develop a little to the E. of this. At 5.15 a belt of quiet bands ran from Pegasus through Lacerta. Cygnus, Cepheus, Draco, Ursa Major, and Coma Berenices, while the lower edge passed through Cygnus, Lyra, Sagitta, Hercules, Corona Borealis, Serpens, and Boötes (brightness 1 to 2). Only traces remained at 6.15. At 7.15 there were two bands (brightness 0 to 1), one through Taurus, Perseus, Cassiopeia, Cepheus, Cygnus, and Corona Borealis, and the other through Cepheus, Draco, Ursa Major, and Coma Berenices. At 8.15 a quiet band (brightness 0 to 1) ran through Vulpecula, Hercules, Serpens, and Boötes. At 2.15 this was reduced to a streak, lying only in Hercules and Corona Borealis, with faint traces in the NW. At 10.15 a broad irregular mass of rays, converging towards the zenith (brightness 4), occupied Cassiopeia, Cepheus, Ursa Minor, Camelopardulis, Ursa Major, Draco, Canes V. atici, Coma Berenices, Boötes, and Serpens. This body of rays was slightly tinged with green and rose, and vibrated easterly, having also a slow but constant change of form and position. The western sky was filled with long, fine streamers from Canis Minor to Aries, and there was also a diffuse, white, quiet arch from the SE, to the NW., with its crown at an altitude of about 10° above the southern horizon (brightness 0 to 1). At 11.15 there v is a broad striated band (brightness C to I) running ESE, and WNW, through Hercules, Cerona Borealis, Ursa Major, Ursa Minor, Lynx, Aquila, and Gemini, white and quiet. At 12.15 there were very faint traces of an arch running ESE, by WNW., passing a little south of the zenith. A magnetic disturbance commenced at 4 a. m. and continued about ten hours, being at no time very large, but reaching its maximum a, 11 a, m.

January 27 and 28, 10,15 p. m. to 12.15 p. m.—The aurora began at 10,15 as a faint streak in the NE, which by 11 o'clock had developed into an arch of streamers through Canis Minor, Cancer, Leo, Coma Berenices, and Boötes (brightness 2), faintly tinged with green and rose, and in rapid vibration from E. to W.—This had become quiet and faded to brightness 1 at 11,15.—At

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12.15 there were two parallel bands of curtains from the NW. to ESE., through Cancer, Leo, Leo Minor, Canes Venatici, Ursa Major, Bcötes, Corona Borealis, and Hercules, moving but slightly (brightness 1 to 2). At 1 a. m. nearly the whole eastern sky was covered with aurora (brightness 2). A broad sinuous band ran from near a Hydra in the ESE, to Cygnus in the NNW., through Leo, Leo Minor, Canes Venatici, Ursa Major, Draco, Hercules, and Lyra, while above this were three series of broad indistinct curtains radiating from the zenith and not reaching west of Gemini and Cassiopeia. At 1.15 the curtains were fading, leaving the bands which were slightly tinged with green and rose in the ESE. At 2 a, m, there was a broad, somewhat sinuous band (brightness 2) in the NE., from the NNW, in Hercules to the ESE in Hydra, through Corona Borealis, Canes Venatici, Ursa Major, and Leo  $(\beta$  and  $\theta)$ , with traces of a streak through Cassiopeia and Gemini. At 2.15 there were also partial coronal streamers (brightness 1) occupying Leo, Leo Minor, Ursa Major, Ursa Minor, Draco, Cepheus, Cygnus, and Cassiopeia, centering towards Polaris, with pale bands branching off from the ESE, in Gemini. At 3 and 3.15 there was a narrow, rather regular arch (brightness 1 to 2) in the NE, from the ESE,, low in Leo to the NNW. in Hercules, through Virgo, Coma Berenices, a Boötis, Corona Borealis, and Serpens, with a streak (brightness 0 to 1) E. by S. from Leo up into Gemini. There were only faint traces at 4, but at 4.15 these had developed into two bands (brightness 0 to 1) starting, respectively, NNW, and NW., one through Cygnus and the other through Pegasus, Andromeda, and Cassiopeia, faintly visible as far as Leo. At 5.15 a quiet band (brightness 1) ran from Hydra through Canis Minor, Orion, and Taurus to Cetus. Faint traces were observed at 6.15 and 7.15 a. m. No more was seen till 11.15 when a broad, diffuse, quiet arch (brightness 0 to 1) ran from the ESE, to the WNW., through Corona Borealis, Ursa Major, and Gemini. The last faint traces were seen in the ESL, at 12.15 p. m. The horizontal force was unusually high from about an hour before the beginning of the aurora, but returned to its ordinary reading at about 3 a.m., remaining undisturbed till 1 p. m., when there was a slight disturbance for a couple of hours, the horizontal force falling and the declination rising. The vertical intensity was rather high all day.

January 28 and 29, 1883, 10.15 p. m. to 12.35 p. m.—There was a faint streak in the NE. at 10,15 p, m., and faint traces were again visible in the ENE, at 11.10 and in the NW, again at 12 midnight. There were traces in the N. and E. at 1 a. m., which had developed at 1.15 into a slightly sinuous arched band (brightness 1) from the NNW, in Hercules to the ESE, in Hydra, through Corona Borealis (a), Boötes (z), Coma Berenices, and Leo (3). At 2 a.m. the arch was in the same position, but had faded to brightness 0 to 1, and there was a second similar arch a little above it, passing through Canes Venatici and \(\beta\) Boötis. This had faded to traces at 2.15. At 3 there were two bands (brightness 0 to 1), beginning in nearly the same place in Hydra, but fading in Coma Berenices, with a trace also in the N. This developed at 3.15 into a somewhat sinuous band (brightness 1) from ESE, in Hydra to the NNW, in Vulpecula, through Leo  $(\theta)$ , Coma Berenices, Canes Venatici (a), Boötes, Draco ( $\beta$  and  $\gamma$ ), and Cygnus close to  $\delta$ . At 4 a. m. a festooned band (brightness 1 to 2) started from nearly the same point in the NNW., and passed through Cygnus, Draco. Boötes, Canes Venatici, Coma Berenices, and Leo, the ESE. in Virgo. This had become straighter at 4.15 and from the ESE, end came curved radiating streamers through Leo, Leo Minor, and Ursa Major, all slowly shifting. At 5.15 there were only traces in the NE., and no more was seen till 7.15, when there was a quiet, yellowish band (brightness 1) from Aries through Andromeda, Cassiopeia, Lacerta, Cygnus, and Lyra to Hercules. A fainter band (brightness 0 to 1) at 8.18 ran from Taurus through Orion, Gemini, Cancer, and Leo to Virgo. At 9.15 a broad, pale, quiet arch extended from the ESE, to WNW, with its crown at an altitude of about 18-, and above it a second similar arch from the same starting points, through Corona Borcalis, Ursa Major, and Gemini. There was also an irregular arch of quiet streamers from the E. to NW, through Cygnus, Lacerta, Andromeda, Perseus, and the Pleiades. At 10.15 there was a broad, quiet arch (brightness 0 to 1) from the ESE, to the WNW., with its crown at an altitude ef 20°, with a similar arch from Hercules through Corona Borealis, Canes Venatici, Leo Minor, Cancer, and Canis Minor. No more was observed till 12.15 p. m., when there was a broad, quiet white band (brightness 0 to 1) from the ESE, to the WNW, through the zenith, and from Polaris to the lower extremity of Ursa Major. The needles were unusually quiet all night though there was a slight disturbance at 9 a.m.

January 29 and 30, 1883, 11.15 p. m. to 1 p. m.—There was a faint streak along the horizon in the NE, at 11.15 which developed into an ill-defined arch of pale streamers, and had subsided to a faint glow at 12.15 a.m. At 1 and 2 faint traces only were visible, and absolutely no aurora was visible at 3. At 4, however, there was a well marked, rather narrow zone (brightness 1), with its starting points ESE, in Leo and NNW, in Pegasus, occupying part of Leo (ξ, δ, and θ), Coma Berenices, and Canes Venatici, Ursa Major, Ursa Minor, Cephens, Draco, Lacerta, the top of Cygaus (not inclosing a), and Andromeda, with an outlying band through Cassiopeia. At 4.15 the starting points were nearly the same, but the aurora had drifted westward so as to occupy Pegasus, Andromeda, Perseus, Cassiopeia, Auriga, Camelopardalis, Lynx, Leo Minor, and Leo, where it was brighter (1 to 2) and much convoluted. This was essentially unchanged at 5.15. At 6.15 a quiet band (brightness 1 to 2) ran from Pegasus through Cygnus, Lyra, Hercules, Corona Borealis, and Boötes to Coma Berenices. At 7.15 a quiet band (brightness 1) ran from Cancer through Gemini, Auriga, Taurus, and Pisces. At 8.15 there were merely traces near the horizon in the N.  $A_1$ 9.10 bands (brightness 1) ran through Cassiopeia, Perseus, Cygnus, and a Lyrae. At 10.10 a band (brightness 2) ran through Ursa Minor, Ursa Major, Auriga, Boötes, Coma Berenices, Leo Minor, Gemini, Cepheus, Hercules, and Corona Borealis. At 11.15 a bright band (brightness 4) ran through Ursa Major, Boötes, Gemini, Auriga, Cassiopeia, Cygnus, Draco, and Lyra. At 12.40 p. m. there were traces in the NW, and N, at an altitude of 20° and 56°, and the last faint traces were seen in Lyra and in the S, at 1 p. m. The magnetic needles were unusually quiet all night.

January 31, 1883, 1 a. m. to 10.10 a. m.—Faint glimmers of aurora were observed in the NE. early in the evening, but there was no definite aurora till 1 a.m., when there were two broad bands of somewhat indefinite curtains (brightness 1) across the eastern sky, with slight waving motion running from Leo in the ESE, to Vulpecula (a) in the NNW., through Leo, Lynx, Ursa Major, Ursa Minor, Draco, Lyra, and Cygnus. These had changed at 1.15 into a broad band from the same starting points, running through Cancer, Gemini, Auriga, Camelopardalis, Cepheus, and Cygnus (brightness 1 to 2). It was brightest (brightness 2) in the NNW., and towards the ESE, was split longitudinally in two, and very sinuous near the Lorizon. At 2 a. m. a broad band (bright ness 2 to 3), somewhat inclined to split lengthwise, and sinuous near the horizon, swept waying slightly from the NW, to the E. by S., occupying Pegasus, Andromeda, Lacerta, Cygnus, Cepheus, Draco, Lyra, Ursa Major, Leo Minor, and Leo. At 2.15 a broad band swept round from NW, to ENE., about 35° above the horizon, from Pegasus, through Andromeda, Perseus, Auriga, Gemini, Leo, Leo Minor, Ursa Major and Canes Venatici into Draco: there joining three spiral bands, making a sort of vortex between Draco and the zenith (brightness 2 to 3). The magnets were somewhat disturbed, especially the declination magnet, the eastern declination increasing about 19. At 3 a. m. the SE, sky from near \( \alpha \) Hydrae to near \( \alpha \) Boötis was filled with exceedingly sinnous broad bands (brightness 1 to 2), reaching nearly to the zenith, the most southern being continued in the form of a narrow zone through Cancer, Gemini, Taurus, Aries, Triangulum, and Pegasus, ending in the NW. At 3.15 the bands were less sinuous and longer and the zone marower and brighter (2 to 3). At 4 there was a very broad zone across the zenith (brightness 1 to 2). The starting points were between ESE, and E, by S, in Crater and Hydra, and NW, in Pegasus, The western edge ran through Virgo, Boötes (a), Corona Borealis, Lyra, and Cygnus, and the western through Hydra, Canis Minor, Orion, Taurus, Aries, and Pegasus. At 4.15 the zone was fading and breaking up, except the eastern edge, which had narrowed into a band (brightness 3faintly tinged with rose on the lower edge, above which in the NE, was "eveloping a row of imperfeet curtains. At 5.15 four quiet yellowish bands started from Pegasus NW, (brightness 4 to 2). running as follows: The first, north of the zenith, through Lacerta, Cygnus, Draco, and Canes Venatici, ending in Virgo: the second, through Cassiopeia, Cepheus, Ursa Minor, Ursa Major to Virgo; the third, south of the zenith through Andromeda, Persons, Auriga, and Lynx to Leo; and the fourth, through Aries, Taurus, Orion, and Canis Minor to Hydra. At 6.15 there was a zone running W. and E. (brightness 2 to 3), with the northern edge waving slowly. The starting points were in Aries and Boötes. The southern edge ran through Taurus, Gemini, Leo, and Coma Berenices, and the northern through Pisces, Andromeda, Cygnus, Lyra, and Corona Borealis. At 7.15 the zone had essentially the same position and form, but had faded (brightness 0 to 1). Faint

traces continued to be visible at 8.15, 9.10, and 10.10, after which the weather became hazy. There was a magnetic disturbance at 5 to 6 a. m., greatest at 6 a. m.

February 1, 1883, 5.15 a.m. to 1.15 p.m.—Traces of small luminous patches appeared in the west at 5.15 a.m. At 6.15 a, m, one white and quiet band (brightness 2) ran from SE, to WYW, along the horizon, while there was an arch of short streamers of the same color and brightness, somewhat irregular, from the same starting points, about 16° higher than the first band, passing through Leo, Cancer, Gemini, Otion, and Taurus. At 7.15 there was a large corona (brightness 2 to 3), centering in Ursa Major south of the zenith; and a bright band of streamers, vibrating rapidly from W. to E., ran through Pegasus, Aries, Taurus, Auriga, Gemini, and Leo Minor. At 8.15 there was a broad arch from ESE, to WNW., with the crown about 15° from the southern horizon, with a second sim-Har arch above it, from the same starting points through Boötes, Canes Venatici, Ursa Major, Lynx, Gemini, and Orion. From the western extremity came a third similar arch through Taurus, Camelopardalis, Ursa Minor, Draco, and Hercules, ending near the eastern horizon. At the same time a broad irregular broken band of short streamers, quivering slightly, extended from the ENE. through Lyra, Cygnus, Lacerta, Andromeda, Triangulum, Aries, and the Pleiades (brightness of all, 2). At 9.15 there were traces only in the S. At 10.15 there was a broad and quiet white arch from the ESE, to WNW,, with its crown about 45 above the southern horizon, and long white motionless streamers in the E. and ENE., in Hercules, Sagitta, Cygnus, Lyra, and Draco. At 11.15 there was a broad waving band from E. to W. through Gemini, Ursa Major, Draco, Lyra, and Cygnus (brightness 1), and a long low arch in the S.; 12.15 p. m. there was a broad quiet band from the E. to W. from Leo through Coma Bereniees, Boötis, and Aquila, with a corona in Ursa Major. At 1.15 a corona, with its streamers thickest in the E, and W,, was barely discernible in the bright twilight. The needles were comparatively quiet up to nearly half past 12 p. m., when a violent disturbance began, which is still going on.

February 2, 1883, 1 a. m. to 12.15 p. m.—Early in the evening the haze and clouds were thick, but at 1 a. m. (8 p. m. local) traces of twisted bands, apparently bright and in motion, were visible through the clouds, crossing the zenith from NW, to SE. These were very faint at 1.15. The clouds were thicker at 2 a. m., and the traces consequently fainter. None were seen at 3 a. m. At 4 the haze grew thinner, allowing the central part of a broad zone to be visible. The starting points were invisible in the haze in NW, and SE,, and the whole was much obscured by haze. In breadth it reached from Ursa Major to Taurus. The sky was much clearer for four or five hours, gradually becoming obscure again. At 5.15 an aurora was observed passing through Canis Minor, Orion, Taurus, and Cetus (brightness 0 to 1). At 6.15 there were two faint bands, one from Cancer through Orion, Taurus, and Aries, and the other through Gemini, Auriga, Perseus, and Andromeda (brightness 0 to 1). At 7.15 a short band crossed the zenith from Hercules through Ursa Major, Camelopardalis, and Gemini. Farther south of the zenith yellowish white bands ran from Ursa Major to Canes Venatici, Coma Berenices, and Leo Minor, and there was a band of streamers, in rapid waving motion, passing through Serpens, Boötes, Coma Berenices. Leo, Cancer, and Gemini (brightness 1 to 2). At 8.15 there were only faint traces along the horizon. At 9.15 a broad, white, quiet, irregular arch from the SW, horizon through Cancer, Leo Minor, Ursa Major, Canes Venatici, Corona Borealis, and Hercules, ending in Serpens. At 10.15 the haze and clouds were again becoming thicker, and traces of an arch were observed running from ESE, to W. about 10° south of the zenith. At 11.15 a broad zone (brightness 0 to 1) covered most of the southern sky, the bands running from ESE, to W. The first ran through Sagitta, Lyra, Draco, Ursa Major, and Leo Minor, and the second through Hercules, Corona Borealis, Coma Berenices, and Leo, while a broad irregular patch ran from the SSE, to SW, through Serpens, Boötes, and Leo, with a smaller luminous streak near the horizon in Virgo. The last faint traces were seen at 12.15 p. m. A magnetic disturbance began at 4 a, m, and continued all night.

February 3, 1883, 1 a. m. to 11.15 a. m.—The sky was cloudy early in the evening, but the clouds broke sufficiently at 1 a. m. (about 8 p. m. local) to show a regular, narrow arch in the SW. (brightness 2), from the SE. to NW., with its corona at an altitude of about 40°, partially obscured by clouds. The arch was partially broken and irregular at 1.15. At 2 the haze was thick again, but through it near the zenith in the SE, there were traces of an extensive and apparently bright aurora which was nearly obscured at 2.15. There was less haze again at 3 and a broad band consid-

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erably obscured from the SE, to NW, through Polaris could be seen. At 4 there were traces near the zenith, but at 4.15 the haze was nearly gone, displaying extensive bands forming a sort of vortex. One broad band (brightness 2) began in the top of Cygnus, in the NNE., as an irregular cloudy patch, and passed round through Lyra, Hercules, Boötes, Canes Venc'ici, Ursa Major; Lynx and Auriga, ending in Perseus, whence just below the edge of this a double band (brightness 1) ran back to Gemini. There was also a broad band (brightness 2) somewhat obscured by clouds on the SW, horizon through Orion. At 5.15 one band of streamers passed through Lyra, Hercules, Corona Borealis, Boötes, and Coma Berenices, and another from Pegasus through Aries, Taurus, Orion, and Gemini to Cancer, but vibrating slowly from E. to W. (brightness 2). At 6.15 a quiet band (brightness 0 to 1) ran from Pegasus through Cygnus, Vulpecula, and Serpens. At 7.15 a quiet yellowish zone (brightness 1 to 2) filled the southern half of the sky, and one outlying band from Ursa Major to Cygnus in rapid, waving motion. At 8.15 there were seen traces of a corona covering the whole sky from the horizon, centering a little south of the zenith. At 9.15 there were four broad bands (brightness 1) covering most of the sky, the first in the north from NW, to NE., with the crown at an altitude of about 12°, the second from E. to W. through Polaris, the other two starting together from the ESE,, the west one passing through Hercules and Ursa Major, and the other through Corona Borealis, Canes Venatici, and Leo Minor, with also a broad band of luminous patches from the ESE, to W. about 15° above the southern horizon. At 10.15 there was a zone of three bands (brightness 0 to 1), with its starting points ESE, and NNW., one through Lyra, Draco, Ursa Major, Lynx, Gemini, and Canis Minor, the second through Corona Borealis, Canes Venatici, and Leo Minor, and the third through Serpeus, Boötes, Coma Berenices, and Leo. At 11.15 there was a white, quiet arch from the NW, to E. through Auriga, Cassiopeia, and Lacerta (brightness 0 to 1), with streamers at the extremities, and also short curved streaks in the south in Boötes, Hercules, and Coma Berenices, and a broad broken band from the SE, to SW, about 10° above the southern horizon, all of the same brightness. The weather then became too thick for further observation. A violent disturbance, affecting all the magnetic elements, commenced about 2 a. m. and lasted about twelve or thirteen hours, being specially violent at 2 and 8 a. m. and 1 p. m.

February 4, 1883, 12.15 a. m. to 11.15 a. m.—The early part of the evening was very stormy, the wind reaching 54 miles an hour, with the drifting snow rendering accurate observation of the aurora impossible, though the sky frequently was almost clear of clouds. Hazy light was observed in the NE, at 12.15 a.m., and bright traces in the NE, at 1 a.m. At 2 a.m. there was a broad zone across the zenith from the NW, to SW, (brightness apparently 1). At the next two observations the sky was completely covered with clouds, and traces only were seen near the zenith at 3 a. m. and in the SE, at 4. At 5 the sky was clearer, showing a band (brightness 0 to 1) from Cancer through Canis Minor, Orion, and Taurus. At 6 a brighter band (brightness 1) ran from Leo, through Gemini, Auriga, and Taurus to Aries. At 7 there were two yellowish bands (brightness 1 to 2), the first from Leo, through Lynx, Camelopardalis and Cassiopeia, to Andromeda, and the second from Cygnus, through Draco to Ursa Major. At 8 there were merely traces round the southern horizon and a few patches in the W. At 9.15 there was a broad white band on the southern horizon, with streamers in Serpens and Boötes. There was besides a white arch from the SE, to NW, through Corona Borealis, Draco, Ursa Major, Auriga, and Orion, and a similar band from E. to N. through Sagitta, Vulpecula, Lacerta, and Andromeda, and streamers in Pleiades (brightness 1). At 10.15 a band ran along the northern horizon from the NW, to ENE., and a striated band from the SE, to NW, through Hercules, Draco, Ursa Major, Lynx, Cancer, Gemini, and Canis Minor. There was also a broad band near the southern horizon from SE, to SW. There were also streamers in the E. All were white and quiet (brightness 0 to 1). This was essentially unchanged at 11.15, after which the sky again became overcust. A violent disturbance began at 3 a. m. and lasted all night.

February 4, 1983, 10.45 p. m. to 11.15 p. m.—The sky, which had become overcast all the after noon, became sufficiently clear at 10.45 p. m. (about half-past 4 local) to show an arch in the NE., with its extremities bearing ESE, and NNW., and its crown at an altitude of about 45°. The sky then became again overcast with snow, but auroral light was still visible at 11.15 p. m. through

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the clouds in the NE. A magnetic disturbance commenced about 5 a. m. and lasted all night docal), reaching its maximum about 12 m. (Washington time).

February 6, 1883, 12.15 a. m. to 12.15 p. m.—The early part of the evening was cloudy and stormy. However, at 12.15 a.m. traces were visible through the clouds in the NE. At 1 a.m. the clouds were broken away somewhat, and much bright light, obscured by broken clouds, was visible in the E. For the next six observations the clouds were thick and the weather stormy. At 8.15 a yellowish-green band, with short, motionless streamers (brightness 1 to 2), ran from Orion and Taurus, through Auriga, Perseus, Cassiopeia, Andromeda, Cygnus and Draco. At 9.15 there was an aurora of essentially the same character as at 8.15. At 10 an arch of diffused light (brightness 1 to 2) ran from the ESE, to WNW,, with its crown at an altitude of about 15° above the southern horizon. At the same time a band of similar character ran from the E. to NW., through Cygnus, Ursa Minor, and Auriga. The latter had disappeared at 10.15, the former remaining unchanged. At 11.15 there was a broad band of quiet streamers, with its grown at an altitude of about 150 above the southern horizon, running from ESE, to WNW., and an elliptical corona continuing towards the zenith with its greatest diameter E. and W., the rays changing position rapidly at short intervals (brightness 2). There was still a corona of the same form at 12.15, but paler (0 to 1) and quiet, brightest in the W., and fading in the E., occupying Cancer, Lynx and Camelopardalis in the N. and Leo Minor, Canes Venatici and Hercules in the S. It was broad daylight at the next observation. A magnetic disturbance of considerable violence began about 5 a.m. and continued all night (local), reaching its maximum about 12 m. (Washington time).

February 7, 1883, 12.15 a. m. to 1 a. m.—The sky was hazy during the early part of the evening, but a faint arch was discernable at 12.15 a. m. in the NE. from ESE, to NNW., with its crown at an altitude of about 30°. There were also traces at 1 a. m., but after this the sky became overcast and the weather cloudy and no more aurora was seen. The magnetic needles were but little dis-

turbed, although the intensity was very small.

February 8, 1883, 3 a, m. to 10,15 a, m.—Traces of a low arch were observed in the NE. at 3 a. m., somewhat obscured by haze, and at 3.15 this arch had risen so as to pass from WNW, to ESE. through Cygnus, Lyra (a), Corona Borealis, Bootes and Coma Berenices. At 4 a, m, a zone, not very broad and rather hazy (brightness 1), had its starting points ESE, and NW, in Virgo and Pegasus, with its western edge running through Leo, Minor, Ursa Major, Camelopardalis, Cassiopeia and Andromeda, and its western through Leo Cancer Gemini, Taurus, Aries and Triangulum. This was somewhat narrower and less hazy at 4.15. At 5.15 a broad, yellowish, quiet band (brightness 1) ran from NW, in Pegasus to ESE, in Coma Berenices and Boötes, the eastern edge through Cygnus, Lyra, Draco, Canes Venatici and Boötes, the western through Lacerta, Cassiopeia, Ursa Minor, and Ursa Major. At 6.15 the main band, waving slightly, ran through Pegasus, Andromeda, Cassiopeia, Camelopardalis, Ursa Major, Coma Berenices and Boötes, with a small secondary band from Lacerta through Cygnus, Draco, and Boötes (brightness of all, 1 to 2). At 7.15 there was only a faint band (brightness 0 to 1) through Virgo, Leo, Cancer, Gemini and Taurus, and at 8.15 merely traces around the southern horizon. At 9 a.m. a belt of streamers (brightness 2), about 200 long, white, and quiet, encircled the entire horizon, and at an average altitude of about 10°. At 9.15 there was an arch from the SE, to SW, with its crown at an altitude of about  $40^\circ$  above the southern horizon, and a broad striated band starting from the same point in the SE, and running to the NW., including Ursa Major in the S. and Cassiopeia in the N., with an arch of short rays, centering towards the zenith, starting from the NW, end of the band and running through the Pleiades, Aries, Andromeda, Cygnus and Sagitta. All were white and quiet (brightness 2). At 10.15 there was a white, quiet, diffused arch from the ESE, to WNW., with its crown at an altitude of about 150 above the southern horizon, with an arch of streamers from E. to NNW., through Cygnus, Ursa Minor, Camelopardalis and Taurus, slowly changing in form (brightness 2). The arch was in the same place at 11.15, but paler (brightness 0 to 1) and there were a few faint streamers in the E. and NW. The magnetic intensity still continued low, and there was a slight disturbance, lasting from 8 a. m. to about 1 p. m.

February 10, 1883, 8 a. m. to 11.15 a. m.—The violent storm having moderated about 8 a. m. (3 p. m. local), a quiet band was visible through the haze, passing through Leo, Cancer, Gemini and Taurus (brightness 0 to 1). At 9.15 traces were visible in the SW., and at 10.15 there were

H. Ex. 41---51

observed through the base a few traces of auroral streamers, white and quiet. At 11.15 there was a definite band, white and quiet (brightness 1), running about E. and W. through Lyra, Draco and Ursa Major. Daylight began before the next observation. The magnetic needles were considerably agitated during the whole night, making large oscillations, but there was no regular disturbance.

February 11, 1883, La, m, to 11.15 a, m,—At about 8 p, m, local time (1 to 1.15 a, m., Washing ton) there were faint traces in the E. in the form of a low, pale arch. At 2 a. m. there was a pale. vertical streak in the ESE, which developed at 2.15 into an irregular band (brightness 0 to 1) sinuous in the ESE, from ESE, in Leo to the NNW, in Cygnus, through Leo (β), Coma Berenices, Canes Venatici (α), Boötes (λ), Hercules and Lyra. This band was hardly changed at 3 a. m., having merely moved a trifle higher so as to pass through the tail of Ursa Major, and at 3.15 it was fading, leaving merely the part south of the magnetic meridian. At 4 a.m. a rather broad, sinuous band (brightness I) crossed the zenith from the ESE, in Virgo to the NW, in Andromeda, through Leo, Coma Berenices, Ursa Major, Camelopardalis, Ursa Minor and Cassiopeia. At 4.15 this had become a narrow zone, broadest in the ESE., with the same starting points, but passing west of the zenith through Draco and Cepheus, waving slowly near the zenith and drifting westward. This developed into a very broad and bright zone between the observations, diminishing to a band at 5.15, and passing through Pegasus, Andromeda, Perseus, Auriga, Ursa Major and two Minor (brightness 1). At 6.15 a similar band ran through Pegasus, Lacerta, Cygnus, Praco, Corona Borealis and Boötes. At 7.15 a paler band (brightness 0 to 1) passed through Aries, Taurus, Orion, Gemini, Cancer and Leo, but at 8.15 there were merely traces over the southern horizon. At 9.15 there was a quiet white arch (brightness 1) from the SE, to NW., with its crown at an altitude of about 15° from the southern horizon, with streamers at the SE, end of the arch in Corona Borealis and in the NE, in Cygnus, Vulpecula and Lacerta. The arch had risen a little at 10.15, and reached to the NNW. At the same time the entire southern half of the sky was filled with a diffuse light (brightness 0 to 1) and pale streamers (brightness 0 to 1) forming a corona and occupying Taurus, Gemini, Camelopardalis, Perseus, Cassiopeia, Cepheus, Lacerta and Cygnus. At 11.15 the greater portion of the sky between the zenith and the southern horizon was filled with nearly parallel bands (brightness 0 to 1) running ESE, and WNW, from horizon to horizon. There was a slight magnetic disturbance from 10 to 11 a. m.

February 13, 1883, 9.15 a, m, to 10.15 a, m.—Though the early part of the evening was clear, it became cloudy by 2 a, m., local time, but the sky was partially clear at 9.15 and 10.15 (Washington). At the first observation faint traces, with slight motion, slowly shifting, were visible near the zenith and in the NW., and at the latter faint traces could be seen through the haze and clouds. The needles were but slightly disturbed.

February 14, 1883, 4.15 a. m. to 8.15 a. m.—It was cloudy and snowing up to about 11 p. m., local time (Washington, 4 to 4.15 a. m.), when it began to clear, remaining clear till 9 a. m. (Washton). At 4 to 4.15, while the stars were still mostly obscured, a zone, apparently very broad and rather bright, was seen crossing the zenith through the clouds and haze. At 5.15 a band with motionless streamers (brightness 0 to 1) ran through Pegasus, Cygnus, Cepheus, Draco, and Ursa Major. At 6.15 there was a short band (brightness 0 to 1) through Leo and Cancer and a few patches of light in Gemini, Auriga, and Pisces. At 7.15 and 8.15 a. m. there were merely faint traces in the S. There was a moderate magnetic disturbance at 9 and 10 a. m.

February 15, 1883, 8.15 a. m. to 10.15 a. m.—Most of the night was cloudy, but it was clear from 8 till daylight. Faint traces of aurora were seen at the zenith and in the NE. at 8.15 a. m., and at 10.15 a. m. there was a white and quiet arch (brightness 1), with rays centering towards the zenith, occupying Hercules, Ursa Minor, and Gemini. It was broad daylight at the next observation. There was no magnetic disturbance.

February 16, 1883, 2 a. m. to 11.15 a. m.—At 2 a. m. there was a pale arch in the E., starting low in Leo in the ESE., passing through β Leonis, Coma Berenices, the corner of Canes Venatici, Boötes (β), and Hercules, fading near a Lyrae, with a lower branch from the same starting point reaching a Boötes (brightness 0 to 1). This had become slightly irregular and not so high at 2.15, and remained in nearly the same place, but was faded to traces at 3 to 3.15. The sky was clouded at 4 a. m. with patches of fleecy cloud, which cleared away at 4.15, partly exposing a broad broker.

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February 17, 1883, 3 a. m. to 5 a. m.—The weather was cloudy till 9 a. m., local (3 a. m. Washington), when the clouds cleared away, leaving the sky covered with haze, through which a somewhat sinuous band was visible (brightness apparently 1), crossing the zenith from near the horizon NNW, and ESE. This had broadened into a zone at 3.15 with one bright streak (brightness 1 to 2) in the NW. Most of the stars were obscured. At 4 the sky was much clearer, and there was an arched band (brightness 1 to 2) from the NNW, in Pegasus to E. by S. in Virgo, through Cygnus (ε), Lyra (just below α), Hercules, Serpens, and Boötes. At 4.15 it was paler (brightness 1), and growing double from the eastern end. It began to cloud again at 5, so that traces only were visible. There was a considerable magnetic disturbance between 8 a. m. and 1 p. m., reaching its maximum at 11 to 12.

February 18, 1853, 11.15 a. m. to ——?.—The weather was cloudy all night, but traces of aurora were visible through the clouds at 11.15 a. m.—The magnetic needles were very quiet.

February 20, 1883, 8 a. m. to 9.15 a. m.—The weather was cloudy most of the night, but cleared away sufficiently at 8 to 8.15 and 9 to 9.15 a. m. (3 and 4 a. m. local) to allow anrora to be seen. This consisted of traces merely at the first observation, but at the second of two quiet bands (brightness 0 to 1), one from Auriga through Perseus to Cassiopeia, and the other from Andromeda through Pegasus to Delphinus. The magnetic needles were considerably disturbed from 4 to 11 a. m., the disturbance reaching its maximum at 7.

February 21 and 22, 1883, 11.45 p. m. to 11.15 a. m.—The twilight had not completely faded at 7.30 p. m. (11.45, Washington), when a twisted streak tinged with yellow was observed crossing the zenith from NW, to SE. (brightness 0 to 1). By 12.15 a.m. this was reduced to a bunch of streamers in Cygnus and Lyra, and a faint band through Lyra, Hercules, and Ursa Major, and had wholly disappeared at 1 a.m. At 1.15 shifting, twisted streaks and bands of streamers with considerable motion (brightness 0 to 1), tinged with yellow and rose, appeared in the N., occupying Lyra, Cygnus, Cepheus, and Draco. At 2 a. m. a very pale band ran from Cygnus (a) in NNW, through Draco and Ursa Major (α), ending in the moonlight ESE., and was wholly gone at 2.15. At 3 a.m. there was a pale band west of the zenith, from the NW., in Pegasus, through Andromeda, Cassiopeia, Auriga, and Gemini. This was replaced at 3.15 by a similar band in nearly the same position as the one observed at 2 a. m. Traces merely were observed at 4 to 4.15. At 5 two bands ran from Boötes and Virgo through Coma Berenices, Leo, Leo Minor, Gemini, and Auriga to Taurus, with bunches of slowly vibrating streamers in Boötes and Virgo (brightness 0 to 1). Traces only were observed at 6 and 8. At 9.15 there was a quiet arch (brightness 0 to 1) in the S. from ESE, to WNW., with an altitude of about 15°, and a quiet, striated arch (brightness 0 to 1) through Hercules, Draco, and Gemini. At 10.17 a. m. the arch in the S. was unchanged, while a second similar arch about 10° to 15° in breadth ran from ESE, to SW., while a third arch ran from ENE, through Cygnus, Ursa Minor, and Lynx to Cancer, with streamers in the NE, and a luminous patch in Gemini (all brightness 0 to 1). At 11.15 there was a well-defined yellow corona (brightness 2), quivering rapidly, occupying Cygnus, Hercules, Corona Borealis, Boötes, Canes Venatici, Leo Minor, Ursa Major, and Ursa Minor, also Auriga and Perseus. The needles were considerably disturbed all night, the disturbance reaching its maximum between 10 a.m. and 12 m.

February 22, and 23, 1883, 1.55 p. m. to 8.15 a. m.—At 11.55 the aurora consisted of indistinct patches and streamers in the NE., which at 12.15 a. m. had developed into a faint corona, centering in Camelopardalis. It was made of shifting streamers, which were short, except in the NW, and SE.—At 1 there was a broad, highly modified zone occupying large parts of the sky, made up

of twisted streaks, angular curtains and streamers, with some motion (brightness mostly 1, reach, ing 2 in some places). Two bands were well defined, one on the eastern edge from Leo through Leo Minor, Ursa Major, Draco, Ursa Minor and Draco again to Lyra, and the other on the west ern edge through Cancer, Canis Minor, Gemini, 5 Tauri, Perseus, and Andromeda. The zone had moved toward the W. at 1.15 and was not so well defined, while a band of indistinct shifting curtains ran from Orion's belt to Canis Minor ( $\alpha$ ) and curving back to  $\beta$  Tauri. At 2 a. m. a broad band ran from the ESE, in Hydra through Leo, Leo Minor, Lynx and Ursa Major, Camelonard alis, Ursa Minor, Cassioneia, and Andromeda to NW, in Pegasus. This was constantly changing its shape with rapid, twisting, whirling, and waving motion, shifting also from E. to W. and back again. It was tinged with shifting colors, pale green and rose (brightness 2 to 3). There were also unieter bands from the same starting points lying towards the SW., the lowest passing through the Hyades. The main aurora had faded to traces at 2.15, leaving large patches of luminous haze. while a narrow band (brightness 2) ran from Pegasus through Cygnus, Lyra  $(\alpha)$ , and Boötes  $(\alpha)$ . At 3 a. m. a narrow, twisted, shifting band, composed partly of streamers, passed close to the zenith from E., low in Bootes, through the tail of Ursa Major, Draco, Ursa Minor, Cephens, Cassi oneia, and Andromeda to the NW, in Pegasus (brightness 1 to 2), with two pale arched bands in the SW,, the lower from Pegasus, through Aries, Taurus (a), the head of Orion and Canis Minor (a), ending in the moonlight SE. It was much faded and broken at 3.16. At 1 a.m. there was a similar band, tinged with green and rose, starting high in the NW, in Perseus, passing through Auriga (d) Lynx, Leo Minor, and Coma Berenices, ending in the ESE,, shifting and way. ing. 4.15 found it broken and shifting, passing through (a) Aurigae, with some ill-defined patches and bands in the SW. Traces only were observed in the SE, at 5, and no more was seen till 8.15. when a rapidly waving band ran from Taurus through Auriga, Camelopardalis, and Ursa Minor to Boötes (brightness 1 to 2). The needles were considerably disturbed from 11 p. m. to 10 a.m. the greatest disturbance being at 2 a. m.

February 23 and 24, 1883, 11.55 p. m. to 11.17 a. m.—When the aurora was first noticed, shortly before midnight, Washington time (6.40 local), it was in the form of two faint, slightly arched bands in the NE, about 30° above the horizon. At 12.15 it was an arch of fine streamers, with its extremities bearing NW, by N, and ESE,, and its altitude about 30° (brightness 1). This band was essentially unchanged in character and position at 1 a. m., with an additional hazy band (brightness 1), from nearly the same starting points, passing through Leo, Leo Minor, Ursa Major, Draco, Ursa Minor, Cepheus, and Cygnus. This had disappeared at 1.15 to 1.20, leaving the first band, which had become more compact and brighter (brightness 1 to 2). At 2 a. m. there was a regular arch (brightness 1) from the ESE, in Virgo to the NNW, near β Cygni, through Coma Berenices, Boötes, Corona Borealis, Hercules, and Lyra (α). This was fading rapidly at 2.15 to 2.20. There was no aurora at 3 or 4, though faint and fugitive traces were noticed between the two hours. At 4.15 there were faint traces in E. and a band (brightness 0 to 1) from NW, in Pegasus through Andromeda, Perseus, and Auriga. From 5 to 5.20 a, m, there was a vellowish zone (brightness 1 to 2) with the bands in rapid waving motion from Orion to Boötes and Serrens through Gemini, Lyux, Ursa Major, and Canes Venatici. From 6 to 6.20 there was a band of streamers (brightness 0 to 1) vibrating rapidly from W. to E., running through Perseus, Cassioneia, Cepheus, Cygnus, Lyra, and Hercules. At 7.20 and 8.20 traces only were observed, and also at 9.17, when they were in the SE., white and shifting. At 10.17 there were curtains from NNW, to ESE., with streamers in Leo Minor. All were white, with occasional tinges of green and yellow, and changing form and position very rapidly. At 11.17 there were faint traces near the zenith, with faint streamers in the W. The needles were more or less agitated all night, the disturbance being extreme at 8 a. m., 9 to 9.30 a. m., and 2 to 2.40 p. m.

February 25, 1883, 12.15 a. m. to 9.17 a. m.—The aurora began as a faint bunch of streamers in the SE, at 12.15, and at 1 a. m. had developed into four bands of ill-defined curtains, forming a sort of zone in the SW,, with its starting points NW, in Pisces and ESE, in Hydra, the uppermost passing through Triangulum, Perseus, Auriga, Gemini, Cancer, and Leo, the lowest through Canis Minor, Orion, and Taurus, with slight waving motion (brightness 1). It had the same general character at 1.15 to 1.20, but was rather lower. From 2 to 2.15 it was nearly in the same position,

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of streamers tains, forming ra, the upperwest through same general same position, Lat the curtains were shifting and turning into bands (brightness 2 to 3). The lowest band beginning as a patch of curtains just above Sirius, and finally formed an arch (2,20), made up of short, ill-defined streamers, quivering slightly (brightness 3), rather brightly colored, green, yellow, and rose, passing just above Sirius and through \( \beta \) Orionis. The curtains broke partially into streamers and moved up towards the zenith, having developed at 3 a. m. into an elongated corona (brightness 1), centering towards the zenith, with its longest diameter NE, and SE,, nearly reaching the horizon at these points, the other streamers reaching as low as Arcturus in the NW, and Aldebaran in the SW. The streamers were uncolored and shifting. For the next half hour there was no definite arrangement of aurora, but the sky was covered with sinuous bands and scattered streamers all constantly changing position and brightness, the bands, as a rule, at right angles to the magnetic meridian, mostly E. of the zenith. At 4 a. m there were two or three broad shifting bands (brightness 1 to 2) from the SSE, in Virgo, spreading out through Leo and Ursa Major, forming an irregular corona at the zenith about 60° in width, with two paler bands from the same starting points along the SW, horizon through Canis Minor and Orion, ending in Taurus, NW, The corona had changed at 4.15 into a broad, shifting zone, ending in NW, in Taurus, with considerable waving motion in the NW. From 5 to 5.20 there was a broad band of waving curtains in the NE, from Pegasus through Lacerta, Cygnus, Lyra, Hercules, and Corona Borealis (brightness 1 to 2). From 6 to 6,20 there were two yellowish bands (brightness 1 to 2) in the SW, through Taurus, Orion, Auriga, Gemini, Cancer, Leo, and Coma Berenices. Traces only were observed at the next observation. At 8 to 8.20 a faint band (brightness 0 to 1) ran from Auriga through Lynx, Ursa Major, Canis Venatici, and Boötes, and the last faint traces were seen at 9.17 a.m. There was considerable disturbance all night.

February 25 and 26, 11,45 p. m. to 10,20 a. m.—At 11,15 p. m. there was a regular arch in the N.E., with its extremities bearing ESE, and NW., with its crown about 40° in altitude (brightness 0 to 1), remaining in the same position at 12. At 12.15 it was rising in altitude and had become brighter (1 to 2) in the NW., where it was tinged with rose, and sent up rather long streamers. From 1 to 1.20 the arch was of the same character, but lower, passing through Hercules, Corona Borealis, and Boötes (above a), ending in Virgo, with streamers in Cygnus (brightness 2 to 3). The arch was shifting, and tinged with green, yellow, and rose. At 2 a. m. there was a rather broad zone (brightness 2), with the starting points NNW, in Pegasus and ESE, in Crater, occupying Leo, Leo Minor, Canes Venatici, Ursa Major, Camelopardalis, Ursa Minor, Cepheus, Cassioncia, and Andromeda. This had drifted west at 2.15, leaving only a faint band in its original position, while the zone now passed through the square of Pegasus, the Pleiades, Perseus, Gemini, and Cancer. This began to grow twisted in the E. and developed into curtains which rapidly increased in brightness (brightness 3), showing some color beginning to whirl and spread toward the zenith and eastward. When this was reached the motion became very rapid, and the aurora formed a sort of spiral corona, made up of bands of curtains, centering round the zenith and covering nearly the whole sky. This moved last, and in fifteen minutes was reduced to large hazy patches, with bright streaks in the NE. At 3 a, m, there was a short arch (brightness 2 to 3) from the E, low in Boötes to NNW, in Cygnus, through  $\varepsilon$  and  $\beta$  Cygni, Hercules, and Corona Borealis. A second arch appeared above this at 3.15, when both were broken into fine streamers, which shifted and developed into homogeneous bands again before 3.20. At 4 a. m. there were bunches of streamers (brightness 2) in the place of the arch at the last observation, with traces of a very faint zone across the zenith. From 4.15 to 4.20 there were only traces in the E. and SE., with much diffused luminosity all over the sky. From 5 to 5.20 there were only traces again in the S. No more was seen till 7 a.m., when there was a belt of waving bands through Taurus, Orion, Gemini, Leo, Ursa Major, Canes Venatici, Coma Berenices, and Boötes, from NW. to SE., with a band of streamers (brightness 1 to 2) running N. to SE, through Cassiopeia, Cepheus, Cygnus, Lyra, Draco, Hercules, Corona Borealis, and Boötes, vibrating rapidly from W. to E. Traces alone were observed in the SE. from 8 to 8.20. At 10.20 there was a faint white arch across the zenith from the SE, to NW. There was no marked disturbance of the needle till 1 p. m., when it was violent, but of short duration.

February 27, 1883, 12.15 a. m. to 10.17 p. m.—The weather cleared between 12 and 1 a. m., disclosing an arch (brightness 1 to 2), partly obscured by clouds in the NE., passing through Arcturus and α Corone Borcalis, with streamers beginning to develop at 1.20 m and above Cygnus. At 2

a. m. two or three broad singons tands were to be seen through the haze crossing the zenth from NW, to SE,, one through Cassiopeia and one through Ursa Major. From 2.15 to 2.20 there was a zone of broad bands east of the zenith, partially obscured, especially near the horizon, coming up through Leo, with the upper band through Ursa Major and Bootes (a) (brightness apparently 1 to 2). At 3 a.m. there was a zone of broad bands with the starting points alone obscured in the NNW. and ESE., occupying Leo, Leo Minor, Ursa Major, Draco, Ursa Minor, Cygnus, and Lacerta (brightness 1 to 2). From 3.45 to 3.20 it was brighter (brightness 2) and west of the zenith, occupyin-Andromeda, Triangulum, Aries, Taurus, Perseus, Auriga, Gemini, and Aries. At 4 a. m. nearly the whole sky was covered with broad, shifting, sinuous, hazy bands running generally NW, and SE, brightness 1), with some brighter streaks (brightness 2) in the E. This had all condensed at 1.15 to 4.29 into a broad arched band (brightness 2) in the NE, from Virgo to Pegasus, passing through Boötes, Serpens, Hercules, Lyra, and Cygnus, sending up streamers in the NW, and do. veloning into a sort of zone. From 5 to 5.20 there was a quiet band (brightness 0 to 1) running through Taurus, Orion, Canis Minor, and Leo into Virgo. Traces only were seen at the next observation, but from 7 to 7.20 there was a quiet band (brightness 0 to 1) through Cassiopeia, Cepheus, Draco, Hercules, and Boötes. A slightly waving band at 8 to 8.20 ran through Orion, Gemini. Cancer, Lynx, Ursa Major, and Leo (brightness 1). At 9.17 a. m. there was a white, quiet arch over the southern horizon from SE, to WNW,, with the crown at an altitude of about 15 and a broad, quiet, irregular band from the E. through Lacerta, Cepheus, Ursa Minor, Ursa Major, and Lynx to Cancer (brightness 1). At 10.17 there was a corona elongated from ESE, to WNW, occur pying Sagitta, Hercules, Lyra, Draco, Ursa Major, Leo Minor, and Gemini in the E., S., and W. 41 underwent a slow, constant change of form and position (brightness 1). There were also long streamers in Lacerta, Andromeda, Triangulum, Persens, and Arius, and a broad, luminous band near the horizon from the S, to SW. The magnetic needles were considerably disturbed all night.

Fibruary 28, 1883, 1.15 a. m. to 5.20 a. m.—The sky was covered all night with clouds, which at intervals broke away and became hazy enough to allow some of the stars to be seen. Between 1 and 2 a. m. bright bands in pretty active motion could be seen through the clouds, particularly in the SE, and NW., where there was a bright loop with its convexity towards the zenith. At 2 a. m. a band of bright curtains, waving rapidly, could be seen through the clouds in the NE., at an altitude of about 30°. From 2.15 to 2.20 there were twisted streaks and streamers from the NW. to SE., and partial coronas, bright and shifting, seen through the clouds. Bands could be seen through the clouds in the SW., which were less obscured from 4.15 to 4.20, so that the upper was observed to pass through a Leonis, α Orionis, and α Tauri. This faded rapidly, while a zone observed by the haze developed from the SE, towards the zenith. The clouds then thickened up so that traces only were seen in the S, at 5 to 5.20. The needles were disturded violently all night.

February 28 and March 1, 1883, 11,30 p. m. to 10,40 a. m.—The sky cleared off while the twilight was still bright, and only the large stars were visible, and there appeared a bright aurora, probably a continuation of yesterday's, as when first seen it crossed the zenith. It was a yellowish, twisted band, which ran from the ESE, to WNW., and appeared shifting and agitated, developing gradually into a broad zone, while at 12.15, when the sky was dark enough for proper observation, occupied Cancer, Cassiopeia, Ursa Minor, Auriga, Andromeda, and Pegasus, and was in rapid motion (brightness 2). At 1.15 to 1.20 the zone was west of the zenith and somewhat obscured by clouds and haze, especially at the starting points. It was observed to pass through Gemini, Au riga, Perseus, and Andromeda (brightness 2), shifting and waying. At 3 to 3.15 it had subsided to quiet bands (brightness 1) from Leo through Canis Minor, Orion, Taurus, and Aries. At 4.17 there was a quiet arch over the southern horizon from SE, to NW., with its crown at an altitude of about 18% or 20%, and a zone of broad bands from the SE, to NW., occupying most of the sky between Cygnus and Lynx, and drifting slowly towards the W. (brightness of all 3). Traces only in the N, and W, were visible at the next hour. At 6.17 there was a zone of broad bands (brightness 3 to 4) from NW, to SE,, stretching in width between Ursa Major and Cygnus, rapidly changing form and position, and bounded on the SW, edge by a broad curtain, passing through Serpens, Boötes, Corona Borealis, Leo Minor, and Gemini, vibrating rapidly in both directions, and showing brilliant pink, green, and yellow, with also a broad, quiet band from the Pleiades to Cygnus, near the northern horizon. At 7 to 7.20 there was a band of rapidly vibrating streamers (brightness ! ie zenith from

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March 1 and 2, 1883, 11.45 p. m. to 11.17 a. m.—The aurora appeared to be fully developed as anon as it grew dark, and was probably a continuation of vesterday's aurora. It first appeared as two streaming bands, starting near the horizon (southeast) and reaching nearly to the zenith. At 12 midnight two parallel bands of curtains crossed the zenith from SE, to NW. At 12.15 these were reduced to bunches of faint streamers in the SE, and NW., which soon rose and developed into curtains across the zenith. At 1 a, m, there was a narrow band of waving curtains (brightness 1, starting in Virgo, E. by S., running through the sickle of Leo and doubling back through Leo Minor, Ursa Major ( $\alpha$  and  $\beta$ ), Draco and Cygnus ( $\alpha$ ), with hazy bands spreading from Pegasus an through Cassiopeia to the zenith. At 1.15 to 1.20 these had developed into a broad shifting zone, edged with curtains (brightness 2 to 3), starting ESE, in Leo and NW, in Pegasus; in breadth extending from  $\alpha$  Aurigae to  $\beta$  Ursae Majoris. At 2 a.m., rising from the same starting points, bands (brightness 1) and curtains (brightness 2) covered the whole sky from the eastern horizon to Auriga. The whole was constantly shifting, and brightest near the zenith, where it formed a sort of elliptical corona. At 2,20 this was reduced to one main band in the NE, from Pegasus NW, to Virgo ESE, through Cygnus (α), Lyra (α), Corona Borealis and Boötes (α), and indefinite (0 to 1) bands spreading up from each end towards the zenith. The band soon devel aped into three, the middle the brightest, and colored especially with a pink approaching salmon color. It was in rapid lateral motion from the NW, and all was changing rapidly. At 3 a. m. it was reduced to a few bands low in the NE. At 3.15 to 3.20 there was a band of curtains, making a loop in the NW., coming up from Pisces through Andromeda, Cygnus and Lyra, with other indistinct bands in the E. The loop rose and became a twisted band across the zenith, with tinges of the usual colors. At 4 a. m. most of the sky was covered with streaks (brightness 1 to 2) and broad hazy bands radiating from near the horizon in the NW, and SE. At 4.15 there was a diverging sheaf of bands in the NW, in Pisces, Triangulum and Taurus, and a broad band along the northern horizon to  $\alpha$  Lyrae and then sweeping up almost in a circle through Draco, Ursa Minor, Leo Minor, and Leo to Virgo in the E. by S. and drifting rapidly westward (brightness 1 to 2. At 3 to 3.20 there were two bands (brightness 2 to 3), the upper quiet and the lower with streamers vibrating rapidly from W. to E., changing color from rose to yellow and green, running from Taurus through Orion, Canis Mipor, Gemini, Cancer, Leo Minor, Leo, Coma Berenices and Boötes to Virgo, from NW, to SE. At 6 to 6,20 there were two quiet bands (brightness 0 to 1), one from Serpens through Boötes, Coma Berenices, Leo, Cancer, Auriga, Taurus, and Aries, and the other from Andromeda through Cygnus and Hercules, with detached patches in Canes Venatici, Ursa Major and Camelopardalis. Traces only were observed at the next two hours. At 9.17 there was an extensive zone (brightness 0 to 1), running E, and W., about 50° broad, drifting slowly southward, with an irregular band near the SW, horizon from W, to SSW,, and quiet streamers (brightness 0 to 1) in Auriga, Perseus, Triangulum, Andromeda, Pegasus and Vulpecula. Traces only were seen at the next two observations in the SW, and N, at 10.17, and in the form of a shifting corona, fading in the dawn at 11.17. The magnetic disturbance still continued.

March 2 and 3, 1883, 11.45 p. m. to 10.17 a. m.—The twilight was so bright that only the largest stats were visible when the aurora was first seen. It began with streamers in the SE., which soon developed into a twisted band across the zenith. At 12.15 the waving band was in the same position (brightness 2 to 3), yellowish green in color and tinged with rose, and soon broke into four bands, extending 40° each side of the zenith. At 1 a. m. a moderately wide zone (brightness 1 to 2) crossed the zenith, starting ESE. in Leo and NW. in Pegasus, extending in width from \( \alpha \) Aurigae to \( \alpha \) Ursa Majoris, while two outlying bands from the same starting points (brightness 2) ran through Canes Venatici, Ursa Major (n), Corona Borealis, Boötes, Draco, Lyra, and Cygnus. The whole was narrower and fading at 1.15 to 1.20. It was brightest near the starting points and

drifted eastward, much obscured by clouds. At 2 a.m. a zone about 60° broad, crossing the zenith from SE, to NW, was visible through the thin clouds (bright aess apparently 1 to 2). At 2.15 to 2.20 the sky was clearer, though the starting points were still obscured. The shifting bands were nll west of the zenith, the crown of the lowest passing through a Tauri. A hazy band was propagating rather rapidly from the SE., and the whole faded quickly and brightened up again. At 2.45 these bands in the W. were still pale, but somewhat convoluted. Suddenly the whole shot in to the zenith with lightning rapidity, burning very bright (3 to 4), and developing exceedingly rapid motion, both waying and whirling, with rapid changes of color and brightness. It passed the zenith in about two minutes, forming a semi-corona, first on the west side and then on the east, The motion was mostly from the NW., and the colors, though delicate, were exceedingly bright. They were apple-green, pale yellow, and rese-pink, in the usual order, the latter especially bean, tiful. In less than tive minutes the motion subsided and the aurora faded, leaving the sky nearly covered with hazy, spiral, and sinuous bands (brightness mostly 1, some brightness 2), appearing to start from the SE and NW., forming a sort of vortex round the zenith, circling and waying slowly, as it was seen at the 3 a. m. observation. At 3.15 to 3.20 there was in addition a bright loop in the NW., seen through the clouds, which gradually shifted and faded, breaking into luminous patches. At 4 a.m. all was gone except a bright glow in the NE, showing through the clouds: which at 4.15 to 4.20 could be seen to be an arched band. A shifting broad zone (brightness 0 to 1) covered most of the sky, and began to develop spirals in the N. At 5 to 5.20 a slowly-waying band (brightness 1 to 2) ran from Triangulum through Andromeda, Cassiopeia, Cepheus, Ursa Minor. Draco, and Boötes. Traces only were seen at the next observation. At 7 to 7.20 a belt of quiet bands (brightness 0 to 1) ran from Taurus through Auriga, Gemini, Lynx, Ursa Major, Leo Minor, Cames Venatici, and Coma Berenices to Virgo. Only traces were seen at 8. At 9.17 there was a broad arch from the NW, to SE,, with its crown at an altitude of about 18°, and a broad, irregular, striated arch from the SE, to NNW, through Lyra, Draco, Ursa Major, Lynx, and Gemini tall brightness 0 to 1). This had faded to traces at 10.17. This aurora was probably a continuation of last night's, as it appeared highly developed at dark, and the magnetic disturbance still continued, though its violence was greatly abated.

March 4, 1883, 12.15 a, m, to 10.17 a, m,—Before the twilight was faded there was a faint arch in the NE., whose extremities bore ESE, and NW., with its crown at an altitude of about 20. At i a, m, there was a regular arched band (brightness I) in the NE, from ESE, in Leo through Coma Berenices, Boötes, Corona Borealis, Hercules, Lyra, and Cygnus, with streamers in Cygnus, which had developed at 1.15 into the upper band of a zone of three bands, passing through a Ursa Majoris. At 2 a. m. there was an extensive zone (brightness 1 to 2) starting ESE, in Leo and NNW, in Pegasus, with its eastern bands in the position of the aurora last noted, and the main body of the zone crossing the zenith, going only 3° or 4° west of Polaris. Here it began to wave and circle, while the band through n Ursae Majoris was now made up of short streamers, vibrating rapidly from E. to W., and slightly tinged with the usual colors. At 2.15 the main position still circling had reached α Aurigae in the W., and the belt of streamers had become a broad sinuous band in rapid serpentine motion from the SE,, again breaking into longer streamers, vibrating from NW, to SE. The western portion faded out in about five minutes, while the eastern subsided to quiet bands (brightness 1). At 3 a. m. nearly the whole sky was covered with hazy zone bands (brightness  $\theta$  to 1) from  $\alpha$  Lyrae to Orion's belt, thinnest near the zenith and most namerous in the W. At 3.15 to 3.20 these were condensed to a broad shifting band (brightness 2) from Leo  $(\beta)$  in the ESE, to Pegasus in the NW, through  $\gamma$  and  $\mu$  Leonis, Leo Minor, Lynx, Auriga, Perseus, and Andromeda. At 4 a. m. there were two well-defined arched bands (brightness 0 to 1) in the NE., the upper broad and the lower narrow, starting from Triangulum to Serpens through Pegasus. Cygnus ( $\varepsilon$  and  $\beta$ ), and Hercules, with much diffused luminosity, reaching up to the zenith. At 4.15 to 4.20 the bands were twisted and broken, with a few pale streamers in the ESE, soon disappearing, and evanescent twisted streaks near the zenith. At 5 to 5.20 one band ran from Aries through Triangulum, Andromeda, Cassiopeia, Cygnus, Lyra, Draco, Hercules, and Serpens, and another short band from Taurus through Auriga and Ursa Major (brightness 0 to 1). At 6 to 6.20 there were traces only in the S. At 7 to 7.20 a slowly waving band (brightness 1 to 2) ran from Taurus (brough Orion, Gemini, Cancer, Leo, and Coma Berenices. At 8 to 8.20 there was a ssing the zenith o 2). At 2,15 to ting bands were band was propa. d up again. At he whoic shot un ing exceedingly ness. It passed then on the east, ceedingly bright, especially bean. g the sky nearly ess 2), appearing ing and waving ddition a bright aking into lumiough the clouds: orightness 0 to 1) wly-waving band us, Ursa Minor, 0 a belt of oniet lajor, Leo Minor, 9.17 there was a broad, irregular,

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March 5, 1883, 12.15 a.m. to 8.20 a.m.—At 12.15 (about 7 a.m. local) there was a faint arch in the NE., with its extremities bearing ESE, and NE., and the crown at an altitude of about 45%. with streamers in the NW. At 1 a.m. a broad twisted band (brightness 1 to 2), shifting and waving, crossed from ESE, in Leo to NNW, in Pegasus through Leo Minor, Ursa Major, Lynx, Ursa Minor, Cassioneia, Cepheus, and Lacerta. It had drifted west to Auriga and Gemini at 1.15 to 1.20, and was brighter (brightness 2), and gradually spread towards the E., beginning to gyrate in the SE. in indistinct curtains. At 2 a.m. there was a rather narrow zone, with some of the bands approaching the curtain form from nearly the same starting points, broadest from  $\zeta$  Ursac Majoris nearly to a Aurigae, with the bright portion mostly NE, of the zenith, and waving somewhat. It was broader at 2.15 to 2.20, and not so bright (brightness 1), and the bands were closer together, with less motion. At 3 there was a very broad zone (brightness 1 to 2) from nearly the same starting points, in width from  $\alpha$  Lyra and  $\alpha$  Boötis to  $\alpha$  Canis Minoris and  $\alpha$  Tami, brightest on the eastern edge and in the part west of the zenith, with a slight waving motion. At 3.15 to 3.20 the edges had faded and all was slowly fading except the extreme NE, bend. From 4 to 4.20 there were remains of the aurora (brightness 0 to 1) in essentially the same position, which had nearly all faded, except the western band, at 4.20. At 5 to 5.20 a quiet band (brightness 2) ran through Taurus, Gemini, Orion, Cancer, Leo, Coma Berenices, and Boötes. At 6 to 6.20 a corona (brightness 1) covered nearly the whole sky, centering in Ursa Major, and in rapid motion. Faint traces of this still remained at 7 to 7,20, and traces were again seen in the NW, and SW, at 8 to 8,20, After this the weather became cloudy. The magnets were comparatively quiet all night.

March 6, 1883, 3 a. m. to 9.14 a. m.—The aurora may have begun a little earlier, as there was a bank of hazy stratus clouds in the NE., but the first that could be recorded with certainty was at 3 to 3.20, when there were ill-defined luminous patches in the E., partly obscured by clouds, followed by exceedingly faint vertical streaks, first one and then three, streaming up from the SE, towards the zenith with a better defined streamer close to the horizon in the NNW, at 3.20. At about 3.40 these had developed into a band (brightness 1) from the clouds in the ESE, across the zenith to α An aromedae in the NNW, which broadened into a zone, and at 4 to 4.15 was reduced to hazy traces about 30° in width near the zenith. These gradually became brighter in the SE, streaming up through Leo (β) to the zenith. At 5 to 5.20 only traces were observed, a little south of the zenith. At the next observation none was seen, but at 7 to 7.20 a quiet band (brightness 0 to 1), from Taurus through Orion, Gemini, and Leo. At 8 to 8.20 a. m. there were traces in NW, and SW. At 9.17 there was an arch from NW, to SE, with its crown about 20° above the southern horizon and traces in the NNW. No more was seen after this, though the sky was clear. There was a slight magnetic disturbance, beginning at 9 a m.

March 7, 1883, 12.15 a, m, to 10.17 a, m.—At 12.15 there were faint streamers in the E., which at 1 a. m. had developed into a twisted band of streamers (brightness 1), from ESE, in Hydra, through Leo, Lynx, Camelonardalis, and Cassioneia, swinging round into Perseus somewhat in the form of a corona, with slight motion. The band was in the same position, with a well-defined semi-corona SW, of the zenith, reaching into Auriga and Gemini, with the band extending down into Andromeda NNW., the whole soon fading. At 2 to 2.20 there was an arch of shifting streamers (brightness 0 to 1) in the SW., much obscured by haze and clouds, especially near the horizon, reaching an altitude of about 30°, and passing through Leo, Cancer, Gemini, and Taurus. At 3 a. m. there was a somewhat irregular corona, connected with the horizon by narrow streaks ESE, and NNW., and made of curtains (brightness 1 to 2) running round through Leo Minor, Lynx, Gemini, Taurus, Aries, Andromeda, Cassiopeia, Cepheus, Draco, and Ursa Major, surrounding hazy curdled streaks (brightness 0 to 1) about the zenith, with slight motion. At 3.15 to 3.20 only the western portion remained, forming a sort of zone, combined with a semi-corona, and slowly shifting. At 4 there was merely an ill-defined arch of streamers in the SW., which at 4.15 had become three or four shifting bands of curtains, flickering from the extremities towards the center (brightness 2 to 3), tinged slightly with the usual colors. This soon tose towards the

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zenith, at length forming a complete corona of curtains (brightness 1), elongated towards the horizon, and brighter (brightness 2) in ESE, and NNW., with considerable motion at 4.20. At 5 to 5.20 a band of streamers, in slow metion from W. to E., ran through Taurus, Auriga, Gemini, Cancer, Leo, and Virgo, with short, broad, quiet bands from Virgo through Boötes, Serpens, Corona Borealis, Coma Berenices. Canes Venatici, Leo Minor, and Ursa Major (brightness 2 to 3). At 6 to 6.20 a band (brightness 1) ran through Perseus, Cassiopeia, and Cygnus. At 7 to 7.20 only traces near the zenith were seen. At 8 to 8.20 there were several parallel bands in the S., 15° to 50° above the horizon (brightness 0 to 1). At 9.17 there was an arch in the S. (brightness 0 to 1) from SE, to NW., with an altitude of about 20°, with faint curtains in the N, and NE, and a few faint streamers centering towards the zenith. At 10.17 traces of the arch still remained, and other traces in the W., N., and near the zenith. There was a magnetic disturbance from 1 a. m. to 1 p. m., reaching its maximum at about 12 m.

March 8, 1883, 12.15 a. m. to 9.17 a. m.—The aurora was first noticed at 12.15 (about 7 p. m. local), when the twilight was still bright, as a band crossing from SE, to NW., passing about 200 SW, of zenith. In the next three observations there was much haze and hazy clouds, obscaring the stars. At 1 a.m. a broad shifting zone crossed the zenith from WNW, to ESE,, showing through the haze (brightness 1 to 2). At 1.15 to 1.20 it was narrower, and passed 15° to 20° SW. of the zenith. At 2 a. m. there showed through the hazy cloud in the SW, a regular arch (brightness 2), reaching an altitude of about 20°. This was gone at 2.15 to 2.20, and a hazy band crossed about 15° SW, of the zenith. At 3 a. m. there was a broad zone about 120° in width from SE, to NW, (brightness 1 to 3). It was brightest on the edges, especially in the W., where there was considerable motion and tinges of the usual colors, all obscured by the haze. At 3.15 to 3.20 ii was mostly confined to the NW., where it formed bright shifting loops, with their convexity towards the zenith. At 4 a broad waving and shifting zone crossed the zenith (brightness 1 to 2) from a broad origin, NNW, to NW, by N., to ESE., the starting points in Virgo and Andromeda, Triangulum and Aries, the eastern edge passing through Coma Berenices, Canes Venatici, Ursa Major, Ursa Minor, and Cassiopeia, and the western through Leo Minor, Lynx, Auriga, and Perseus, with an arched yellow band (brightness 2 to 3) to the NE. through Cygnus (a), Lyra (a), Corona Borealis, and Virgo. At 4.15 to 4.20 it was in nearly the same position, but fading and shifting. The eastern edge of the zone appeared fimbriated. At 5 to 5.20 a slowly waying band (brightness 1 to 2) ran through Taurus, Auriga, Ursa Major, Canes Venatici, Coma Berenices, Boötes, Corona Borealis, and Draco. Traces only were observed at 6 to 6.20. At 7 to 7.20 bands and patches (brightness 0 to 1), without motion, covered the southern half of the sky. These had faded to mere traces near the southern horizon at 8 to 8,20. And traces only in the SW, and N, were seen at 9,17. None were seen at the next observation, but the sky then became cloudy, so that the end cannot be determined with certainty. A magnetic disturbance commenced about 3 a. m., and continued the rest of the night, reaching its greatest violence at about 9 a. m.

March 9, 1883, 1.15 a. m. to 6.20 a. m.—Very early in the evening, while the twilight was still bright, a patch of aurora appeared in the SE, near the horizon, but soon disappeared, and no definite aurora was seen till 1.15 to 1,20, when indistinct horizontal bands appeared in the NE., beginning gradually to develop in the ESE. At 2 a. m. a barely perceptible band crossed the zenith from ESE, to NNW., through Leo, Ursa Major, Camelopardalis, and Cassiopeia, and was in nearly the same place at 2.15 to 2.20, beginning to shift a little towards the W. At 3 a kezy band (brightness 1) ran from the ESE, in Virgo to the NNW, in Andromeda through Leo, Ursa Major (a and தி, Camelopardalis and Cassiopeia, which at 3.15 to 3.20 was paler, and sent a band through Cancer, Taurus, and Aries. At 4 a.m. there were merely traces in nearly the same position, but at 4.15 to 4.20 there was a hazy band nearly 1 in brightness starting close to  $\alpha$  Virginis in ESE, through  $\delta$ , Leo (3 and 8), Leo Minor, Lynx, Auriga, and Perseus, ending in a series of short, ill-defined streamers in Andromeda NNW. At 5 to 5.20 a quiet arch (brightness 1) ran from Taurus, through Orion, Gemini, Leo, and Boötes. At 6 to 6.20 there was a bright corona (2 to 3), centering in Ursa Major, on the edges vibrating rapidly from W. to E., and in the center whirling rapidly. Traces were seen at the next two observations. The magnets were quiet until about 12 m., when there was a violent disturbance, lasting only three hours, and reaching its maximum at 1 a.m.

March 10, 1883, 1.30 a.m. to 9.17 a.m.—Evanescent traces were noticed in the N. about 4.30 a.m.,

towards the tt 4.20. At 5 triga, Gemini, sites, Serpens, intness 2 to 3). At 7 to 7.20 ands in the S., S. (brightness and NE, and till remained, rbance from 4

about 7 p. m. ing about 200 ds, obscaring SE., showing 5° to 20° SW. arch (brightband crossed h from SE, to ere there was 3,15 to 3,20 it exity towards 1 to 2) from a omeda, Triani. Ursa Major, Perseus, with rona Borealis, ng. The east-(htness 1 to 2) rona Borealis, es (brightness re traces near t 9.17. None nd cannot be

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and again at 2 a. m. in Cygnus in the YW. At 2.15 to 2.20 there was a zone of three shifting bands (brightness 0 to 1) in the NE., through Cygnus, Lyra, Corona Borealis, and Boötes (a) into Virgo. At 3 to 3.20 there was a broad zone, shifting and changing in brightness from 0 to 1 to 1 to 2, crossing the zenith from ESE, in Virgo to NNW, in Pegasus, reaching in breadth from  $\beta$  and  $\gamma$ Diraconis nearly to \alpha Auriga. At 4 a. m. two bands (brightness 1 to 2) ran from the ESE, in Virgo to the NNW, in Andromeda, through Boötes, Corona Borealis, Draco (# and p), and Hercules, with a bright patch growing hazy and fading out towards the zenith in the NW., occupying Andromeda, Perseus, and Cassiopeia. This had developed at 4.15 to 4.20 into a broad, shifting zone (brightness 1 to 2), starting from the same point in the NNW, and forming a much convoluted mass in the E. in Aquila and Boötes, while the western edge ran through Boötes, Ursa Major, Ursa Minor, Camelopardalis, and Cassiopeia. At 5 to 5.20 a.m. a quiet band (brightness 1) ran from Aries through Triangulum, Andromeda, Cygnus, Lyra, Hercules, and Corona Borealis. At 6 to 6.20 the band was in nearly the same position, but brighter (1 to 2), and had a few streamers in Corona Borealis. At 7 to 7.20 there were merely traces in the N. and NE. At 8 to 8.20 a broad band (brightness 0 to 1) crossed the zenith from Orion to Aquila, through Auriga, Lynx, Ursa Major, Draco, and Hercules. At 9.17 a.m. there was a broad diffused arch in the south from ESE, to WNW., reaching an altitude of about 200, and a faint corona clongated from E. to W., occupying Cygnus, Ursa Minor, Lynx, Gemini, Lyra, Draco, and Ursa Major, and a short arch from E. to N., passing into Cassiopeia (brightness of all 0 to 1). There was a slight magnetic disturbance, lasting from 9 a. m. to 2 p. m.

March 11, 1883, 2 a. m. to 9.17 a. m.—Traces in the ESE, began to assume a definite form at 2 a. m., faint streaks streaming up to Virgo. At 3 a. m. the streak was very small, but at 3.15 to 3.20 better defined and longer, reaching into Boötes and Corona Borealis. At 4 a. m. a broad, hazy, striated band, almost a zone (brightness 1), ran from ESE, in Virgo to NNW, in Andromeda, through Coma Berenices, Canes Venatici, Ursa Major, Camelopardalis, and Perseus, and had drifted W. at 4.15 to 4.20 so as to pass through β and δ Leonis and Auriga. This had expanded into a broad zone at 4.45, but again contracted to a band at 5 to 5.20, crossing the zenith from cancer through Gemini, Auriga, Lynx, Camelopardalis, Ursa Major, Draco, Lyra, and Hercules. At 6 to 6.20 there were merely traces in the S.—At 7 to 7.20 a band of streamers (brightness 1 to 2), vibrating rapidly, passed from Taurus through Perseus, Cassiopeia, Cepheus, Cygnus, and Lyra. At 8 to 8.20 extensive traces crossed the southern sky. At 9.17 there was an arch in the 8. from SE, to NW., reaching an altitude of about 20°, with a short streamer in the NW, and traces of an arch running from ESE, to WNW, through Lyra, Draco, Ursa Major, and Lynx (brightness 6 to 1). There was a magnetic disturbance between 7 and 11 a. m., reaching its maximum at about 8 a. m.

March 12, 1883, 3.40 a. m. to 9.17 a. m.—At about 3.40 a. m. (10.30 local time) there were three or fear faint streamers in the N. in Andromeda and Cygnus, but at the regular observation at 4 a. m. the sky was too cloudy to allow any to be seen. At 4.15 traces of a pale zone or clongated corona could be seen through the clouds, but at 5 to 5.20 the sky was sufficiently clear to display a quiet band (brightness 0 to 1) from Boötes, through Canes Venatici, Ursa Major, and Lynx, to Auriga. Traces were seen in the S. at 6 to 6.20. The sky was partially cloudy at the next two observations, but clear enough at 9.17 to show an clongatêd corona (brightness of 1), longest from SE. to N. W., where it reached the horizon, centering at the zenith, and made up of a long, slender ray, with slight motion, about 40° long on the sides of the corona. Increasing light and clouds prevented observation of the end of the aurora. The needles were slightly disturbed from 9 to 10 a. m.

March 13, 1883, 1.10 a. m. to 9.17 a. m.—The weather was cloudy early in the evening, but between 1 and 1.15 a. m. disclosing a brilliant display in the western sky still bright with the twilight in the form of an arch of short streamers vibrating from the extremities towards the crown. The ends bore NW, and S. about 20° above the horizon, while the crown reached an altitude of 35° close to a Tauri, while below the arch were irregular curtains, the whole tinged with the usual colors (brightness 2). The streamers suddenly fused together and the motion became rapid, bright colors—particularly rose—developed in the S. with rapid changes of color and brightness, becoming a broad zone of bands and curtains in very rapid motion (brightness 2), and in a few seconds reached the zenith and passed it, forming a semi-corona, and faded to hazy bands

covering nearly all the sky. In about two minutes it began to develop again in the NW., reaching brightness 3, with bright colors and rapid motion in Cassiopeia, and some reached the zenith. forming an elongated corona of curtains in very rapid motion in several concentric rows rapidly fading. At 2 a. m. a band of short streamers ran from  $\alpha$  Hydrae through Orion's belt to the clouds in the NW, while there was a broad hazy band just above this, and one long semi-corona the western half of which was a broad, sinuous band, the eastern a fan of streamers, the longest about 30°, near the zenith, centering about the middle of Camelopardalis and extending from Leo in the ESE, to Cassiopeia in the NW. The streamers were replaced by a hazy band at 2.15 to 2.20, with traces of the corona which were gradually growing more distinct (brightness of all 0 to 1). At 3 a. m. there were three hazy arched bands in the SW,, and a narrow zone from the clouds in the ESE, to Cassioneia NNW, in breadth, from \(\lambda\) Draconis to \(\alpha\) Aurigae, with a semi-corona E, of the zenith, mostly in Bootes, Canes Venatici and Ursa Major (brightness 1). At 3.15 to 3.20 there were only traces of the zone and corona, while the bands in the SW, were less distinct (brightness 0 to 1). At 4 a m there was a wavy broad zone (brightness 1 to 2) brightest on the eastern edge. with the starting points near  $\alpha$  Virginis in the ESE, and  $\alpha$  Arietis in the NW., with the western edge close to the hozizon and the eastern through Corona Borealis, Draco, Cepheus, Cassioneia and Andromeda, composed of bands and curtains, with some motion on the eastern edge. At 4.15 to 4.20 all was west of the zenith (brightness 1) and rapidly fading from above towards the horizon. At 5 to 5.15 a band of curtains and streamers rapidly vibrating and waving (brightness 1 to 2) ran from Andromeda through Lacerta, Cygnus, Lyra and Hercules. At 6,20 a band (brightness 0 to 1) ran from Gemini to Lynx and Ursa Major. At 7 to 7.20 there were traces only in the SW. At 8 to 8.20 the sky was nearly covered by a corona centering in Ursa Major and extending to a band about 15° to 20° above the horizon. There was no motion near the zenith, but a few bands of streamers in the N. and NW. (brightness 2 to 3), in Auriga and Cassiopeia, were vibrating very rapidly. The last faint traces were seen in the NW, at 9.17. The needles were disturbed from 1 to 8 a. m., the disturbance reaching its maximum at the last hour.

March 14, 1883, 1.15 a. m. to 9.17 a. m.—At about 1.15 a. m. there was noticed a faint, narrow. quiet arch in the NE, from ESE, to NNW, just below ε Cygni through Boötes (close to a), Corona Borealis  $(\alpha)$ ,  $\alpha$  Lyra and Cygnus; at 1.20 rising and changing into streamers in the NNW. At 2 a. m. there was a narrow, indistinct, hazy zone from ESE, in Virgo to NNW, in Andromeda. stretching in breadth from  $\delta$  Ursæ Majoris to  $\alpha$  Persei. This at 2.15 to 2.20 was wholly W, of the zenith, occupying Andromeda, Perseus, Cassiopeia, the upper part of Taurus, Auriga, Gemini and Leo (brightness 0 to 1). At 3 a.m. there was a broad zone of two chain bands, about 300 apart (brightness 2), starting in the ESE, in Virgo and the NNW, in Aries, and extending from the middle of Camelopardalis near the zenith to about 2° below a Canis Minoris and the SW., altitude about 25°, with a slight waving motion in the ESE. At 3.15 to 3.20 it was not so bright (brightness 1) and the western edge was unchanged, but the whole had spread E, so as to cover nearly the whole sky to within 10° of the horizon in the N.E., and was very sinuous in the N. At 4 a.m. there was a hazy loop in the N. and NE. (brightness 1) from Aries near a through Triangulum, Andromeda, Cepheus  $(\alpha)$  and Draco, bending back near  $\theta$  Draconis through Herenles  $(\epsilon)$ , Lyra (β), Cygnus, and Andromeda. At 4.15 to 4.20 there were pale traces of the loop from Aries up through Cassiopeia towards the zenith, with a regular arch in the SW, from ESE, near a Virginia to the moonlight in the NW., with its crown near \alpha Hydra, and a belt of three or four bands in the NE., from N. to E., with its crown near \(\beta\) Cygni (brightness 0 to 1). At 5 to 5.20 a. m. a quiet band (brightness 0 to 1) ran from Taurus through Perseus, Andromeda, Cassiopeia, Cepheus, Cygnus, Lyra and Hercules. At 6 to 6,20 auroral bands covered nearly the whole sky. The brightest part was in the N. and NE, where it had a rapid motion. Round the zenith were only a few faint, quiet bands (brightness 1 to 2). There were extensive traces at 7 to 7.20, and slight graces in the S, at 8.20. Traces of an arch in the SW., from SE, to NW., reaching an altitude of about 18°, with a faint trace in the NNW., could be seen at 9.17. There was a magnetic disturbance from 3 to 9 a.m., reaching its maximum about 6 a.m.

March 15, 1883, 1.15 a, m, to 8.17 a, m.—There were traces of a faint arch in the ESE, while the twilight was still bright, coming up from near the herizon to α Boötis. The traces continued till 3.15 to 3.29, when there were bands of pale light from Pegasus through Cygnus, Lyra and Her-

NW., reaching d the zenith. c rows rapidly t to the clouds mi-corona the longest about om Leo in the 5 to 2.20, with 0 to 1). At 3 clouds in the rona E. of the to 3.20 there et (brightness e eastern edge. th the western us, Cassioneja edge. At 4.15 ls the horizon. iess 1 to 2) ran rightness 0 to the SW. At ding to a band few bands of

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faint, narrow, s (close to  $\alpha$ ), s in the NNW, n Andromeda. olly W. of the a, Gemini and out 30° apart ling from the SW., altitude right (brighto cover nearly N. At 4 a. m. Triangulum. ules (a), Lyra from Aries un ear a Virginis four bands in 0 a. m. a quiet eia, Cepheus, de sky. The ith were only 20, and slight an altitude of netic disturb-

SE., while the continued till yra and Herenies. At 4.20 there was a brighter arch (brightness 1 to 2) from the E. to N. through Hercules, Draco, Cepheus, Cassiopeia and Andromeda, with traces in Perseus, Aries, Corona Borealis, Ursa Major and Lynx. At 5.15 to 5.20 a broad band, waving slowly, ran from Auriga through Camelopardalis, Ursa Minor, Cassiopeia, Cepheus, Lacerta, Cygnus, Lyra and Hercules (brightness 1 to 2). At 6.17 there was a broad curtain (brightness 2 to 3) from Sagitta in the E. through Cygnus and Cassiopeia, with streamers centering towards the zenith, and a broad band from the northern extremity of the curtain to Ursa Major, with a slight vibration. At 7.15 to 7.20 a quiet band (brightness 1) ran from Leo through Coma Berenices and Boötes. The last aurora seen was a quiet arch (brightness 0 to 1) at 8.17 in the SW., from SE. to NW., reaching an altitude of about 5.50. There was a magnetic disturbance, affecting almost solely the horizontal force, between 5 and 6 a. m., reaching its maximum about 5.30.

March 16, 1883, 1 a. m. to 9.17 a. m.—At 1 a. m. there was an arch in the NE. (brightness 0 to 1) with one end near the horizon ESE, and the other in the twilight NNW., running just above  $\alpha$  Boötis, Corona Borealis and Lyra (\(\beta\)). At 1.15 this was rising rapidly and soon formed a narrow zone across the zenith again narrowing into a sinuous band (brightness 1) through Leo (a), Lynx, Camelopardalis, Cassiopeia and Andromeda. At 2 a. m. there was a broad zone with its starting points ESE, in Virgo and NNW, in Andromeda, extending in breadth from B Tauri in the SW., to n Ursa Majoris in the NE. The western band was the brightest reaching brightness 2, while the rest was pale and hazy (brightness 0 to 1). At 2.15 to 2.20 the ESE, starting point had spun out over about 20° in azimuth, forming a broad patch of very sinuous and, as it were, cardled streamers, while the eastern edge passed through Boötes, Corona Borealis, Hercules, Lyra  $(\beta)$  and (vgnus  $(\varepsilon)$ ). The whole zone was rather broken and not so bright (brightness 1 to 2). At 3 a, m, it had all faded to traces except the easternmost band, which ran through Hercules, & Lyra and ε Cygni, and was still paler at 3.15 to 3.20. At 4 a, ια, there was no aurora, but at 4.40 faint traces appeared in the NW., developing into a very transitory band across the zenith from NW, to SE. No more was seen till 9.17 a. m. when there were faint traces in the NW. The needles were somewhat agitated at the time of the aurora without any larger disturbance.

March 17, 1883, 3.15 a. m. to 9.20 a. m.—At 3.15 to 3.20 there was a faint, arched streak from hear the horizon ESE, in Virgo up through α Corona Borealis. This soon rose and formed a zone, which from 4 to 4.20 had a brightness 1 to 2, starting ESE, in Virgo, and NNW, in Andromeda, occapying Boötes, Canes Venatici, Ursa Major, Cameleopardalis, Auriga and Perseus. It was very simuous in the ESE, shifting and changing form and brightness, and rather yellow in color, At 5.15 to 5.20 it had faded to a band (brightness 0 to 1) from Orion through Gemini, Lynx, Ursa Major, Canes Venatici and Boötes. At 6.15 to 6.20 a quiet zone (brightness 1) crossed the zenith from WNW, to ESE, from Taurus through Auriga, Gemini, Lynx, Camelopardalis, Ursa Minor, Draco and Hercules. There were traces only at 7.15 to 7.20 a little south of the zenith. No more was seen till 9.20 when there were traces of an arch from SE, to NW, through Corona Borealis, Ursa Major, Lynx and Auriga. The magnets were unusually quiet all night.

March 18, 1883, 4.40 a. m. to 9.17 a. m.—At 4.40 a. m. (11.30 p. m. local) a very faint, narrow band stretched across the zenith from ESE. to NW., through Ursa Major, Camelopardalis, Auriga, and Perseus indistinct towards the horizon. At 5 to 5.20 there was a rather indistinct short band in the ENE, from Hercules to Lyra. At 7 to 7.20 a slowly waving band (brightness 0 to 1) ran from Leo through Coma Berenices, Boötes, and Serpens. At 8 to 8.20 a band of streamers waving slowly like a curtain from E. to W. ran from Perseus through Cassiopeia, Andromeda, Lacerta, and Cygmus, and two quiet bands nearly parallel extended from Aquila through Hercules, Corona Borealis, Boötes, Canes Venatici, Ursa Major, and Leo (brightness of all 1 to 2). At 9.17 there were traces in the W. The magnets were slightly disturbed from 8 to 9 a. m.

March 19, 1883, 4.40 a, m. to 6.20 a, m.—At 4.40 a pale band (brightness 0 to 1) could be seen crossing the zenith with its extremities some distance from the horizon ESE, and NW., passing through Boötes, Canes Venatici, Ursa Major, Camelopardalis, and Perseus. At 5 to 5.20 a similar band passed west of the zenith from Serpens through Boötes, Coma Berenices, and Leo. At 6 to 6.20 a band of streamers in rapid vibration (brightness 1) ran from Orion through Taurus, Perseus, Andromeda, Cassiopeia, Lacerta, and Cygnus. The needles were slightly agitated at the time of the aurora

March 20, 1883, 4.40 a. m. to ———.—At 4.40 a. m. a faint streak was observed in the ESE. coming up from Virgo through Boötes towards the zenith. This soon faded and no more was observed. Clouds, however, interfered with observation later in the night. The magnets were very quiet.

March 21, 1883, 1.15 a. m. to 9.17 a. m.-The twilight was still very bright at 1.15 (8 p. m. local) showing only the larger stars, when bright, shifting streamers began to appear 80 or 100 above the horizon ESE,, then shooting up as a band through Leo and Taurus, then forming several broad sinuous bands in Leo, which rose to the zenith and formed an elongated corona rendered indistinct by the twilight. At 2 a.m. there was a sinuous band (brightness 1 to 2) in the ESE,, running up from Virgo into Boötes and Corona Borealis, and a broad hazy zone across the zenith from the twilight in the NNW. to the moonlight in the ESE., occupying Andromeda, Cassiopeia, Perseus, Auriga, Camelopardalis, Ursa Minor, Ursa Major, and Leo. At 2.15 to 2.20 the zone was in essentially the same position, but shifting and changing from a zone to a twisted band and back again, and moving slowly westward. At 3 a. m. an area of curtains (brightness 2) rapidly developed from the NW., consisting of three or four shifting rows from Andromeda to Hydra and from near the SW, horizon to Auriga, slightly tinged with the usual colors. At 3.15 to 3.20 there was a band of curtains from Libra through Hercules,  $\alpha$  Lyrae, and  $\alpha$  Cygni, waving from E. to N. and developing a large patch in Lyra and a few bands in the place of zone at 2 a. m., which quickly developed a small faint corona and all rapidly faded. At 4 a. m. there was a similar band of curtains in the NE., partly obscured by clouds. At 4.15 to 4.20 there appeared faint bands and streamers in the N. and NE, mixed with patches of cloud. Clouds interfered with observation at the next two hours, but it had cleared at 7.15 to 7.20, and showed a quiet band (brightness & to 1) from Aquila through Pegasus, Andromeda, and Perseus from E. to NNW. At 9.17 there was a corona of long slender rays centering towards the zenith, waving slightly. The needles began to be agitated at the first sign of the aurora, and the disturbance continued all night, reaching its maximum at 3 p. m.

March 23, 1883, 1 a.m. to 8.20 a.m.—At 1 a.m., while the daylight was still very bright, so that only the largest stars were visible, there was a white, sinuous, shifting streak in the E. near Arcturus. At 1.15 a.m. there was one arched band in the E. through Arcturus and Virgo, and a twisted, shifting band across the zenith from SE. to NW., soon fading, and extensive patches developing in the E. At 2 a.m. a rather narrow, shifting zone, waving slowly, crossed the zenith from the ESE, in Virgo to NW. in Andromeda through Boötes, Canes Venatici, Ursa Major, Ursa Minor, Cepheus, Cassiopeia, Perseus, and Andromeda, and two arched sinuous bands in the NE., the upper through Corona Borealis, Hercules,  $\alpha$  Lyra, and  $\alpha$  Cygni, and the lower near the horizon. At 2.15 to 2.20 the zone had shifted W. nearly to  $\alpha$  Auriga, fading gradually, while a new zone developed the former place and bands in the E. shifted. Clouds interfered with the next three observations, and, though the sky then cleared, no more aurora was seen till 8.15 to 8.20, when a yellowish band (brightness 1), waving slowly, ran through Leo, Leo Minor, Ursa Major, Canes Venatici, Draco, and Cygnus, sending up a few rapidly vibrating streamers in Cygnus. The magnets were disturbed from 7 a, m. to 2 p. m., the maximum disturbance being at 8 a, m.

March 24, 1883, 1.45 α, m. to 3.15 α, m.—The twilight was still bright at 1.45, but a well-defined arch (brightness 1) was observed running through Boötes (just above α), Corona Borealis, Hercules, Draco, and α Cygni, and rising rapidly. At 2 a, m. a broad yellowish band (brightness 1 to 2), fringed on the upper edge, with ill-defined streamers, lay in the NE., passing through Canes Venatici, the tail of the Great Bear, Draco, and Cygnus to the twilight in the NW. This had risen at 2.15 a, m. to form a narrow zone (brightness 1) from the ESE, to NW, through Canes Venatici, Ursa Major, Ursa Minor, Draco, Cepheus and Cassiogen to Andromeda. Three or four ill-defined rolling curtains developed quickly from the E, towards the N., with rapid, quivering motion propagated in the same direction through Boötes, Corona Borealis, Hercules and Lyra, reaching a brightness of 2 to 3 in Boötes in the E, with a bright display of green, yellow, and rose in the usual order, quickly quieting down and growing paler, while the zone widened in both directions to about twice its usual width and growing hazy, and then developing a waving motion on the western edge. At the next observation the clouds already so obscured the aurora that traces

in the ESE, no more was nagnets were

1.15 (8 p. m. ear 80 or 100 then forming gated corona ess 1 to 2) in y zone across Andromeda, t 2.15 to 2.20 to a twisted brightness 2) ndromeda to ors. At 3.15 ygni, waving f zone at 2 a. . there was a ere appeared terfered with a quiet band o NNW. At lightly. The ued all night,

right, so that ear Arcturus, and a twisted, es developing with from the Ursa Minor, E., the upper zon. At 2.15 one developed arce observan a yellowish matici, Draco, eets were dis-

well-defined lis, Hercules, tness 1 to 2), rough Canes 7. This had rough Canes Phree or four id, quivering es and Lyra, low, and rose in both direcing motion on a that traces of an arch were alone visible in the E. The clouds prevented further observation entirely. The needles were quiet, with a high horizontal force.

March 26, 1883, 1.15 a. m. to 5.29 a. m.—It was still broad daylight at 1.15, but a perturbation of the magnets indicated an aurora, which was seen on leaving the observatory as a pale, shifting, simuous band from rear the horizon ESE, and passing up about 20° E, of the zenith. At 2 a. m. a narrow zone (brightness 1 to 2) ran from the ESE, in Virgo to the twilight in the NW., through the sickle of Leo, Gemini, Taurus, and Aries. At 2.15 to 2.20 this had spread eastward to within about 10° of the eastern horizon, broken up into sinuous bands and curtains, brightest in the E. and N., whirling curtains in the E. and a vertical loop in N., quickly developing into an arched hand and again bearing a loop with rapid motion, both waving and vibrating, and showing rather bright colors—green, yellow, and rose—the green especially appearing against the twilight. At 3 a. m. there was a broad zone of ter bands (brightness 2) with its starting points in Virgo ESE., and NW, in Aries, extending in breadth from Procyon to Polaris. It was in essentially the same place at 3.15 to 3.20, but there were more bands, shifting, broken, and hazy, some approaching the form of curtains, growing paler and then brighter again, especially in the ESE., where the bands were very sinuous. Clouds interfered with observation the next bour, but traces were seen in the W. At 5.15 to 5.20 a band (brightness 1) ran from Serpens through Boötes, Coma Berenices, Leo, Cancer, Gemini, and Orion, with a few quiet streamers in Serpens and Boötes. The magnets were disturbed all night.

March 27, 1883, 2.15 a. m. to 6.20 a. m.—The sky was covered with hazy clouds at 2 a. m., but these were sufficiently thin at 2.15 to 2.20 to show traces of a narrow band across the zenith from the NW, to SE. At 3 a. m. there were three or four bands, obscured by the hazy clouds lying low in the SW., passing through Virgo, the lower part of Leo, into Canis Minor and Taurus (brightness 1). The position of these bands was practically unchanged at 3.15 to 3.20, but the upper band was broadened and fringed out into ill-defined streamers, while the lowest was narrow and bright. All were shifting and changing in brightness (brightness 1 to 2) and bright streamers developed in the SE. At 3.15 there was a large, complete, and quiet regular corona (brightness 1), of about 40° radius, centering in Ursa Major, near the zenith, with a broad band on the western edge and twisted shifting streaks near the center. This had become a broad zone at 4 a, m., partly obscured by the clouds (brightness 1 to 2) from the NW, to SE., extending in breadth from the lower edge of Draco to Procyon, and at 4.15 to 4.20 had again become a corona, but more incomplete and elongated, running down towards the horizon in the E., with a bright (2 to 3) and quiet regular arch in the W., with an attitude of about 25°. All shifted rather rapidly, with a loop in the NW. (altitude about 35°), increasing in brightness 2 to 3, and finally all settling into a broad zone. At 5 to 5.20 quiet bands (brightness 0 to 1) were visible through the dense haze running through Coma Berenices, Canes Venatici, Ursa Major, Leo, Lynx, Cancer, and Gemini. At 6.15 to 6.20 there was a bright coroua (brightness 2 to 3) centering in Ursa Major. The streamers were very short in the N., not reaching the zenith. The edge of the corona was in Serpens, Boötes, Orion, Gemini, Auriga, Lyax, Hydra, and Leo, all in rapid motion from E. to W. Clouds then interfered more or less with observation, rendering it impossible to determine the end of the aurora. A violent magnetic disturbance commenced about 3 a. m. and still continues.

March 28, 1883, 2 a. m. to 6.20 a. m.—At 2 a. m., partly obscured by the clouds, there were bands coming up from the ESE. At 2.15 to 2.20 there was a bright arched band (brightness 2 to 3) in the SW. from the ESE., in Crater through Hydra  $(\alpha)$ , Monoceros and Orion  $(\gamma)$ , narrow and curling down in the NW. It was bright yellow, shading into rose on the lower edge, flickering slightly, and then developing rapid motion in the NW and rising at the same time to  $\alpha$  Canis Minor is, broadening at the same time, while a second and then a third bard above this and only about half as long developed from the ESE., and then growing paler and sinking. At 3 a. m. the whole sky was covered with broad hazy bands and curved patches running NW, and SE. At 3.15 to 3.20 there was a loop in the N. and NNE, from Aries, through Andromeda into Cygnus, shifting and rising, while a broad hazy band developed from the NW. to SE, across the zenith, and with the loop formed a semi-corona E, of the zenith, much elongated, and then becoming a band of streamers (brightness 2 to 3) from Aries through Andromeda, Cassiopeia, Cepheus, Draco, and Corona Borealis and then curving back through Lyra, vibrating rapidly from E, to N., rising

towards the zenith, and splitting. At 4 a. m. there was a broad zone from ESE, to NW, (brightness I) made up of coronal streamers east of the zenith, not reaching lower than Cepheus, while all the western sky was covered. At 4.15 to 4.20 there was a zone of four main bands (brightness I to 2) from the SW, horizon nearly to the zenith, with the same starting point, but curving back in the E, through Aquila. The upper band was edged with short streamers, and long streamers began to develop in the E, At 5 to 5.20 the whole sky was covered with quiet bands (brightness 0 to 1) running WNW, to SE. At 6.15 to 6.20 there were traces of a great corona covering the sky. No more was observed. Yesterday's magnetic disturbance continued.

March 29, 1883, 3.45 a. m. to 8.15 a. m.—The aurora was only observed at intervals of fair weather during the night. At 3.45 broad bands in the W. suddenly shot up to the zenith, with rapid vibration and play of colors, and formed a corona, apparently covering the whole sky. At 4 a. m. the corona still persisted, and surrounded by belts of curtains covered nearly all the sky (brightness 1 to 2). It was partly obscured by clouds and haze, but appeared to be in motion, suffting and waving with rapid vibration in the NE., and bright yellow patches showing through the clouds. It had partly faded at 4.15 to 4.20, and was much obscured by haze and clouds. Traces only were seen at the next hour. The sky was clear enough at 7.15 to 7.20 to show quiet bands (brightness 1), forming a zone, occupying Orion, Taurus, Gemini, Perseus, Andromeda, Lynx, Ursa Major, Cassiopeia, Cepheus, Boötes, Corona Borealis, Lacerta, Cygnus and Lyra, Traces were visible at 8.15. The needles were quiet up to 4 a. m., when a violent disturbance commenced and still continues.

March 30, 1883, 7.15 a. m. to 7.20 a. m.—The sky, which had been cloudy all night, cleaned about 7.15 a. m., displaying a slowly waving band from Gemini through Lynx, Ursa Major, Canes Venatici and Boötes (brightness 0 to 1). The needles were somewhat disturbed from 4 a. m. to 1 p. m.

April 2, 1883, 2.15 a. m. to 7.20 a. m.—There were traces of a band in the ESE, at 2.15, which at 3 a. m. had developed into a broad hazy zone from the ESE, in Virgo, fading in the twilight in the NNW, reaching in breadth from θ Ursa Majoris to β and β Draconis. This had condensed at 3.15 to 3.20 to a broad based in the SW, through Virgo, Hydra, Leo, Gemini, Cancer, Canis Mine γ the upper part of Orion and Taurus, and beginning to shift and break (brightness 1). At 4 a. m. there was a broad, ill-defined, sinuous band in the NE, from near α Serpentis, through Heredies, Lyra and Cygnus, into Pegasus, and a hazy band starting from the same place, running through Boötes, Canes Venatici, Ursa Major, Lynx, Auriga and Perseus (brightness 0 to 1), and all had faded to traces at 4.15 to 4.20 except the band in the E, and this even had become traces at 5 to 5.20. At 6.15 to 6.20 a belt of slowly waving bands, with a few patches of streamers in Aquila, ran from Taurus, through Auriga, Perseus, Andromeda and Cassiopeia, to Cygnus (brightness 1). At 7.15 to 7.20 there was a short band from Ursa Major to Boötes in slow motion from W, to E, and a rather motionless band from Perseus and Cassiopeia to Cepheus (brightness 0 to 1). A magnetic disturbance commenced at 3 a. m., and was not over when the aurora ended, reaching its maximum at 12 m.

April 3, 1883, 1.45 a. m. to 7.20 a. m.—A slight agitation of the needles indicated aurora, which appeared at 1.45 as very faint, evanescent white streamers in the ESF., while the daylight was still bright. There was none to be seen at 2 a. m., but at 2.15 there were traces of bands high in the SW. These had developed at 3 a. m. into a narrow hazy zone W. of the zenith from ESE., in Virgo, to the twilight NW., occupying Leo, Cancer, Gemini, Auriga and Taurus, which had risen at 3.15 to 3.20 to Ursa Major, while what had been simous bands in Scrpentis in the E. began to develop into curtains (brightness 1), with waving hadion. The whole sky was covered at 4 a. m. with a sort of elongated corona, approaching the horizon in the ESE, and NW., and extending from below Procyon, in the SW., to α Cygni and α Lyrae in the NE. (brightness 0 to 1). It was made up of rather sparsely scattered bands, rows, and curtains, which lattice were best devel oped and brightest in the S, and SE, with some motion. It was broken and paler, reaching nearly to the SW, horizon, about 10° higher in the NE, where it consisted of long streamers. This was attended with considerable magnetic disturbance. At 5 to 5.20 there was a corona, curling in Ursa Major, with long streamers, reaching to the horizon in the E, and W. They were not so bright in the S,, and only reached the zenich in the N. The whole was quiet (brightness 0 to 1),

SE, to NW. ian Cepheus. main bands ng point, but reamers, and ed with aniet es of a great ce continued. ervals of fair e zenith, with iole sky. At ly all the sky be in motion, wing through and clouds. o show quiet Andromeda.

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ated aurora, the daylight of bands high a from ESE., s, which had the E. began covered at 4 and extends 0 to 1). If we hest devel ching nearly s. This was a, curling in were not so ness 0 to 1), and continued unchanged at 6.15 to 6.20. At 7.15 to 7.20 there were only left traces of long streamers in the S., all running to Ursa Major. The magnetic disturbance still continued at 9 p. m.

April 4, 1883, 1.45 a. m. to 7.20 a. m.—At 1.45 the daylight was still bright, and an exceedingly faint band appeared in the ESE, extending towards the NW, about 10° west of the zenith. None was to be seen at 2 a. m., but at 2.15 to 2.20 there were traces in the ESE, gradually developing into very pale shifting curtains across the SW, beginning to wave rather rapidly in the S. At 3 a. m. there was a broad shifting lazy zone across the zenith from ESE, in Virgo to the NW, with the western edge in Hydra, Canis Minor and Orion, and its eastern in Boötes, Ursa Major, Draco, Cepheus, Cassiopeia and Perseus (brightness 0 to 1). This had faded to traces at 3.15 to 3.20, except some brighter bands in the E, through Serpens, Aquila, and the lower part of Cygnus, quickly rising to α Lyrae and instantly fading. At 4 a. m. traces of the zone were to be seen and a patch of ill-defined curtains (brightness 1 to 2) in Cygnus and Andromeda, NNE., with a bright long streamer or two. All had faded to traces at 4.15 to 4.20, but curtains were beginning to develop in the NNW. At 5.15 to 5.20 there was a band of slowly vibrating streamers (brightness 1) from Taurus through Auriga, Perseus, Cassiopeia and Cepheus. At 6.15 to 6.20 there was a quiet band (brightness 0 to 1) through Gemini, Lynx, Ursa Major and Boötes. Traces alone remained at 7.15 to 7.20. The magnetic disturbance continued all night.

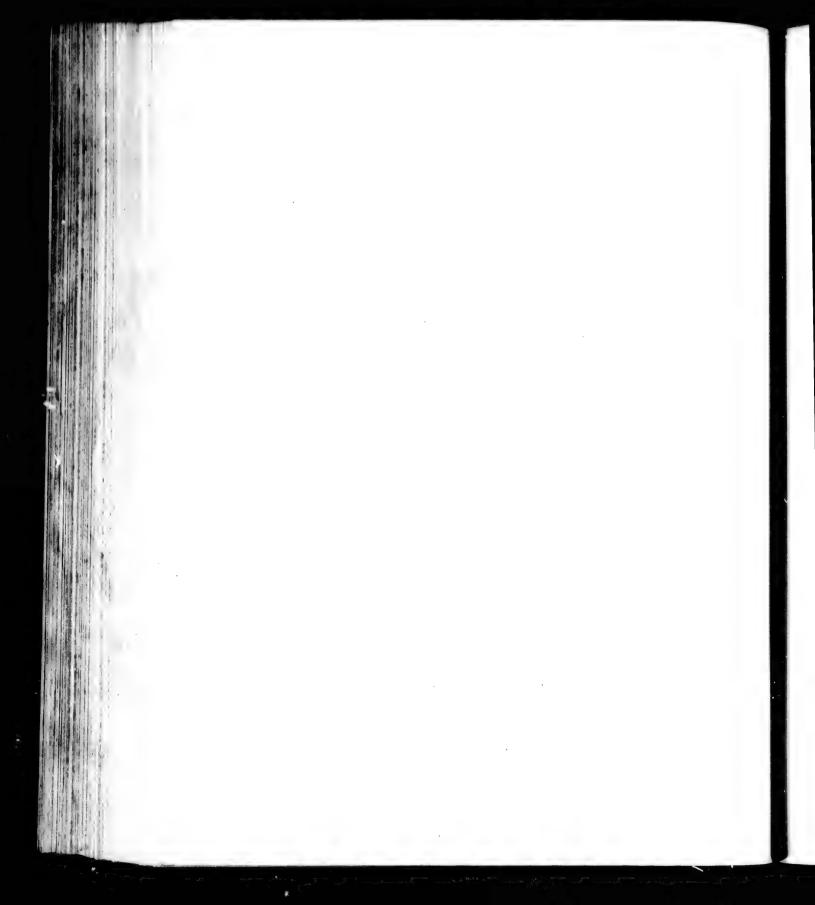
April —, 1883, 4.15 a. m. to — — — The sky was covered by clouds all night, but at 4.15 to 4.20, when the magnets were very much disturbed, auroral light appeared in the NE. showing strongly through the clouds, and quickly rose as a band reross the zenith and disappeared in the W., while fresh patches of light developed in the E. The magnetic disturbance continued all night.

April 8, 1883, 3.45 a. m. to 6.20 a. m.—Sinuous traces appeared in the ESE, at 3.45 and had developed at 4 a. m. into defiaite pale sinuous bands in the E. coming up through Aquila into Lyra and Cygnus. At 4.15 to 4.20 these had developed into a broad belt of waving sinuous bands (brightness 1 to 2) in slow motion extending from Aquila near α through Lyra, Cygnus, Cassiopeia and Perseus, and gradually broadening and shifting and rising. These had faded to quiet bands (brightness 0 to 1) at 5 to 5.20, crossing high in the sky through Auriga, Gemini, Lynx, Camelopardalis, Ursa Major, Ursa Minor, Draco, Boötes and Hercules. Traces were still visible in the 8, at 6 to 6.20.

April 9, 1883, 3.45 a. m. to 6.20 a. m.—A very faint band crossed the Ph through Boötes and Ursa Major, running SE, and NW, at 3.45 a. m. This had become sinuous and shifting at 4 a. m. and extended on through Cephens and Persens, with shifting sinuous bands on either side, one in Draco and the other in Auriga and Gemini. All had faded to traces at 4.15 to 4.20. At 5 to 5.20 a faint luminous band ran from Serpens through Boötes to Coma Berenices (brightness 0 to 1). Traces only were to be seen at 6 to 6.20. There was magnetic disturbance chiefly affecting the horizontal force at about 8 a. m.

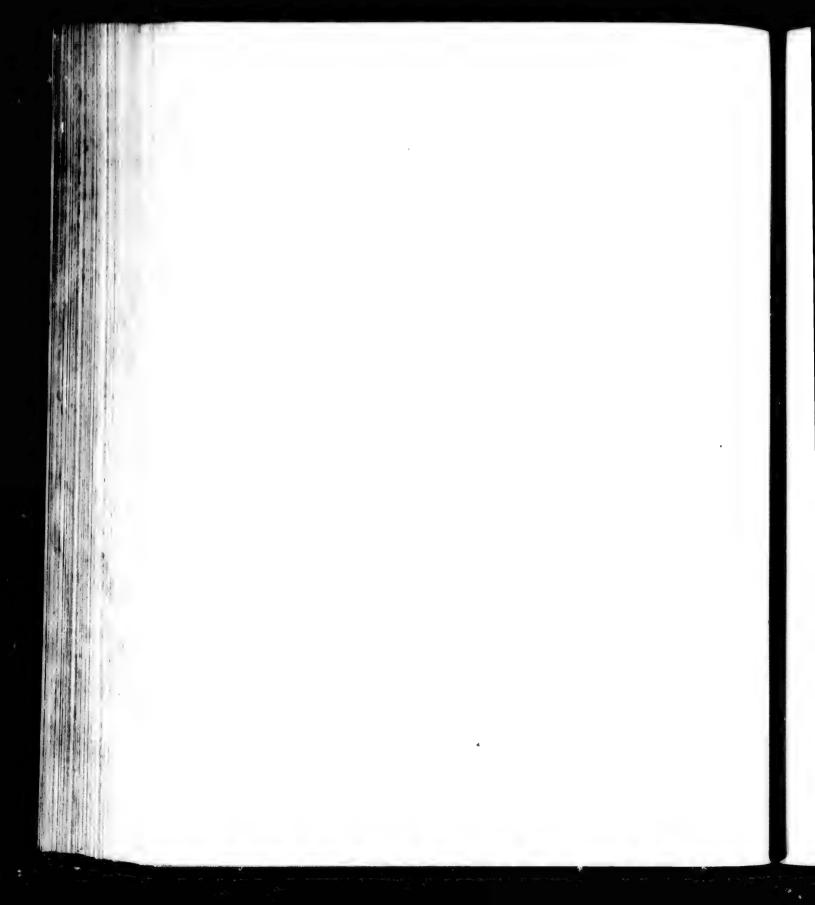
April 13, 3.45 a. m. to 5.20 a. m.—At 3.45 the twilight was quite bright and the stars obscured by haze. A faint arched yellow band lay in the SW. from near the horizon ESE to the light in the NW, reaching an altitude of about 40°. At 4 a. m. there were barely perceptible traces in the SW., but at 4.15, as indicated by the agitation of the needles, there was an extensive aurora in rapid waving and vibrating motion in the form of a zone about 30 or 40 degrees broad, and composed mostly of curtains and coronal streamers, crossing the zenith from ESE, to NW. The usual color appeared with the yellow very prominent (brightness 2 to 3) and the whole moved quickly toward the magnetic N. The stars were only faintly visible. When the north magnetic edge had reached a Lyrae the rest had faded, and all was soon reduced to sinuous traces occasionally brightening up again, but all was nearly faded at 4.20. These developed into a narrow band again at 4.45, but at 5 to 5.20 there was only a pale, quiet band (brightness 0 to 1) through Persens, Andromeda, Cassiopeia, Lacerta and Cygnus. The needles continued more or less agitated till 2 p. m., being considerably disturbed at 1 p. m.

H. Ex. 44--56



# PART VI.

TERRESTRIAL MAGNETISM.



## TERRESTRIAL MAGNETISM.

The magnetic records were placed in the hands of the United States Coast and Geodetic Survey for computation and discussion.

The following report is presented:

ACCOUNT AND RECORD OF THE MAGNETIC OBSERVATIONS WITH PARTIAL RESULTS DEDUCED BY C. A. SCHOTT, ASSISTANT, COAST AND GEODETIC SURVEY.

Computing Division, Coast and Geodetic Survey Office,

May 6, 1884.

J. E. HILGARD.

Superintendent Coast and Geodetic Survey:

DEAR SIR: Towards the end of March, 1881, Mr. Carlile P. Patterson, then Superintendent of the United States Coast and Geodetic Survey, was invited to aid and co-operate in the researches proposed by the International Polar Commission, which held its second session at Bern, Switzerland, in August, 1880, H. Wild, president. General W. B. Hazen, Chief of the United States Signal Corps, United States Army, having notified the Commission that the United States would take part in the undertaking, caused two expeditions to be fitted out, one to proceed to Point Barrow, Alaska, the other to Lady Franklin Bay, Grinnell Land. The Coast and Geodetic Survey was to co operate in the magnetic work which these parties were to execute by furnishing such magnetic and other instruments as were then available and by instructing three or four observers of the Signal Corps in their use; besides bearing a part of the expense of the first-named expedition, the second expedition having been provided for by special appropriation of Congress.

#### PART I.—INTRODUCTION.

It was not until near the close of April that these preliminary arrangements were concluded: and it was well understood, in consequence of the want of suitable magnetic instruments, and in particular of differential instruments, and owing to the fact that no trained scientific observers were at the time available, that the Coast and Geodetic Survey could not then follow the minute instructions which had been prepared for the guidance of the various expeditions which were to take part in the work of the Commission. In the words of the Superintendent, we were simply to do for terrestrial magnetism the best that was possible at the time. For the first year at Point Barrow, and during the entire absence of the other expedition, the assistance of the survey was more incidental than fully co-operative; but this condition was considerably improved in the second year at Point Barrow, when we were able to send a set of differential instruments with a newly instructed observer. In the summer of 1883 a special observer was sent in charge of pendulum work and particularly to verify the magnetic work, as well as to redetermine the geographical position and the true meridian or azimuth; but unfortunately he was unable to accomplish anything in consequence of the continued rain, fog, or cloudiness of the sky during the few days he could stay at the place, the state of the ice and the damaged condition of the vessel demanding a speedy embarkation of the whole party.

That under these circumstances the magnetic work should fall somewhat short of the accuracy which the committee had desired it should possess is not surprising; indeed, the Polar Conference

found afterwards that so far as the first year's magnetic work was concerned it appeared to have been undertaken rather prematurely, inasmuch as it could not be supposed that differential instruments of a particular description were ready at hand, nor was there sufficient time to procure them. Disclaiming, therefore, such close co-operation as would have been desirable, but which was impossible under the circumstances, the records and results herewith presented are the outcome of faithful labor and are believed to be an acceptable contribution to our knowledge of magnetism in high latitudes, and it is thought that in the second year, at least, these records will prove to be a valuable part of the material accumulated by the several expeditions.

Later on, in full co-operation with the work undertaken by the International Polar Commission, the Coast and Geodetic Survey established at Los Angeles, Cal., a magnetic observatory and equipped it with a set of Adie's self-recording magnetometers of the Kew pattern. In the spring of 1882 the adobe building had been constructed by Assistant J. S. Lawson, and in July following the instruments were mounted and the photographic process was arranged by Mr. W. Suess, mechanician Coast and Geodetic Survey. The observatory was then permanently-turned over to the charge of Mr. Marcus Baker, Coast and Geodetic Survey, under whose direction the absolute and differential measurements have been made uninterruptedly from about the end of September, 1882, to the present time, and it is the intention to continue the work for some years.

In May, 1881, Mr. J. B. Baylor, and in June following, Mr. M. Baker, of the Coast and Geodetic Survey, were detailed to instruct at Washington Sergeants E. Israel, J. Cassidy, J. Murdoch, and M. Smith, Signal Corps, U. S. Army, in the use of the sextant and the alt-azimuth for the determination of time, latitude, longitude, and azimuth, and in the requisite computations; they were likewise instructed in the use of those magnetic instruments which they were to take with them, Mr. A. C. Dark was instructed at San Francisco in astronomical observations by Subassistant J. F. Pratt, Coast and Geodetic Survey. With the exception of Sergeant Israel, who proceeded to Lady Pranklin Bay, the above named observers formed part of the personnel of the Point Barrow party. These observers made the best use of the short time available for their instruction.

In May, 1882, J. Pahnarts and Sergeant J. E. Maxfield, Signal Corps, U. S. A., received instructions from Mr. Baker in the use of the sextant and the theodolite, and in June they practiced under Assistant Eimbeck, Coast and Geodetic Survey, with the Brooke differential instruments which left the office for Point Barrow June 14, 1882.

The following instructions to the parties were drawn up (June 9, 1881) by the writer under direction of Superintendent C. P. Patterson:

4 Instructions and notes for the guidance of the observers to be stationed at Point Barrow, Alaska, and at Lady Franklin Bay, north of Smith Sound, Arctic Ocean.

"As soon as the quarters of the expedition have been fixed upon a magnetic house will be erected, in which the regular magnetic observations as described below will be made; other observations will be made when on boat or sledge trips.

"Instruments.—For the use of the magnetic observatory there will be provided a magnet ometer, for absolute and differential declination and for horizontal magnetic intensity, to be per manently mounted on a stone pier. In connection with this instrument a meridian or azimuth mark will be established a short distance off the observatory and visible from it through an open ing in its wall. The astronomical bearing of this mark will be carefully determined by means of an altrazimuth instrument and solar observations. In the same house, but on a separate pier, will be mounted a Kew dip-circle, and, in the case of Point Barrow, a third instrument, a bifilar magnetometer, will also be permanently mounted on its pier. At Point Barrow the magnetometer or unifilary and the bifilar instruments will be mounted in the magnetic meridian and at a distance apart of not less than twelve feet, and the dip circle will be mounted equidistant from these instruments, forming an equilateral triangle. At Lady Franklin Bay the two instruments will be mounted in the plane of the magnetic prime vertical and not less than 12 feet apart. No iron is to be used in the construction of these buildings and they should not be nearer than fifty yards to any other building or double that distance to any large mass of iron. Special reading lamps (of copper must be provided for use with the instruments, and they must be tested to make sure that

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ed a magnet ity, to be per mor azimuth ough an open by means of rate pier, will a bifilar magnetometer for at a distance these instrunents will be No iron is to fifty yards to ling lamps (of ake sure that they do not affect the position of the magnets. The use of candles stuck in wooden blocks is preferable to lamps.

· When on boat or sledge journeys the party will carry a chronometer, a small alf-azimuth instrument with circles of about three inches diameter (as constructed by Fauth & Co., of Washington, or by Casella, of London), provided with a magnetic needle or compass mounted over its vertical axis, and a dip circle.

· Observations at the permanent station,—Hourly observations will be made for declination and diamal variation with the magnetometer on three consecutive days about the middle of each month; besides these observations, extending over seventy-two hours, there will be made at any convenient intermediate time each day (of the three) one set of deflections, followed immediately by a set of oscillations for the determination of the horizontal intensity. At Point Barrow the bifflar will be read immediately after the unifilar. There will also be made at any intermediate time each day (of the three) a set of dip observations. In connection with the declination, the mark will be read once each day (unless the instrument should accidentally be disturbed), but it suffices to determine the magnetic axis of the declination magnet on one of three days. The instrumental constants of the magnetomater will be determined before leaving Washington, and the observer will use the Coast and Goodetic magnetic blank forms for their records, or, in case no special forms are provided, they will use small (octavo) note-books; they will also compute, as soon as the observations are completed each month, the magnetic mean declination, diurnal range, and turning hours; also the horizontal force in absolute measure (English units) and the dip, tabulating the results for each day.

Extra observations on other than the three days about the middle of each month will be made during all occurrences of auroral displays, but as they are likely to be very numerous at Point Barrow observers there may confine their extra observations to the more conspicuous displays only. On these occasions the declinometer (and the bifilar) at Point Barrow will be read every 10 minutes or oftener, or less often, as the state of the needle may appear to demand, the object being to ascertain the relation and establish a connection between the appearance of the annorm and the motion of the magnetic needle.

"When landing on a boat journey or during a sledge journey, at suitable stations (not less than 10 or 15 miles apart), the time, latitude, and azimuth will be determined by the alt-azimuth instrument and the declination by the same instrument (the hour and minutes of the observation is to be noted in order that the diurnal variation may be allowed for); the dip will also be observed, and in case time is pressing, reversal of circle, reversal of face of needle, and reversal of polarity of needle may be dispensed with, but the needed corrections to the result from the single position of the instrument or needle must be ascertained at the permanent station. Observations of deflections with magnetic needle and with weights will be made with the dip circle as arranged for relative and absolute total force, the data for the latter to be supplied at the permanent station.

"It is highly desirable, especially in the case of the Lady Franklia Bay party, that all stations within reach and formerly occupied by other parties for magnetic purposes, be revisited in order to farnish material from which to deduce the secular change during the interval; besides all opportunities should be taken when landing on the way up, to secure observations for declination, dip, and intensity; the latter, best by oscillations of the intensity magnet. The winter quarters of the late English expedition should be connected magnetically with the present quarters.

"All magnetic observations will be made on Göttingen time, as provided for by the Hamburg Conserves."

"All magnetic work will be kept strictly in conformity with 'Notes on measurements of tenestrial magnetism,' United States Coast Survey, Washington, D. C., 1877,† and other records in cot; ection therewith should be equally clear and complete, and all computations should be made by the observer in separate books. Duplicates of all records will be made, compared with the original, and the latter returned annually,‡ if practicable, to the Superintendent of the Coast and Geodetic Survey, Washington, D. C. The observers should also provide themselves with copies

" This sentence I find added to original report.--[Sch.]

A new edition, the third, has since appeared in Appendix No. 8, Coast and Geodetic Survey Report for 1881. It was then supposed that the parties would remain out for three years.

of the Admiralty Manual of Scientific Inquiry, the Arctic Manual and Instructions, 1875, and Aurorae, their character and spectra, by J. R. Capron, 1880. Also, with Terrestrial and Cosmical Magnetism, by E. Walker, 1866, and any other work they may require for their information."

Besides the above paper, which is printed (pp. 12 to 14) in "Instructions No. 72, War Department, Office of the Chief Signal Officer, Washington, D. C., June 17, 1881," the parties received additional instructions headed (2) Obligatory observations in the domain of terrestrial magnetism, and (3) Elective observations—contained in the same order. Among these optional observations are mentioned observations of tides and of earth currents; for both of these phenomena returns were made.

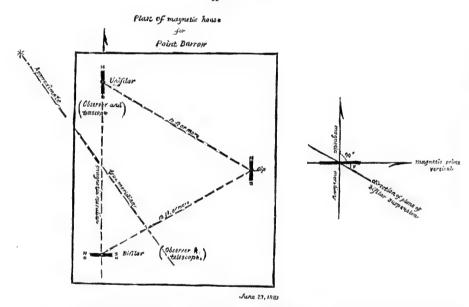
The Point Barrow party was also provided with a plan of the magnetic house, and received the following note respecting the adjustment of the bifilar magetometer, which had been hastily constructed from some remains of an older instrument:

"The portable bifilar magnetometer.—This instrument was reconstructed from such parts as could be found from an old instrument. A collimator magnet was provided, also a new bifilar suspension adjustable by means of a right and left handed screw in the place of a disk, as originally supplied; the projecting arms indicating that the instrument had been arranged for an induction inclinometer were removed.

"It is to be used differentially or for variations only of the horizontal component of the magnetic force. The instrument is to be adjusted with the axis of the collimator magnet in the magnetic prime-vertical, and the variations of the horizontal force observed by readings of the scale.

"If H= horizontal magnetic force,  $\Delta H$ = variation of the same, v= angle of twist in the bifilar suspension (usually between 40° and 70°),  $\Delta v$ = variation of this angle (expressed in parts of radius) then

$$\frac{JH}{H} = \cot v J v$$



"If  $n_0 =$  reading of the scale of any fixed part, say of the magnetic axis of the collimator, n = any reading at another time, a = value of one division of the scale in parts of radius (or angular value in minutes times .000291), then  $\Delta v = (n - n_0) a$ .

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n such parts as a new bifilar sus. sk, as originally for an induction

nent of the maggnet in the maggs of the scale. wist in the bifilar ssed in parts of

iformation."

"To correct for changes in the value of  $\frac{JH}{H}$  for change of temperature of magnet let  $e^{\pm i t}$ change of magnetic moment of magnet corresponding to a change of 10 Fahr, we have the corresponding to a change of 10 Fahr, tion  $q(t-t_0)$  where  $t_0 =$  normal temperature a 'opted' and t, any other temperature. The value of q may be found by a series of observations of oscillations at high and low temperatures, the magnetic net being suspended as in the unimbar magne-ometer. Putting  $k=\sigma$  cet v we have

$$\frac{dI}{dt} = 2\left(t + 2a\right) + q\left(t + t_0\right)$$

the value of "may be about ,0000, and it should be so arranged, by varying the distance of the threads, that the least integer reading of the scale should indicate about  $\frac{1}{1000}$  to  $\frac{1}{10000}$  parcef the  $^{\circ}$ 

Let so tal force. The observed variation in the hecknowal component of the magnetic force will be true only in case the magnetic moment of the suspended magnet remains unchanged during the time of observations, but as every magnet gradually loses magnetism a further correction for loss of magnetic moment is needed. This may be determined by comparing differences of values of horizontal force as determined by means of the unifilar magnetometer at certain times (and after long fatervals) with a series of corresponding readings of the differential instrument. The . Let being an old one, it seems best to examine and readjust the bifilar at the end of each year crottener in case of necessity.

. The north end of the magnet may be turned clober to the right or left of the meridian, but , will be desirable to choose that side which will make increasing horizontal force correspond to sing scale readings.

· The principal adjustments of the instrument may be summed up as follows:

"Level; su pend magnet as unifilar; focus telescope; place scale Lorizoned and admit light for distinct vision; take torsion out of suspension; and plane of detorsion in magnetic meridian; determine axis of collimator; determine scale value or value of one division is minutes or are; 🚭 ton axis and note corresponding scale reading of magnetic meridian; take off units and substitute bitlar tube; place plane of bifilar suspension in magnetic meridian, point on asis and read torsion chele; test this by turning telescope 180° in azimuth and bringing the magnet in the acversed position, north end to the south, and read torsion scale; if it reads as before, the plane of threads was truly in the magnetic meridian; repeat adjustment if necessary; turn telescope 90 trainto the magnetic prime-vertical and turn in the rance direction the torsion circle mutil the axis et a collimator appears pointed in telescope; read the torion circle, it will be the section the toridian value; compute the value of k and after the distance of thread. By the corresponding until a satisfactory value for k is found.

what of the asteroll remember that at Point Darrow the korboatal tone in Joint one half of (a) A. Ale non. They may also consult Lleyd's Treatise on Magne dury funden, 1871.

value (extract to open tion with the Polar Conversation during the social year of conversation) of the Leint Barnow station, directions were given by you, May 23, 1882, to proper the and threely magnetographs for immediate service. These instruments had been used at a style it is At the West, Fla., and lately at Madison, Wish, and required thorough by the control of the cont pherographic registration being out of the question in the Volar regions, they were changed and remounted according to a plan devised by me, for direct eye observations. The extractions, with the assistance of Fauth & Co., instrument makers, and W. Suess, jaccianician, this was expeditiously done, and the instruments left Washington Jure 14, 1882.

The following memorandum was handed to the relief party before starting for Point Barrow:

"The magnetic instruments intended for Poins Darrow will be the modified Brooks Magnet ometer, viz., declinometer, bifilar or horizontal force narguetometer, and Lloyd's balance of a

H. Ex. 41- -57

e collimator. n= dius (or angular

<sup>&</sup>lt;sup>a</sup> For a description see Coast Survey Report for 4560, Appendix No. 26, or the original paper to Phil. 100 s.  $\mbox{Rex}$ , Soc. 1847, part 1.9 On the autematic registration of reagneten eters,  $\mbox{Ac.}$ , by the teeraphy-Jan., 1-16.1



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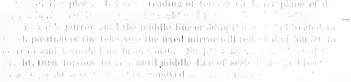
For the convergence of the collection of the second of the collection of the collec

To determine the torsion coefficient  $\frac{h}{f}$  let a=angle through which the magnet was deflected, and z=angle through which the torsion circle had been turned; then  $\frac{h}{f}=\frac{a}{p+a}$ ; hence scale value  $a=\left(1+\frac{h}{f}\right)$  expressed in minutes of are. Increasing numbers of scale should correspond to a notion of the north end of the magnet to the cast. The scale is numbered from 20 to 80, which numbers a> to be read 200 and 800, and thus has a range of  $5^{\circ}$  on either side of the normal position. Two space scales, divided on white bristol board, about 15 centimeters long, p(s)=f additional extent of the should be made, and, in case of necessity, fastened to the ends of the reading scale. The particular cross thread of the theorem is to be kept on the 500 mark, p(s)=f reading scale. The articular cross thread of the appears to each of the instruments. The definition of the fixed and movable mirrors is in the plane of the optical that the tele cope. The instrument is blaced under a zing cover.

#### 92. THE SOFT ONTAL FORCE OR BITHLAR MAG 255 CO. 2.

That plane of detersion in the magnetic meridian, turn torsion cools with well-fit suspends **d** in properties to the first of the form and read enters. The nove weight, we produce the agree of the fit in the fit to the cools of the plane of total and the fit in the magnetic than the fit of the fit is the fit to the cools of the fit is the

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the containing open consistency strong and proceeding position of the distances of the threads above and before and  $l \equiv \log t$  for the distances of the threads above and before, and  $l \equiv \log t$  for the distances of

$$\frac{W_0(r_0)}{l}\sin(r_0)E^{-1}$$

ow let H and  $\gamma$  vary by  $\delta H$  and  $\delta z$  and the ratio,  $\frac{\delta H}{H}$ , or the variation of the horizontal force  $\varphi$  and in parts of the force, is given by the relation

$$\frac{2H}{H}$$
 entrop

"Suppose the scale division to be 1 millimeter and the distance of the scale and minimillimeter, then  $\partial z = \frac{1}{2x}$ . Now putting for z; its equivalent a ( $a = a_0 z$ ,  $v = a_0 z$ ) and of each division of scale in terms of radius and  $a = a_0 z$  the directness of any two scale is a fact, and smaller k = a cot z, the ratio,  $\frac{\partial H}{\partial z}$  becomes k ( $n = a_0 z$ ). A second method for determining z,  $z = a_0 z$ ,  $z = a_0 z$ , as follows: Let  $m = \frac{W}{100}$ , or let it be equal to any other convenient fraction of W, and  $z = a_0 z$ .

An important addition to the Briefer instruments as instancy the stability or axity of the direction at point of the scale; the idea was taken to an the later Adic magnetograph. The circular windows of the thometers were of Franch planteglass. It wind on Petunary 11, 1881, I and that the representation is so that the excellent sufficient with the fight refraction by turning the glass critically apparent the deviation changed from a tree division on a graph of the scale

responded to a cate the new concerned of the two readings of the scale, that is, before and after the small weight was added, or for weight W and for weight W+w will correspond to above both borizontal force. To give the instrument any desired sensitiveness compute the angle of deflection <math>z corresponding to it, and set the torsion circle accordingly, then by means of the upper suspension screw, with its two sets of opposing screw-threads, the suspension threads are to be brought to that distance, which will bring the middle of the scale (50) on the vertical thread of the telescope. Using the second method a weight has to be provided corresponding to the desired sensitiveness, and the suspension threads must be regulated in order that the additional weight may produce a change of a certain number of divisions of scale when it is added and taken off.

The instrument is provided with a mechanical compensation for changes of temperature. In view of the extreme low temperatures which are likely to be experienced at Point Barrow, he cover, and under the present circumstances, it will be better to deduce the corrections for any outstanding amount, not compensated, differentially from the observations of the horizontal force themselves, than to attempt a complete mechanical compensation. The latter operates as follows:

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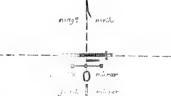
Referring to accompanying figure, suppose the temperature increases, the effective force of the magnet will diminish, the differential expansion of glass and zine (which materials form the compensation) will push the zine and in, which brings the suspension three leadings together, and thus diminishes the zine force balancing H in the same ratio that if itself diminishes. Increasing scale readings should correspond to increasing hoticistal magnetic force, or correspond to a move of the north and of the magnet toward is north. The narrow space dividing the basic

the research and consisting the plans of the space laxis of the telescope. The institute of the phase during a space cover.

#### "3. THE VERTICAL POLCE OR BALANCE MAGNETOMETER.

"Cat the Unife-edge supporting the magnet in the magnetic meridian and level support; the

noghet will then be free to oscillate in the magnetic prime verifical; behave the magnet and its appendages (. Trop, knowledge, balancing weights, compensation beroked out zoneally by the ansoft two weights en opposite sides of the knowledge in a fibring the contact of gravity of the platent to the opposite imposition close to and to switch kept adapt when every platent be desired a reliable asset this is done by realling a to the fibric of the contact of switch and an analysis of the code (50) is a few of on



the thread on the role supervises the magnet is best into the same time this center division in states a role and proceed, respecting the fixed mirror.

the of the vectical  $\phi$  appoint of the earths force, d= the horizontal distance of  $\phi$  of the system from the plane of support passing through the knife edge, W= the trace of random and appendages, m= the magnetic moment of the magnet, then Ym=Wd. Note that the tragget inclined through the small angle  $\phi$ , and let h= distance of center of gravity of the tystem below place of knife edge; then—

$$\frac{3V}{V}\frac{h}{d}$$

STo determine the ratio  $\frac{h}{d}$  we oscillate the magnet and appendages in its vertical plane and let T = time of an oscillation in that position. We then take the magnet off its support and suspend it (with its appendages) by a single thread (determining torsion and allowing for it), as in

fore and after to the of the e of deflection per suspension be brought to the telescope, sensitiveness, ty produce a

perature. In Barrow, la .. s for any out. rizontal force tes as follows: igure, suppose effective force he differential hich materials sh the sine end throad releser . It of torsion ratio that II scale readings ng horizental o a movember et texted to be ding the back instruces to a

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cal plane and port and susg for it), as in the case of a free declination magnet, observing that the sides which were vertical when on its bearings will now be horizontal. The moment of inertia will be the same as before. Let  $T_1$  = the time of a horizontal oscillation, then—

$${^{\hat{\sigma}} V = \frac{T_1^2}{T^2}}$$
 cot dip.  $\phi = \frac{T_1^2}{T^2}\phi$  cot  $v$ 

where  $\theta = \text{dip}$ . For one linear unit of scale and r units of distance to mirror the value of  $\phi = \frac{1}{2\rho}$ .

The dip is to be determined by means of the dip circle. For a particular scale value,  $T_1$  having been determined, we alter the position of the center of gravity by the adjusting screw, until by trial the desired value of T is produced. The scale value may also be ascertained by means of deflections, the magnet being first in a horizontal, next in a vertical position. (See p. 65 of 2d part of Bulletin, St. Petersburg, 1882.) \*

"The temperature compensation originally with the Brooke balancing magnetometer consisted of a glass thermometer tube filled with mercury. This has been removed, and a brass arm was substituted, as in the Adie instrument. The compensation operates as follows: Suppose the temperature is rising; the magnetic energy of the horizontal magnet will diminish, and gravity will consequently pull the south or unmarked end of the magnet down and thus elevate the marked end, but this is counteracted and the balance restored by the expansion of the brass arm which is directed to or on the same side as the marked end; the diminution of magnetic moment is thus counteracted by the increased leverage of the extended brass arm.

"Increasing scale readings should correspond to increasing vertical magnetic force or to a movement of the north cud of the magnet downward. The instrument is placed under cover of thick plate-glass.

"Referring to the diagram of the magnetic observatory containing the modified Brooke differential or variation instruments, it will be seen that the north seeking or marked ends of the magnets turn all to the inside or toward the telescope-pier. The directions in which the scale-numbers increase are also there indicated.

"Time being wanting for an accurate mechanical compensation of the force magnetometers, it is the intention that only the greater part of the change should be so compensated and corrections applied for the remainder. For this purpose thermometers are inserted, which are to be read in connection with the scales. The data for outstanding temperature correction will be had from the ordinary hourly observations."

The Point Barrow party was also put in possession of the resolutions adopted at the third session of the International Polar Conference, held at St. Petersburg, August, 1881. From this publication the following notes were taken:

"The differential magnetic observations for changes of declination, horizontal and vertical components of the earth's magnetic force, are to be made *hourly* and continuously, commencing as soon as possible on or after August 1, 1882, and closing as late as practicable before or on September 1, 1883.

"These hourly observations may be made either with reference to local time or with reference to any other meridian. [The full hours of local mean time are recommended, and the instruments are to be read in the order, bifilar 1½ minutes before and after, unifilar 1 minute before and 1 minute after, and balance magnetometer ½ minute before and ½ minute after each full hour.]

"Term-day observations.—Term-days are the 1st and 15th of cach month (excepting January 1, when January 2 will be taken). The differential instruments on term-days are observed every 5 minutes throughout the 24 hours, and strictly according to Göttingen mean civil time, beginning with 0 m (or midnight, Göttingen.) The three instruments will be read as rapidly as possible, one after another, in the order given above, the declinometer being read at the exact full 6fth minute.

"Additional observations to be made on term-days during one hour are specified below. Declina-

\*If  $\epsilon$  -rangle which the line joining the centers of gravity and of motion makes with the axis of the magnet, we have  $\tan \epsilon \tan \theta = \frac{T_1^{(i)}}{T_1^{(i)}}$ ; also  $\frac{\Gamma}{H} = \tan \theta$ , and since in our case  $\alpha \ge 90^\circ$ , formula (3) of p. 63 changes to  $\delta V = H \frac{T_1^{(i)}}{T_2^{(i)}} \psi_1$ , hence,  $\frac{\delta V}{T_1^{(i)}} = \frac{T_1^{(i)}}{T_1^{(i)}} \psi$  or  $\theta_2$ , as above.

tion observations will be made every 20 seconds, beginning with the full hour and minute of Göttingen mean civil time.

| Date.   | Time of observation.   |   | Date.  | Time of observation.  |
|---|--|---|--|---|
| October 15<br>November 1<br>November 15<br>December 15<br>1883<br>January 2<br>January 15 | Noon to 1 p. m.<br>1 p. m. to 2 p. m.<br>2 p. m. to 3 p. m.<br>3 p. m. to 4 p. m.<br>4 p. m. to 5 p. m.<br>5 p. m. to 6 p. m.<br>6 p. m. to 7 p. m.<br>7 p. m. to 8 p. m.<br>8 p. m. to 9 p. m.<br>9 p. m. to 10 c. m. | Access to the contract of the | 1883<br>February 1<br>February 15<br>March 15<br>April 1<br>April 15<br>May 1<br>May 1<br>June 6<br>June 6<br>June 6<br>June 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1<br>July 1 | Miduight to 1 a. m. 1 a. m. to 2 a. m. 2 a. m. to 3 a. m. 3 a. m. 0 4 a. m. 4 a. m. to 5 a. m. 5 a. m. to 6 a. m. 6 a. m. to 6 a. m. 6 a. m. to 7 a. m. 7 a. m. to 8 a. m. to 9 a. m. 9 a. m. 7 o. 10 a. m. 10 a. m. 10 a. m. to 10 a. m. 10 a. m. to 10 a. m. 10 a. m. to 11 a. m. 11 a. h. to moon. |
|   |  |   |  |   |

"If three observers are available, all three testringer's will be observed.

"Absolute magnetic measures of declination, dip, and intensity.—Observations are to be made as often as necessary to furnish the absolute values needed for the differential measures. |Unless some change is suspected in the latter, it will suffice to observe for absolute values the declination, the dip, and the horizontal intensity (oscillations and deflections) on the day before each term-day. Declination observations will then be made about 8 a. m. and 1 p. m., local time, and for these and the intermediate hours the corresponding readings of the scales of the differential and absolute instruments will be given. Observations for dip and intensity may be made at any convenient time of the day,—Sch.]

"Tests are to be made for possible local deflection before selecting the position for the absolute instruments.

"Scale values of differential instruments.—The unifilar or declinometer should have a sensitiveness such that 1 millimeter on the scale will correspond to a variation in declination (D) equal to V, hence  $\delta D = V$ . For the bifilar or horizontal force magnetometer at a place where the dip is  $\theta$ , 1 millimeter of its scale will be made to correspond to a variation of the horizontal component tH) of the magnetic force equal to 0.001  $\cos\theta$ , hence  $\delta H = .001\cos\theta$  expressed in the metric units of the force mm, mg,  $\kappa$ . For the vertical force or balance magnetometer, 1 millimeter of the scale will be made to correspond to a variation of the vertical component (V) of the force =0.001, hence  $\delta V = .001$  in the same units as above."\*

For absolute measures the Point Barrow party had Coast and Geodetic Survey magnetometer No. 11, and the Lady Franklin Bay party magnetometer No. 12, both new instruments, made by Fauth & Co., of Washington. Kew dip circle No. 23 was taken to the former place, and Kew dip circle No. 19 to the latter, both instruments the property of the Coast and Geodetic Survey. The magnetometers are described and figured (Plate No. 36) in Coast and Geodetic Report for 1881, Appendix No. 8. The Kew dip and intensity circles with needles 9 centimeters in length are well known.

#### GEOGRAPHICAL POSITION OF UGLAAMIE STATION, ALASKA.

The two United States Polar expeditions which had been organized under the orders of W. B. Hazen, brigadier and brevet major general, U. S. A., and Chief Signal Officer, left for their respective destinations early in the summer of 1881, the one for Alaska in command of P. H. Ray, lieutenant, U. S. A., the other for Lady Franklin Bay in command of A. W. Greely, lieutenant U. S. A.

"Supposing, for the sake of illustration, that at Point Barrow H .0.95 (in mm, mg, s, units) and  $\theta = 41\frac{1}{2}$ , then  $\cos \theta$  .4478 and  $\delta H \approx 0001478$  .  $\frac{1}{6766}$  hearly. From  $\cot z = \frac{\delta H}{H avc}$  we have  $\log \cot z = 9.72822$ , hence z = 61-52 and the whole angle to be turned off would be 90-4z: 151-52. For the vertical force instrument we have from V = H tan  $\theta$ ,  $V \approx 6.3565$ ; also, total force F = H see  $\theta = 6.4272$  and for  $\delta V = .001$  (metric units),  $\frac{\delta V}{V} = .0001573$ . The angular value of one division of each of the scales equals 1.

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to be made es. |Unless declination, ch term-day, or these and nd absolute convenient

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ave a sension (D) equal the dip is  $\theta$ , apponent (H)etric units of of the scale pree =0.001,

agnetometer its, made by nd Kew dip urvey. The it for 1881, gth are well

rders of W. ft for their P. H. Ray, lieutenan;

0 - 814 , then -61 52 and

ve have from 0001573 The Lieutenant Ray's party sailed from San Francisco in the Golden Fleece, July 18, and arrived off Ughamie, near Point Barrow, September 8. The meteorological and magnetic station was established near the small Esquimaux settlement of that name,\* about 17 kilometers or 10½ statute miles from Point Barrow and to the southward and westward of it, about 150 meters from the coast of the Arctic Ocean, and at an elevation of about 5 meters above its level.

The geographical position of the station, as derived from dead reckoning on board the Golden Fleece, is given by Lieutenant Ray t as follows: Latitude 71° 17′ 50″, longitude 156° 25′ 45″ west of Greenwich. The astronomical observations at Ughamie for position and direction of meridian were made by A. C. Dark, and are contained in Appendix I to this report. Observations found defective or unreliable from whatever cause have been omitted in this appendix. The latitude here adopted results from two sets of observations, one of a series of double altitudes of the sun on April 28, 1882, the other of two sets of single altitudes of the sun about upper and at lower culmination on June 24, 1882. The first value from sextant observations has been given the weight 4, and the second value from theodolite observations the weight 1: the resulting latitude becomes m. 71° 17'.7 with an estimated probable error of 4 0'.3 According to British Admiralty Chart 2164 the position of Ployer Point, where the English relief expedition under Commander R. Magnire, Royal Navy, was stationed in 1852, 1853 and 1854, is in latitude 149.21/25", and in longitude 156° 16′ 06′′ west of Greenwich. Following the trend of the coast being en the cemetery and summer camp down to Uglaamie and converting the linear measures of the chart into difference of latitude  $\Delta \varphi$  and difference of longitude  $\Delta \lambda$ , we find the latitude of e-glaamic station 71° 21′.1 -- 3′.5 = 71° 17′.9 and for the longitude of the station 156° 16.2° 4-2° 4 = 156° 44′.5 west of Greenwich. Since neither the first (nautical result) nor the last result (depending on estimated direction and distance) can compare in accuracy with the value deduced at the station, I shall adopt the value  $\varphi = 71^{\circ} 17'.7$ 

The longitude adopted results from a chronometric determination harde by the supply expedition in the summer of 1882 in the Leo, under the command of Lieutenant Powell, Signal Corps, U. S. A. The result as worked out by Mr.W. Upton, computer in the office of the Chief Signal Officer, is given in his report appended to "Signal Service Notes, No. V., Work of the Signal Service in the Arctic Regions, prepared under the direction of General Hazen, Washington, 1883." It depends on four chronometers, the sea-rates of which could be established from observations at San Francisco before and after the voyage, and at Plover Bay. East Siberia, during the voyage, though neither at Plover Bay nor at Uglaamie did the weather prove favorable. Mr. Upton's result is  $10^6$   $26^m$   $39^s \pm 10^s$ , or  $156^\circ$  39'  $45'' \pm 2'$  30''; it will be seen that this result is intermediate between tlet derived from dead reckoning on board the Golden Fleece and from the English determination of their station in 1853 to the southward and eastward of Barrow Point and referred to our station. Moreover we have two sets of lunar distances from the sun July 7, 1882, with the resulting longitade 10h 25m 57s, and a set of lunar distances from Jupiter as observed at Point Barrow and referred to Uglaamie by the addition of 1<sup>m</sup> 25\*, giving the result 10<sup>h</sup> 27<sup>m</sup> 14\*; the mean of these two astronomical determinations is 10<sup>h</sup> 26<sup>m</sup> 36°, which agrees so well with the above chronometric value, that I have adopted the latter, viz:

 $\lambda = 10^{h} 26^{m} 39^{s}$  or  $156^{\circ} 39' 45''$  west of Greenwich.

For the magnetic work we need the difference of longitude between Uglaamie and Göttingen, Germany; taking the latter place to be  $0^{10}$  39 $^{10}$  46°.2 cast of Greenwich, we have the required difference  $11^{10}$  06 $^{10}$  25 $^{25}$  +  $10^{10}$ , by which amount Göttingen is east of Uglaamie.

The magnetic work at Uglaamie, 1881, 1882, 1883.—The necessary buildings were erected without delay; October 3, 1881 the party was housed. October 17 the meteorological observations were commenced, the instruments were mounted in accordance with the plan furnished with the instructions, but it was not till the 1st of December that the magnetometers were adjusted and the regular hourly magnetic observations were recorded. Lacutemant Ray remarks:

<sup>\*\*</sup> Called Ootivakh on Ivan Petroff's map of Alaska, Tenth Census of the United States, Washington, 1882. The name of Kokmullit, given on this nap, is that of an Esquimaux settlement at Point Barrow. It is called Non-wook on the Admiralty Chart of 1853 (No. 2164.)

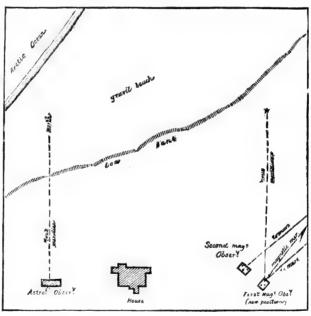
Report of Chief Signal Officer of September 15, 1881.

<sup>;</sup> In his report to the Chief Signal Officer, dated at Ughamie, Aug. 25, 1882.

"The three magnetic instruments were mounted on wooden piers, the season being too far advanced to place masonry. Posts 12 inches square were set into the frozen earth to a depth of 1 foot, and eemented into their place by pouring water around them and allowing it to freeze. The piers answered every purpose, were perfectly solid, and did not change their position in the slightest degree, and when the observatory was taken down this summer I found their earround their base unmelted. As soon as the weather was warm enough, brick piers capped with stone were placed, and the instruments are now all in position on permanent piers." This operation occasioned an interruption in the hourly observations from July 22 to July 30, 1882. This first series closed with September 9, 1882; it includes term-day observations, also hourly observations of dipping needle deflected by a constant weight as a substitute for a vertical force measure; these latter observations of relative total force, while of small value as differential measure, may nevertheless supply means for computing changes in the intensity which otherwise would have been wanting.

The supply party in the Leo arrived off Uglaamie Angust 20, 1882, with the Brooke magnetometers; they were mounted on brick piers, in a building especially erected for them, and their relative position was in strict conformity with the plan contained in the instructions. So long as thawing weather continued these piers lacked somewhat in stability, but the frost soon rendered them immovable. These instruments having been adjusted, the hourly series of observations commenced September 12, 1882, and were continued without interruption to August 27, 1883; the term-

U. S. Polar Station, Uglaamie, Alaska.



day observations and those for absolute measures were continued throughout the second year of the occupation of the place.

It has already been mentioned that in consequence of unfavorable conditions betwoen August 22 and August 29, 1883 (when the station was abandoned), no verification of the magnetic works could be made by Mr. R. A. Marr, but on the return voyage some magnetic observations were secured at Unalashka, and after the return of the instruments to Washington some additional verification work was done by Sergeant Maxfield in January and February, 1884.

The accompanying sketch shows the location of the magnetic observations and the position of the instruments.

The first position of the magnetic observatory was a little to the westward of the new position shown on the sketch; the change was made in July, 1882.

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#### PART IL-ABSOLUTE MEASURES.

MONTHLY VALUES OF THE MAGNETIC DECLINATION, DIP, AND INTENSITY AT UGLAAME, DE-CEMBER, 1881, TO AUGUST, 1883.

The horizontal direction of the magnetic force at Ughaamie was determined by means of Fauth & Co.'s magnetometer, Coast and Geodetic Survey, No. 11, mounted on the northern pier of the magnetic observatory built soon after the arrival of the party. In July, 1882, it was shifted to a new position, where it remained to the close of the work. This instrument served both for the absolute as well as for the differential or variation measures; the latter observations, however, were discontinued or the arrival in the second year of the Brooke variation instruments. The instrument was not well adapted for differential work, as has been stated.

From returns brought home in the Leo, it was evident that the declinations were defective, for some reason not then apparent; also, that the magnet, which was a new one, had parted with much of its magnetism. It became desirable, therefore, practically to test the condition of the instrument for accurate work as soon as this could be done. It was returned to the office at Washington January 12, 1884, and after undergoing some trifling repairs, due to defective packing. Sergeant Maxifeld was directed to determine the declination with it at the magnetic observatory in this city,\* also to furnish some additional measures of the instrumental constants, those obtained by Sergeant Smith in June, 1881, not being deemed sufficient. These measures proved that the instrument was still in a satisfactory condition.

When the full returns came to hand it became evident that the discrepancies noticed in the monthly values of the declination were due to a want of attention to the suspension fiber. The plane of detorsion was apparently placed in the magnetic meridian in December, 1881, but no further test or adjustment was made till March, 1883. During this period the force of torsion had gradually increased (from unknown causes) and affected the declination to the amount of nearly 5½° in September, 1882. After this date this deflection remained perfectly steady, until removed in March, 1883.

For the first six months the monthly results refer to the mean declination of the day (from 24 hourly values), but after the arrival of the Brooke differential instruments the declinations were referred to the mean of the respective months through hourly corresponding readings of the Fauth & Co. magnetometer No. 11, and the Brooke declinometer. These corresponding readings generally extend over 6 hours on each day of observation.

The record and computation of the absolute measures are contained in accompanying Appendix No. 2. Placing little reliance on the determination in December, 1881, on account of a weak astronomical azimuth, and omitting for the present all results of 1882 and those for 1883, up to the middle of March, we have the following reliable values, which rest on a new astronomical azimuth, determined July 25, 1882, and which are roughly checked by a second measure, taken on the Brooke declination pier August 31, 1882, the same mark+ being used and all distances being known. The observations of July 31 are rejected, there being apparently an error of about 4½°:

<sup>&#</sup>x27;The observations made February 5 and 7, 1884, gave for the declination 3° 57',9 W. The same computed from annual observations made at Washington, D. C., since 1877, is 4° 00°,4 W.; difference, 2'.5. The measures for intensity were conally satisfactory.

t Distance magnetometer No. 11 to mark 900 feet, and to Brooke declinometer, 39.5 feet. First position of instrument November 21, 1881, azimuth of mark on house, 96° 13′ W. of N. from observation on Jupiter: second position of instrument, July 25, 1882, mark 46° 36′ E. of N. from observation of the sun.

H. Ex. 44---58

Table of resulting magnetic declinations at Uylaamic station.

(Values reduced to mean of month by means of the differential observations)

| Date        |   |    | l)       | Monthly men          |     | Corresponding<br>mean of readings<br>of Brooke<br>declinometer. |     |                 |       |
|-------------|---|----|----------|----------------------|-----|---|-----|-----------------|-------|
|             |   |    |          |                      |     |   | *,  |                 |       |
| 1883.       |   |    | 1        | 1883.                |     |   | 1   | Directors       |       |
| March 31    |   | 33 | 33, 3 E. | March                | 15  | 33. 3   |     | 484.7           |       |
| Amil 11     | i | 33 | 31.7     | April                |     | 29 0  | •   | 482.1           |       |
| April 30    | 1 | 35 | 26.4     | Mas                  |     | 28, 6   |     | 4 45, 0         |       |
| May 14      |   | 33 | 30, 8    | June                 |     | 11. 8   |     | 475.7           | į     |
| May 31      |   | 35 | 26, 11   | July                 |     | 47. 8   |     | 474.0           |       |
| June 14     | i | 35 | 25, 2    | August               |     | 30, 1   |     | 470.5           | 1     |
| June 30     | 1 | 34 | 58, 3    |                      |     |   | _   |                 | anne. |
| July 14     |   | 35 | 47, N    | Mean I               | -35 | 30. 1   | 1.3 | dean 477 (i. za |       |
| Americal 14 |   | 35 | 30.1     | Corresponding to the |     |   |     |                 |       |

The following results, except the first, are those mentioned as affected by torsion; some of these we propose to use differentially—they are all reduced to the mean of the month respectively:

| 1881         |   |      |          |    | 1882         |    |          |
|--------------|---|------|----------|----|--------------|----|----------|
| December 11  |   | 35   | 15. 7 E. |    | October 31   | 41 | 17. 7 E. |
|              |   |      |          |    | November 16  | 41 | 18.7     |
| 1882.        |   |      |          |    | November 30  | 41 | 14.7     |
| January 24   |   | 37   | 28. 8    |    | December 14  | 41 | 08, 8    |
| April 18     |   | 39   | 49. 9    |    |              |    |          |
| May 24       |   | 39   | 06. 1    |    | 1883.        |    |          |
| June 17, 18  |   | 39   | 47. 4    | 1  | January I    | 41 | 15. 1    |
| July 19, 20  | 1 | 39   | 54. 0    | 1  | January 11   | 41 | 10. 3    |
| August 19    |   | 4.1  | 14. 9    |    | January 31   | 41 | 24. 7    |
| August 31    |   | 41   | 23. 4    | 1  | February 14  | 41 | 26, 1    |
| September 14 |   | 41   | 19. 7    |    | February 281 | 10 | 16. 7    |
| September 30 |   | 41   | 35. 5    | 1. | March 14     | 36 | 02.0     |
| 43 4 1       |   | - 11 | 1311 ()  |    |              |    |          |

New position of instrument and a new azimuth used here.
Thosion partly removed by observed at the torsion. After this date the magnet was suspended on a single fiber; it had previously been suspended on two fibers.

Toward the middle of August, 1882, the deflecting force of torsion had become constant and remained so till the middle of February the following year. For this period we have the following means and the corresponding monthly means of the readings and of the Brooke differential magnetometer: the mean correction to the absolute results is then found as shown below:

| Date                              | D <sub>1</sub>  | Brooke                             | A.H M M        | $D + \Delta r$ | Correction<br>for | Corrected        |  |
|-----------------------------------|-----------------|------------------------------------|----------------|----------------|-------------------|------------------|--|
| 17,110                            | declination.    | declinometer, $\Delta r = r_0 - r$ |                | 17 : 141       | tersion.          | declination.     |  |
| 1662.                             |                 | -                                  | ,              | ,              |                   | ) (              |  |
| August 19, 31<br>September 14, 30 | -41 19. 2 24. 6 | (498, 0)                           | -20.4          | - 55 50, 5     | 4- 5- 34-1        | -35 44.6<br>50.0 |  |
| October 11, 31<br>November 16, 30 | 20. 4<br>16. 7  | (495, 6)<br>489, 8                 | 18. 0<br>12. 2 | 48. 1<br>42. 3 | 32.3<br>31.4      | 45. 8<br>42. 1   |  |
| December 14                       | 08.8            | 489. 9                             | 12.3           | 42.4           | 26. 4             | 34. 2            |  |
| January 3, 14, 31                 | 16. 7           | 488. 1                             | 10. 5          | 40. 6          | 36, 1             | 42.1             |  |
| Februai v. 14                     | 26. 1           | 489. 4                             | 11.8           | 11.9           | 44. 2             | 51. 5            |  |
|                                   |                 |                                    |                | Меан           |                   |                  |  |

The two values within parentheses in column headed r are interpolated: Mean reading of declinometer for the last 5 months, 4764.2, and for the preceding 5 months, 4884.4, hence difference for 5 mor  $^{4}$ hs,  $12^{4}$ , 2, or monthly change, 2', 4, and the first interpolated value becomes  $4 \times 2.4 + 488.4 = 498.0$ The ofth column gives the computed declination corresponding to difference  $r_0 - r$ , or for the reading r, and the torsion correction is determined by the difference  $D = D_1$ . Our completed series, when compared with the preceding series (March to August, 1883), exhibits necessarily a trace of the comparatively rapid monthly decrease in the differential series between February, 1883 (mean 489.5) and May, 1883 (mean 476.1), but the magnitude of the errors of observation of the absolute measures forbids any attempt at correction of the differential series. Omitting the value for August, 1882, we finally have the table of absolute values, as follows:

Resulting monthly means of the magnetic declination at Uglaamic.

| 1862.            | 1 ( )    | 1863                |         |     |         |
|------------------|----------|---------------------|---------|-----|---------|
| <b>Heptender</b> | -35 50.0 | Murch               |         | -33 | 33.0    |
| October          | 45, 8    | Amil                |         |     | 29.4    |
| November         | 43, 1    | May                 |         |     | 1216, 4 |
| December         | 34.2     | June                |         |     | 11.0    |
| 18863.           |          | duly                |         |     | 47.1    |
| January          | 42.1     | August              |         |     | 30.1    |
| February         | 51.5     | 74175,1171          |         |     |         |
|                  |          | For the epoch March | 1, 1883 | 15  | 37. 5   |

The value = 35° 27'.2 for the epoch March 1, 1883, is preferred to the value deduced above for the epoch June 1, 1883. The corresponding value of the Brooke declinometer reading is 484.7

Respecting the annual change of the declination due to the secular variation, we know from the general discussion of the secular variation, Appendix No. 12, Coast and Geodetic Survey Report for 1882, that the eastern declination in Alaska is now diminishing. The expression for the secular variation at the two stations nearest to Point Barrow, viz. Port Clarence, in  $\varphi = 65^{\circ}$  17' and  $\lambda = 166^\circ$  19' west of Greenwich, and Chamisso Island, in  $\varphi = 66^\circ$  13'.3 and  $\lambda = 161^\circ$  48'.7 west of Greenwich, give for the annual change in 1880 and 1885 the values + 10/3 and + 11/3 for Port Clarence, and + 10'.7 and + 12'.0 for Chamisso Island, and we have to expect a greater value at Point Barrow. Captain Maguire determined the declination at that place in 1853, and found = 40° 21', or, when reduced to Ughamje, about = 40° 06', which, compared with our value above, gives almost exactly a diminution of 44° between 1853 and 1883. It is known, from the other stations, that this declination has not passed through a maximum within the last thirty years, but has diminished gradually, with an accelerating rate. For uniform speed, the annual change would be + 10': it is, therefore, probably near + 15'. The absolute measures—September, 1882, to August, 1883—would give the value + 28/4, which is known to be greatly in excess, and if we fall back on the differential series, we obtain a value but a triffe less, and undoubtedly affected by torsion in the suspension skein of the declinometer, which was never re-examined after the first adjustment had been made. Omitting the readings between March and April, when the torsion was most pronounced, a discussion of the 5 monthly means, November, 1882, to February, 1883, inclusive, give a monthly change m = -0.97, and a discussion of the 4 monthly means for May, June, July, August, 1883, gives m = -1/.15, but if April be included m = -1/.92, mean = -1/.53; mean of first and last value -1/.25, hence annual change +15/.0, which is adopted as the most probable value.

#### ABSOLUTE MEASURES-RESULTS OF THE MAGNETIC DIP.

The observations were made with the Kew Dip Circle,\* L. Casella (London), No. 4370, or Coast and Geodetic Survey, No. 23.—It remained mounted on its pier in the small magnetic observatory during the stay at Uglaamie. The instrument left Washington June 23, 1881, and was returned January 12, 1884, only sustaining the breakage of one of the dipping needles. Test observations made by Sergeant Maxifeld at Washington in January and February, 1884, on four days, gave very satisfactory results. (See results for intensity.)

Observations were generally made on three days each month. The series commences with November 30, 1881, and ends with August 14, 1883. It does not appear that there is any appreciable difference in the results by needles 1 and 2; they are therefore combined indiscriminately. The following monthly means are made up from the individual results contained in Appendix No. 2, and they are here arranged with a view of deducing, if practicable, from the monthly values, taken at an interval of a year, a value for the annual change of the dip, independent of any annual variation.

ome of these ctively :

Linexionsty been

onstant and e the followo differential low:

ding of declifference for 5 488.4 = 498.0 r the reading series, when trace of the (mean 489.5) ute measures

.ugust, 1882,

<sup>\*</sup> Figured in Coast and Geodetic Survey Report for 1881, Appendix No. 8, Plate No. 37.

. Table of resulting dip at Uglaamie.

| Date of observations.           | Observed<br>dip #s. | Date of observations.                    | Observed Annual change. $\theta_{11} = \theta_{1}$ . |
|---------------------------------|---------------------|--|--|
| 1861.                           |                     | 1882.                                    | , , , , , ,  |
| December 1, 17, 18, 19<br>1882. | 81 24, 6            | December 14<br>1883.                     | 81 22.4 -2.2   |
| January 18, 19 -0               | 22. 1               | January 1, 14, 31                        | 22, 0 -0, 4  |
| February 16, 17, 18             | 27. 1               | February 14, 28                          | 24. 8 -2. 3  |
| March 17, 18, 19                | 27. 6               | March 14, 25                             | 25. 0 + -2. 6  |
| April 17, 18, 19                | 24.3                | April-1, 14, 30                          | 24. 5  |
| May 17, 18, 19                  | 1313 13             | May 14, 23                               | 22. 6 +0. 4 ,  |
| June 16, 18, 19                 | 24. 0               | June-1, 14, 30                           | 23. 9 -0. 1  |
| July 17, 18, 19                 | 21.5 -              | July 14, $\frac{1}{2}$ , $\frac{31}{45}$ | 19. 2 -2. 3  |
| August 17, 48, 19               | 222, 8              | 0.015 1.62 3.45 5                        | 10. 2 -2. 0  |
| September 1, 14, 39             | 22.2                |  |  |
| October 14, 31                  | 22.6                | Mean                                     | s 81 23.4 - 1.2 °                                    |
| November 16, 30                 | 22.8                |  | 4  |

Mean dip from twenty months of observation, 81° 23'.4, answering to the epoch October 1, 1882. Annual diminution of the dip, 1'.2

Applying the effect of the secular variation, or, more properly, of the annual change to the mean monthly values, i. e. to  $\frac{1}{2}$  ( $\theta_1 + \theta_{11}$ ) for the months from December to July, inclusive, and to  $\theta_1$  the correction—0'.6 for the months of August, September, October, and November, we obtain the following table of monthly dip values, all reduced to the same epoch, and which, therefore, should indicate any annual variation that may exist, unless in consequence of the smallness of such variation it be hidden by the observing errors:

#### 2. Table of mean monthly dips reduced to the same epoch (December, 1882).

| Date, middle of month.   | Mean dip. | Correction for annual change. | Dip referred<br>to epoch, |
|--------------------------|-----------|-------------------------------|---------------------------|
|                          |           |                               | ,                         |
| December, 1881 and 1882  | 81 23, 5  | -0, 6                         | 81 22.9                   |
| January, 1882 and 1883   | 1313 13   | 0, 5                          | 21.7                      |
| February, 1882 and 1883  | 25. 9     | -0.4                          | 25, 5                     |
| March, 1882 and 1883     | 26. 3     | 0.3                           | 26, 0                     |
| April, 1882 and 1883     | 24. 4     | -0, 2                         | 24. 2                     |
| May, 1882 and 1883       | 22.4      | . 0.1                         | 22.3                      |
| June, 1882 and 1883      | 23. 9     | -1-O, 1                       | 24. 0                     |
| July, 1882 and 1883      | 20.4      | · [-0, 2                      | 20, 6                     |
| August, 1882   6 months  | 1 29.0    | -, 0, 3                       | 22.5                      |
| September, 1882 6 months | 21. 6     | ++ O, 4                       | 22. 0                     |
| October, 1882 - 6 months | 22, 0     | $\div 0.5$                    | 22.5                      |
| November, 18824-6 months | 11-1 -1   | · † · 0, 6                    | 22, 8                     |

If the results exhibited in the last column of the table can be trusted for such small differences from the mean (81°23'.1), they would indicate a slightly greater dip about the time of the vernal equinox and a slightly smaller dip about the time of the autumnal equinox.

The probable uncertainty of a monthly determination of the dip, *i.e.*, of any one of the values  $\theta_l$  or  $\theta_D$  is found to be  $\frac{2^{\ell} \cdot 5}{\sqrt{3}} = \pm 1'.4$  about.

Observations at Washington, D. C.; at Toronto, Canada; at Madison, Wis.; at Esquimault, British Columbia; at Sitka, Alaska, and at many intermediate places (see preface to "Diary of a magnetic survey of a portion of the Dominion of Canada," by General Sir J. H. Lefroy, London, 1883) show that the dip as well as the total intensity of the magnetic force are at the present time and have been for some years past slowly decreasing, and our result at Uglaamie is conformable with this general and extended action of the secular change. General Lefroy also states that at Fort Rae, Great Slave Lake, the present rate of the secular variation is -1/7 per annum, determined from comparisons of observations by Capt. H. P. Dawson, with an earlier deduction. Both at Washington and Toronto the dip reached a maximum in 1859, at which time it is nearly certain that the total force had been declining for some years. In 1853, Captain Magnire, R. N., found the dip at Plover Point, about 24 miles southeast of Barrow Point,  $81^\circ$  36' (Phil Trans. Roy. Soc'y, 1857, vol. 147, Part II, London, 1858), indicating an apparent diminution of 15 m 29 years, but if is highly probable that since Captain Magnire's occupation of this point the dip was on the increase for a few years before its present reversed motion commenced.

ARSOLUTE MEAST RES: HORIZONTAL COMPONENT, VERTICAL COMPONENT AND TOTAL MAGNETIC FORCE.

The observations for horizontal force were made with magnetometer Coast and Geodetic Survey No. 11, mounted on its pier in the small magnetic observatory; on its return to Washington in January, 1881, the glass tube was found broken; it was replaced by a spare tube, and after repairing some trilling damages, additional of servations were made here by Sergeant Maxifeld for a better determination of the instrumental constants.\* He also made the observations of deflections by gravity and by magnetism with the Laoyd needle of dipeircle No. 23, which were required to furnish the constant for converting relative total intensity into absolute measure.

Constants of magnetometer No. 11: Mass of ring 300.767 grains, outer diameter 3.779 cm., inner diameter 2.953 cm., thickness 0.529 cm., measured April 29, 1881, at 77° Fah., again from measures on April 30 at 73° Fah. outer diameter 1.4895 inches, inner diameter 1.460 inches, thickness 0.208 inches; the ring is of bronze. Moment of mass  $M_1$  at any temperature t (Fah.) in units of feet and grains=0.93070 [1+.00002 (t-75%)]. From observations of oscillations of long or intensity magnet  $L_{\rm H}$  with and without ring, by Sergeants Smith, in June, 1881, and Maxield, in January, 1881, we have at the temperature of 62 Fah.:

| 1 | Pate               | 31          |     |
|---|--------------------|-------------|-----|
|   | tam 1:<br>11<br>17 | 0<br>0<br>0 | 1 1 |
| í | January 28         | e 87, 15    | 3 ( |
| 1 | Wich Middle Can-   | M=0.87094   |     |

hence M for any temperature t (Fah.), M=0.87694 [1+,0000136 (t-62)]; length of collimator may not  $L_{11}$  2.48 inches, diameter 0.33 inch about; length of shorter magnet  $S_{11}$  2.04 inches, diameter 0.34 inch about. Scale of declination magnet  $L_{11}$ , 80 divisions; angular value of scale 37,69. The temperature coefficient determined from the monthly observations of the intensity at Ughamie was found to equal q=.00085, a value rather large and probably related to the rapid loss of magnetism of  $L_{01}$  when first magnetized; the magnetic momentum of this magnet changed from about 0.0693 (English units) in December, 1881, to 0.0671 in January, 1881.

From the monthly observations at Ughamie the following results were deduced

Table of resulting values for magnetic horizontal force (H) at Uglaamic, as determined by magnetometer

No. 11 from oscilletions and deflections, and expressed in English units.

| Date of object, Cops      | 11        | sister(1) | $(\mathbf{p}, \mathbf{w}, \mathbf{c}, \mathbf{w}, \mathbf{w}_{\mathbf{w}}, \mathbf{w}_{\mathbf{w}}, \mathbf{w}_{\mathbf{w}})$ | 11      | 11 1    | Appointment |
|---------------------------|-----------|-----------|---|---------|---------|-------------|
| feel, the option (7.15.1) | 1.5       | , -,      | 1889 December 11  | 1.90%   | ,100    | 0.0, 1      |
| 1882 diamont by the of    | 1 1010    | 1.03      | 1853 January Littlet  | 1 51.7  |         | 117.1       |
| Leteraty 10 47, 15        | 1.500     | 1.5       | Lilitary 15 cm  | 1.932   | 1100    |             |
| March 17, 18, 19          | 1.382     |           | March Heat  | 1.90 5  | 1.00    | 4.1         |
| Apr. (417, 1 × 19)        | 1.900     | 1 111     | At ril 11, 5-1  | 1 0 1   | E-01811 | 40) 2       |
| May 1, 15 10              | 1,503     | 11.44     | May 14.51   | 1.20 (4 | 1057.15 | 4 1         |
| June 1, 1, 19             | 1 ( , , , | 111.11    | June 11)  | 1.950   | 19666   | 15 [ 5 ]    |
| July 18, 19 . 1           | 1 9 1     | 41.95     | July 11/21  | 1.9(5)  | 00,0    | 1 1         |
| August 17, 18, 19         | 1 014     | 1025      | An et H   | 1.975   | 1.11    | 1, 4        |
| September - 1, 14 30      | 1.939     | 00285     |   |         |         |             |
| October 11 31             | 1.9.6     |           | Mean  | 1.9. 1  | 111 ~ 2 | + 00        |
| November 14, 29           | 1.572     | 11753     |   |         |         |             |

Mean horizontal component of magnetic intensity from 21 months of observation 1.939, (English units), for epoch October (middle), 1882. Annual apparent increase, +0.015

Oscillations alone on January 18, 19 and April 17.

och October I,

age to the mean e, and to  $e_1$  the we obtain the erefore, should as of such vari-

nall differences e of the vernal

e of the values

at Esquimault, to "Diary of a efroy, London, e present time is conformable states that at annum, deterluction. Both nearly certain 2. N., found the us. Roy. Soc'y, 9 years, but it on the increase

The following results were deduced from Sergeant–Maxfield's observations at Washington: A, anary 28, 4834, H = 6375 (English units); dip January 39, 31, 16bruary 1, 2, 1831,  $\theta$  = 50 - 35, 39, hence T = 43,185. These results over pare favorably with the values deduced (and referred to same time) from 18 years of annual determinations in the same place, viz. H = 4,378,  $\theta$  = 70 - 39,24, F = 43,218.

From evidence sit that to that given for the dip, but less conclusive, it is probable that H is on the increase, though the above amount appears far too large. In the discussion of Captain to nizes observations at Barrow Point in 1852-753-754, Sir Edward Sabine assumes H for that epoch to 1.15. This value when compared with the above would indicate an annual increase of about 40,005.

Second and independent determination of the horizontal force by means of the Kew Dip Carde, according to The replayed's method's of deflections by gravity and by magnetism in emperation with dip observables. This method has the great advantage of being independent on a compensation and of another of magnetisms of the needle, and applies well for stations in high

for intensity viable he Dip Circle at Uglaamie commence in Joseph Proposition on D. C., was selected as a base station.

Here t = 0 , addition is see  $t = \sqrt{\sin(u_0)} \sin(u_0)$  see  $t_0$  became known from the observations t = 0. In this is an independent of the deflecting weight employ t = 0. In this is a second of the deflecting weight employ t = 0.

( closer accent, Lleval's needle No. 1 weighted: Febra

1 cl. c. vi tie as for 18 years, 1867 to 1884, reduced to 1 cl. .

. Poyd's needle No. 4, deflecting No. 3, as

(consequence) to the second of

atter August 23, we have

to Aloyd's needle No. 4 weighted; January 40.

, dip carde No. 23.

7. form that the result of shades needle No. 4, deflecting No. 3; does

the second

The second of the angle of the second and the secon

and the conservation of th

Part Land

all force (H) at Uglaamie, as defermed by

the Co. 23, from anyity and marnetly deflect to is:

| 1      | 0 - 1 - 0 - 1 -           | Γ*                                   | Date or " " " alreits.  | H  |
|--------|---------------------------|--------------------------------------|---|--|
| \<br>\ | + 18 10<br>18 10<br>18 10 | 1,015<br>- 75-<br>1 - 9.4<br>1 - 9.8 | Level 1 121<br>Matter 1 1 21<br>April 1 1, 50<br>Mr. (4 )<br>Dec 1 1 30<br>(5) 24 | 1, 92°<br>1, 9°s<br>1, 9°s<br>1, 90°s<br>1, 90°s |
|        |                           | 1                                    | χους τ 14   | 1,103  |

Mean hor's small composite of magnetic intensity from 15 months of observations, L935 (Fig. 5), anits), for the epoch damas youndle), 1883, with apparently an annual diminution.

Specifically a constraint magnetism Court of Gooder's Sorvet Report for 1881. Vig. No. (4.04)

The Lean values of H(b) (2) a settinment of all methods b = b . Mound the particle of the discontinuous setting of the se

| :   | <i>d</i> |     | Dr        | Litt. | <b>V</b> | • |
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| 11  |          |     | 4         | 11    | 1        |   |
| , i |          |     |           |       |          |   |
|     |          |     |           |       |          |   |
|     |          | 111 |           |       |          |   |
|     |          |     |           |       |          |   |

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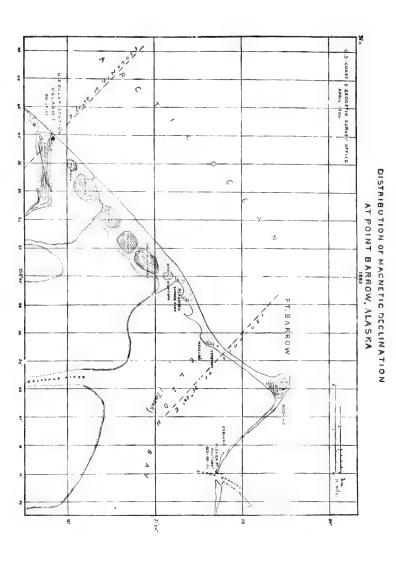
| * (                      |      |        |          | 3<br>17 |       |           | , in the second | Include auto |        |       |
|--------------------------|------|--------|----------|---------|-------|-----------|---|--------------|--------|-------|
|                          |      |        |          |         |       |           |   |              |        |       |
| 1 1 4                    |      | 1.9%   |          |         |       |           | *,**  |              |        |       |
| 4 1000                   | 1 1  | . 100  | 0.85.1   | 1       | 1     |           |   |              |        | 11.   |
| . Inat                   | 1    | 1 9 0  | 4, 414   |         | 1. 50 | 1, 10, 10 |   |              |        | 23    |
| 14                       |      | 1 72   | 0 - 16   |         | 11 -  |           | :   |              |        | - 6   |
|                          |      | 1 255  | 0 / 1    |         |       |           |   |              |        | 1 3   |
| 31                       | 1 1  | 1 921  | 0 - 5 17 | 1,7     | 1 .   | - 4       |   |              |        | 9, 1  |
| •                        |      | 1. 940 | 0.5115   | 1 4     |       | * .       |   | 1            |        |       |
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|                          | 2.3  | 1 917  |          |         |       |           | 45,0  |              |        | 1000  |
| A Company of the Company |      | 1 63   |          |         | 1.0   |           | 1.1   | 1            |        | ah 2  |
| 1 1 1                    |      | 1 4    |          |         | 13    |           |   |              | 1      | п,    |
| i                        |      |        |          |         |       |           |   |              |        |       |
| t a                      |      |        | 1        |         |       |           |   | 1            |        | 2.1   |
| 1                        |      |        |          |         | 1 5   | 46.0      | 10.1  | 1 ;          | + (%)  | 1.1   |
| 1                        |      |        |          |         | . 1   | 1.1       | 180   | 1 21         |        | 5.3.4 |
| 12:                      | 4.5  | 1      |          |         |       | 11        | 5.011   | 12.0         | 8.5%   |       |
| 4.1                      |      |        | 4        |         |       |           | 9.4   | 12 14        | 1.19.1 | 4.4   |
|                          | 4.5  |        |          |         |       |           | 143.14  | 2 4 1.4      | 13.    |       |

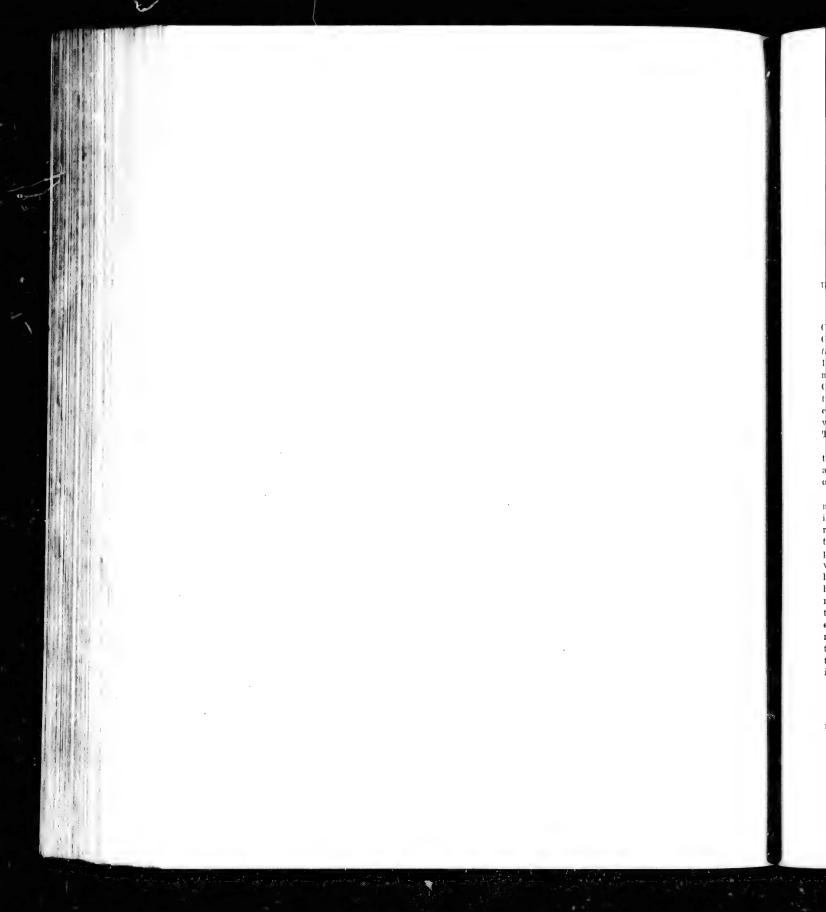
To an arguminating  $a^{*}=a^{*}$  . In a , a band and  $a^{*}=a$  , a aH a , the horizontal comparent so the force H there is a specificant a changes of or a discontinuous feed component Van Cawe total force F (resp. a)  $V_{t}(y,y,z)$  .  $F = \{H : H : t \in See \ | \ G \}$ 

Some that  $\sigma t = 41.2$  and  $\sigma H = 1.2$  are sized of V = 2.0 for V = 0.0 for the Euglish contrast Vwhere  $\operatorname{ith} \delta H = \operatorname{corps}_{\delta} \delta V$  and  $\delta P$  georges.

The topography of the accompanying map is compiled from surveys of 1853 (by C.49 %, Maguire, R. N.), of 1881 '83 (by Lieutenant Ray, U. S. A.); for the positions and names of the small lakes northwest of Ughanale I am indebted to Sergeant Murdoch; the two astrones and stations are haid down by their observed latitude and longitude. The d. tribution of the production of the PSSI is also with by two is agonic lines, the direction and distance of which are taken from reversible for 1883 is also with the United States (Coas) and Geodetic States (Coas) and Geo

thy Captall, unuses on the isstrong captall lact, and the captall captall lact, and detre show a line in a manufacture.





### PART III.—DIFFERENTIAL MEASURES.

HOURLY VARIATIONS OF THE DECLINATION, HORIZONTAL AND VERTICAL INTENSITIES, WITH BE MONTHLY TERM-DAY READINGS, AT UGLAAME, DECEMBER, 1881, TO AUGUST, 1883.

1. The observations of the first year of occupation consist of hourly readings of the Fauth & Co. magnetometer, Coast and Geodetic Survey No. 11; of the bifilar magnetometer, Coast and Geodetic Survey No. 2; and of Dip Circle, Coast and Geodetic Survey No. 23, comprising variations in the magnetic declination in the horizontal and in the total intensities between December, 1881, and September, 1882, together with term-day readings at the beginning and middle of each month, as agreed upon for the Polar stations. There were four observers, viz: Sergt. James Cassidy, Sergt. John Murdoch, Sergt. Middleton Smith, and A. C. Dark. They took regular turns, each observing four hours at a time. Fifteen readings were taken each hour, five for each instrument, viz, 6 minutes and 3 minutes before and after rad at the full hour, commencing with the declinometer and immediately followed by readings of the biblar and dip instruments. The temperature was noted. The presence of an aurora is indicated by an asterisk.

The instrumental outfit of the second year of occupation being far more complete than that of the first year, only so much of the record and discussion of the first year's work will be given here as seems desirable; further consideration will be given to this year's record after the presentation of the second year's work.

11. The observations of the second year of occupation consist of hourly readings of the Brooke magnetometers, comprising variations in the magnetic declination, in the horizontal intensity, and in the vertical intensity, between September, 1882, and August, 1883, together with term-day readings on the 1st and 15th of each month, as agreed upon for the Polar stations. The observations were made by six observers, viz: Sergeants Murdoch and Smith and Mr. Dark, as in the previous year, and Sergt. J. E. Maxfield, with Privates C. Ancor and J. Guzman. They took watches of four hours each in regular rotation. Six readings were taken every hour, viz: The horizontal force magnetometer was read 14 minutes before and again 14 minutes after the full hour, the declinometer was read 1 minute before and 1 minute after, and the vertical force magnetometer 4 minute before and 4 minute after the full hour. The temperature was noted by two thermometers suspended inside the cases or zinc covers of the horizontal force magnetometer and of the declinometer. Suitable centigrade thermometers had been ordered, but they were not received in time, and none was placed inside the case of the vertical force magnetometer. The temperature of this magnet can be inferred from the mean of the readings of the thermometers of the other instruments, which rarely deviated more than half a degree. The presence of an aurora is indicated by an asterisk.

#### ADJUSTMENT OF THE BROOKE DIFFERENTIAL MAGNETOMETERS.

The unifilar magnetometer.—The length of 1 division of the scale is 1 millimeter; the radius, mirror to scale, is 1.719 meter; hence the angular value of 1 division of the scale=1'.

 Observations for torsion coefficient, September 9, 1882, 1<sup>h</sup> p. m. When in the magnetic H. Ex. 44——59 meridian the plane of detorsion read 164° 30′, and by turning the torsion circle 90° first backward,• next forward, and again to the first position, we have the readings:

| Torsion circle.             | Scale r                | eadings.               | Mean.                     | Differences.                                     |  |  |  |  |
|-----------------------------|------------------------|------------------------|---------------------------|--|--|--|--|--|
| TOTALON CITCAG.             | Left.                  | Right.                 | mean.                     |  |  |  |  |  |
| 164° 30'<br>74 30<br>254 30 | d<br>530<br>456<br>684 | d<br>519<br>416<br>490 | 8 524.5<br>436.0<br>594.5 | d<br>88,5 for 90<br>155,5 for 180<br>88,5 for 90 |  |  |  |  |

Mean deflection  $a=83^{\circ}.1$  for  $\beta=90^{\circ}$ ; hence  $\frac{\hbar}{f}=\frac{83.1}{5316.9}$  0.01563, and the scale value  $\alpha=1^{\circ}.016$ 

The fixed mirror was set to show scale division 50 bisected, and at 0<sup>b</sup> 08<sup>m</sup> (September 10) a. m., Göttingen mean time, the magnetometer (movable mirror) was set to read 524.

- (2) On November 1, 4h 52m p. m., Göttingen time, both mirrors set to read 500.
- (3) The instrument was readjusted November 3, 6<sup>h</sup> 10<sup>m</sup> p. m. At 3<sup>h</sup> 47<sup>m</sup> p. m. the plane of detersion was found to read 51° 52°, when the following observations were made:

| Torsion                 | eirele.                     | Scale in; |                             | D  | ifferences.                            |
|-------------------------|-----------------------------|-----------|-----------------------------|----|--|
| 510<br>141<br>321<br>51 | 59'<br>52<br>52<br>52<br>52 | 1 3       | # 1<br>86<br>92<br>84<br>87 | 20 | 964 for 90°<br>18 for 180<br>13 for 90 |

Mean deflection  $a=104^\circ.3$  for  $\beta=90^\circ$ ; hence  $\frac{h}{f}=\frac{104.9}{5205.7}\pm0.01970$ , and the new scale value a=1/020

Fixed mirror reads 500, and the magnetometer (movable mirror) was set to 493 at 55 165 a.m., November 4, Göttingen time. Increasing scale divisions denote increasing easterly declination.

<sup>\*</sup> The circle is graduated from left to right.

#### backward.

er 10) a. m.,

plane of de.

<sup>ь</sup> 16<sup>ш</sup> а. т., clination.

## DIFFERENTIAL MAGNETIC OBSERVATIONS AT UGLAAMIE.

HOURLY READINGS OF THE BROOKE DECLINOMETER FROM SEPTEMBER 12, 1882, TO AUGUST 27, 1883,

Increasing scale numbers denote increasing easterly declination. Value of one division of scale between September 12, 1882, and November 3, hast observation, a = 10.016; from November 4 to close of series, a = 1.029. The average scale reading, 69.7, corresponds approximately to 35° 37°.2 E. declination. The presence of an autora is unificated by letters, those; (a) a true, list visible, (b) a feedle display, (c) a bright appearance, (e) a brilliant display. The two readings of the declinometer are given for each only new world as their mean. The two readings are placed opposite the brace in the first column, and their mean directly below. The extreme search divisions are 200 and 600.]

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, September, 1882.

(Göttingen time.)

| Sept. 12 (   | Date.                           | 0h     | ] _{h  | 95    | 3h   | 45   | D.   | 6h   | 74   | 44   | ₽p     | 10b   | m    | Noon. | 13h   | 146   | 15h  | 16h  | 175   | 15h    | 195   | 20h   | 214  | 224 | 236  |
|--|---------------------------------|--------|--------|-------|------|------|------|------|------|------|--------|-------|------|-------|-------|-------|------|------|-------|--------|-------|-------|------|-----|------|
| Set 1 18 ( ) 52   529   541   520   542   543   543   542   544   548   549                    | 5 pt 12'                        | ş      | . 115  | 593   |      |      |      |      |      |      |        |       |      |       |       |       |      |      |       |        |       |       |      |     |      |
| Neath 16   Sept. 15   Sept. 15   Sept. 15   Sept. 16                    |                                 |        | 511    | 5.30  | 512  | 519  | 536  | 5.42 | 526  | 510  | 7.6163 | 5227  | 516  | 5008  | 521   | 510   | 530  | ,332 | 5,99  | 547    | (1.1) | 511   | 4113 | 110 | 10   |
| Sect 14  |                                 | 1 507  | 1      | 514   | 519  | 514  | 525  | 7(5  | 1996 | 565  | 1234   | 5110  | 513  | 522   | 511   | 540   | 535  | 570  | 114   | 519    | 11    | 545   | 22   | 500 | 18   |
| Sept 17   Sept 18   Sept                   |                                 | ( ol5  | ., . 1 | ,1()  | 406  | 494  | 519  | 510  | 524  | a27  | 504    | 397   | Seed | 1725  | 5.13  | 521   | 701  | 162  | 557   | 508    | 523   | 528   | 5.6  | 516 | 518  |
| Nontrol  |                                 | 514    | 514    | 1512  | ,503 | 504  | 524  | 508  | 524  | 524  | 1504   | 1:10  | 5.12 | 5.22  | 5014  | 522   | -    | 563  | 518   | 5.8    | 521   | 520   | 5 -8 | 515 | 519  |
| Section 18   535   519   562   518   509   521   509   521   509   522   507   525   522   510   508                   |                                 | 1 535  |        |       |      |      |      |      |      |      | 1      |       |      | 1     |       |       |      |      |       |        |       |       |      |     |      |
| Section   Sect                   |                                 |        |        | 5.12  | 504  | 5.0  | 521  | 515  | 520  | 519  | 502    | 327   | 527  | 525   | 5.22  | 510   | 50%  | 5.13 | + 0.5 | 536    | 531   | 5.43  | 501  | 511 |      |
| Sept. 17   685   595   686   687   638   595   688   689   687   697   697   698                     |                                 | 595    | 5.3    |       |      | 530  |      |      |      |      | 5.2    | ,524  | 506  | ,524  |       |       |      |      |       |        |       |       |      |     |      |
| $ \begin{array}{c} \text{Substant.} & 577 & 588 & 588 & 598 & 598 & 593 & 592 & 597 & 577 & 577 & 572 & 588 & 593 & 592 & 593 & 594 & 596 & 592 & 593 & 593 & 597 & 5$ |                                 | 5 514  |        |       |      |      |      |      |      |      |        | 52.1  |      |       |       |       |      |      |       |        |       |       |      |     |      |
| Sept. 29   Col. 1   Sept. 20                      |                                 |        |        |       | 5 33 |      |      |      | 5.7  | 5.2  | 5.8    | ,325  | 524  | 5.76  |       | 5.7   | 533  |      |       |        |       | 502   |      |     |      |
| Sept. 19   505   505   508   508   508   508   507   507   507   507   508   508   508   509   509   509   500                     |                                 | 1 518  | 563    | 5.9   | 535  | 527  | 521  | 322  | 535  | 516  | 21.1   | 54.4  | 516  | 523   | × 1   | 5.2   | 523  |      |       | Sick   | 5.19  | 752   | 510  | 514 | 109  |
| Month  |                                 | \$ 507 | 515    | 518   | 528  | 518  | 5.22 | 523  | 517  | 514  | 56.3   | 514   | 519  | 517   | 5.4   | 715   | 521  | 5.27 | 541   | - 16   | 544   | 556   | 523  | 521 | 200  |
| Section   Sect                   |                                 | 566    | 78.8   | 518   | 526  | 519  | 522  | 722  | .517 | 1516 | 2016   | 520   | 518  | 516   | 520   | 511   | 526  | 196  | 542   | 542    | 240   | 355   | 504  | 526 | 504  |
| Section   11   Section   12   Section   13   Section   14   Section   14   Section   15   Sect                   |                                 | j 5:16 | 512    | 513   | 520  | 5.14 | 515  | 516  | 513  | 519  |        | 194   | 516  | 597   | 516   | 515   | 5.44 | 121  | 5.31  | 5.66   | 718   | * 161 | 5.19 | 524 | 739  |
| Michael   192   266   501   504   506   502   509   507   508   506   508   508   508   508   508   508   509   505   505   505   508   50                 |                                 | € 193  | 0.00   | 516   | 524  | 517  | 521  | 514  | 518  | 514  | 5      | 195   | 178  | 531   | 5.7   | 7.79  | 32.0 | 5.4  | 5.02  | 5011   | + 313 | 124   | 525  | 5.6 | + 7  |
| Section 2  |                                 |        |        |       |      |      |      |      |      |      |        |       |      | 5.30  |       |       |      |      | 1.12  |        | 530   |       |      |     |      |
| Motor  | Sept. 22                        |        |        |       | 522  |      |      |      |      |      |        |       |      |       |       |       |      | 5.2  |       |        |       |       |      |     |      |
| Section   Color   Co                   |                                 | 301    | 54.5   | 5,72  | 5.12 | 520  | 516  | 516  | 518  |      | 518    | 515   | 514  | 524   |       |       | 524  |      |       | 100    | 540   | 5.6   |      |     | 5.23 |
| Section   Control   Cont                   |                                 | 1 328  | 5. 3   | 510   | 520  | 514  | 515  | 512  | 521  | 519  | 14     | 521   | 518  | 517   | 120   | 5.28  | 5.10 | 29   | 7     | 572    | 546   | 114   | 520  | 715 | 345  |
| Visit   Color   Colo                   |                                 | ( 720  |        | 5. 1  | 5.10 | 519  | 5.23 | 5.2  | 521  | 519  | 5.9    | 5.5   | 5.23 | 5.4   | 513   | 5.4   | 5.11 | 1.2  | 5.7   | 202    | 5.5   | 7     | 5.13 |     |      |
| Mosar   746   748   748   749   74                   | $\lambda^{a} \in (a^{\pm})$     | 520    |        | 5 2   | 500  | 521  | 1523 | 522  | 5.0  | 524  | 21     | +124  | 120  | 324   | 519   |       | - 11 | 122  | 11.15 | 7/1118 | 5.5   | 5.28  | 544  |     |      |
| Sept. 22   Graph   Sept. 25   S                   |                                 | 1 315  | 111    | 5.6   | 5 2  | 506  | 507  | 497  | 523  | 50.4 | 201    | 1.57  | 11.8 | 5.20  | 517   |       | 613  | 8115 | 554   | *26    | 5.24  | 15    | 51.1 | 100 | 1 .1 |
| Mean   Col.   St.   Gen.   G                   |                                 |        |        | 5. 2  |      |      | .513 | 516  | 530  | 501  | 44.1   |       | 515  | 1-11  | * 11  | 500   | 5.4  | +47  | 5.95  | 5.,0   | 521   |       | 5.2  | 5.9 |      |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |                                 |        |        |       |      |      |      |      |      |      |        |       |      |       |       |       | 5.3  |      |       |        |       |       |      |     |      |
| Mean   |                                 |        |        |       | 5.9  |      |      |      |      |      |        |       |      |       |       |       |      | 4.5  |       |        |       | ,-323 |      |     |      |
| Mode   | Mean                            | 3.2%   | 16     | 516   | .710 | 514  | 402  | 51.8 | 521  | 451  | 5,15   | 11.(3 | 5.9  | 500   | 5.6   |       | 5    | 1    |       |        | 5.6   | 519   | 5.15 | 5.4 | 517  |
| Sept. 29 (a)8 a27 547 547 542 541 541 547 542 688 249 (b) 182 588 a.0 192 546 542 546 542 546 542 548 549 (b) 183 547 546 542 546 542 548 549 (b) 183 547 546 542 541 540 542 541 540 542 541 541 541 542 541 540 542 541 541 542 541 542 542 542 542 542 542 542 542 542 542  |                                 | 1 51 5 | 51.    | 515   | 512  | 514  | 516  | 518  | 514  | 516  | 100    | 516   | 511  | 512   | " . " | 15    | 520  | 1.0  | 5.0   | 515    | 5.29  | 5.2   | 512  | 514 | 517  |
| Step 4 (58) 517 708 541 542 541 540 548 550 7 8 187 588 721 740 543 542 7 1 366 556 550 743 541 542 580 542 57 1 57 57 57 58 57 58 58 58 58 58 58 58 58 58 58 58 58 58   |                                 | 810 7  | 217    | 517   | 5.3  | 512  | 514  | 511  | 5.7  | 5.2  |        |       | 182  | 3.95  | 0     | 102   | 516  | 1.2  | 531   | 5.6    | 535   | 5.2   | 516  | 512 | 513  |
| Sept. (Alik 70) 713 503 501 401 588 502 501 5 45 5 5 6 58 501 508 529 508 506 529 508 509 506 507 506 507 500 508 500 508 509 508 509 506 507 500 508 509 508 509 500 500 500 500 500 500 500 500 500  |                                 | 115    | 517    | 7,174 | 1111 | 512  | 514  | 510  | 518  | 5.0  | ٠,     | 5     | 1-1  | Terms | 121   | * (1) | 515  | 51.2 | 1     | 536    | 5 6   | 5.20  | 715  | 511 | 512  |
|  |                                 |        |        |       |      |      |      |      |      | 2.1  |        | 1 2   | . 1  |       |       |       |      |      |       |        |       |       |      |     |      |
|  | $\{\lambda\}_{\lambda=1, \mu }$ |        |        |       |      |      |      | 51 + |      |      |        |       |      | 1.41  |       |       |      | 100  |       |        |       |       |      |     | 115  |

fit a so to concern at a fit of the fit of t

correction for a base to a midionic (v. ) we start a correction to reduce to a minionic system, (c. ), or relation to reduce to a uniform system, (c. ), Monthly mean, 521.7; Correction, (c. 2.3.2), corrected mean, 497.5.

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, October, 4882.

| Date. 0  | a   p       | 21         | 31           | 41                                     | 8º           | 61                  | - 71              | 1 50               | 91                  | 101                | 111                 | No                | . 131             | 111             | 101                 | 161          | 171           | 15               | 150            | 20                 | 21                | 22           |    |
|--|-------------|------------|--------------|--|--------------|---------------------|-------------------|--------------------|---------------------|--------------------|---------------------|-------------------|-------------------|-----------------|---------------------|--------------|---------------|------------------|----------------|--------------------|-------------------|--------------|----|
| ( 50)  | 516         | 120        | 519          | ************************************** | 519          | 518                 | 522h              | 522                | 521                 | f-19               | 514                 | 523               | 531               | 526             | 523                 | 546          | 543           | 199              |                | 432                | 524               | - 1          |    |
| Mean 500   | 516         |            | 519          | 592                                    | 519          | 518                 | 522               | 599                | 321                 | 519                | 511                 | 520               | 531               | 126             | - 21                | 516          | 543           | 5.19             | . 9            | 100                | 224               |              |    |
| ot. 2 521  | 513         |            | 508<br>208   | 500<br>520                             | 569          | 512<br>512          | 496               | 516<br>514         | 567<br>568          | 199<br>195         | 330                 | 252               | 465               | 536             | 318                 | 16.6         | 570           | 63=              | 150            | t d                | 1.7               |              | 1  |
|  |             |            | 50a<br>500   | 520<br>518                             | 508<br>470   | 312<br>490          | 40%<br>532        | 515<br>507         | 508<br>513          | 497                | 3 JA<br>483         | 2×4<br>51.0       | 178<br>192        | 5.16            | 542<br>500          | 51.2         | 559<br>194    | 632<br>489       | 100            | 1.6<br>211         | 1 - 1             | 1            | 1  |
| ct. 3 \ 432<br>Mean \ 444                          | 511         |            | 497          | 521                                    | 476          | 489                 | 521               | \$99<br>503        | 517                 | 500                | 4×4<br>4×0          | ar 6              | 503<br>408        | (0.1<br>(0.1    | 503                 | 516          | 179           | \$11.5<br>\$19.7 | - 1            | - 5                | 50.1              | 1.0          | ,  |
| Mean   | 504         | 1500       | 499          | 508                                    | 494          | 402<br>490          | 516               | 300                | 515<br>5.8          | 454                | 419                 | 335<br>431        | 521               | 195<br>500      | 503                 | 535          | 60<br>515     | 587<br>512       | 6.0            | 17                 | n,                | - 1          |    |
|  | a (anderes  | ,500       | 49a<br>515   | 50B<br>521                             | 492          | 4D1<br>4D4          | 515               | 1° 9<br>3×3        | 526<br>514          | 4.2                | 146<br>502          | 383               | 52 L              | \$18,8<br>5(2)8 | 56d<br>467          | 781<br>585   | 519<br>551    | 523              | 614            | 10                 | 5 %               |              | 1  |
| et. 5 500<br>Mean 504                              | 504         | 505        | 512          | 513                                    | 499          | 504<br>499          | 50%<br>506        | 190                | 515                 | 179<br>480         | 569<br>508          | 540<br>508        | 516<br>515        | 517<br>518      | 198                 | 546          | 549           | 518<br>518       | - ind          | 0.93               | 0.01              |              |    |
| ct. 6 { 470  |             | 505        | 170          | 490                                    | 404          | 510                 | 450               | 461                | 152                 | 350                | 452                 | 385               | 4111              | 760             | 193                 | 332          | 521           | 487              | 192<br>489     | 417                | 115               | 1            | •  |
| Mean 474   | 498         | 506<br>509 | 10           | 101                                    | 524          | 500<br>500          | \$ 22<br>5005     | 146                | 444                 | 359<br>506         | 162                 | 507               | 492<br>510        | 747<br>509      | 515                 | 50.2         | 520<br>503    | 450<br>500       | 450<br>519     | 509                | 195               | 1 :          |    |
| t. 7 502<br>Mean 502                               |             | 511        | 199          | 201                                    | 206<br>515   | 5.6                 | 56:4<br>56:4      | 500                | 50.1                | 504                | 198                 | 205               | 517               | 514<br>512      | 51.8<br>510         | 5.7          | .508<br>506   | 518<br>519       | 317            | 511<br>510         |                   |              |    |
| t. 8 5 507   | ,503        | 204<br>506 | 50.5<br>50.9 | 504                                    | 512          | 512<br>513          | 512               | 50 F               | 11.9                | 5.5                | 198<br>500          | 501               | 108<br>566        | 56.2            | 51e<br>5.1          | 507          | 516<br>518    | 513<br>512       | 5 p            | 500                | 1 12              |              |    |
| Mean 500<br>t. 9 515<br>Mean 515                   | 501         | 505        | 5.9          | 104                                    | 510<br>510   | 313                 | 512               | 20.5               | 502                 | 50.6               | 199<br>500          | 35.06             | 50%               | 1 140           | 510                 | 5.00         | 517<br>547    | 511<br>520       | 51.1           | 539                |                   |              |    |
| t. 9 515<br>Mean 515                               | 500         | 505        | 512<br>510   | 511                                    | 06           | 5.0                 | 503               | 107                | 503                 | 502                | 497                 | 192               | 50.2<br>505       | 516             | 501                 | 124          | 524<br>556    | 518              | 511            | 317                |                   |              | 1  |
| L  | 5t<br>502   | 513        | 100          | 511                                    | 4514<br>5014 | 510                 | 509<br>512        | 515                | 1.7                 | 502                | 470                 | 309               | 500               | 5.6             | 509                 | 511          | 597<br>598    | 1 0<br>5 6       | 2.5            | 61.1               | 51 -              | 1            | 1  |
| Mean oll   | 501         | 510        | 502          | 212<br>450                             | 1.0          | 5- 6<br>50a         | 510               | 11.55<br>11.55     | 188                 | 50 . (<br>4×9      | 172a                | 50%               |                   | 5.8             | 511<br>516          | 517          | 538<br>608    | 553              | State<br>for 1 | 511                | 195               |              |    |
| t. 11 \$ 523<br>Mean 524                           | 504         | 500        | 500          | 462<br>Lef                             | 17           | 50 %                | 119<br>523        | Service<br>Service | 1976                | 1-7<br>4556        | i5c2<br>501         | 500<br>504        | 515               | 542             | 5.0                 | . 16<br>516  | 3489<br>198   | 55.5<br>5.0e     | 647            | 6.4                | 1.7               | 150          |    |
| t. 12 . } 560                                      | 512<br>518  | 507<br>508 | ins<br>ac    |  | 10,1         |                     | 313               | 521                | 5-9<br>715          | 498<br>501         | 4×0<br>470          | 500               | 515               | 517<br>519      | 51.1                | 5.0          | 521<br>520    | 56.5             | 79 g<br>51 0   | 500                | 513<br>510        |              |    |
| Mean 761   | 515<br>.511 | 508<br>511 | 06<br>569    | 511                                    | 314<br>314   | , oca<br>312        | 546<br>505        | 5216               | 31.25<br>12         | \$10h              | 4756                | 511               | 5(9)              | 51.1<br>50.8    | 510 6               | 522          | 520<br>509    | 5 (6)            | 522<br>514     | 501                | 512<br>510        | -1           |    |
| t 13 { 512<br>Mean 512                             | 510<br>510  | 510<br>510 | 510<br>510   | 711                                    | 511          | 514<br>511          | 3.9               | . 11               | 317                 | 69<br>510 <i>0</i> | 510<br>509          | 512               | 596               | 510             | 521                 | 530          | 50s<br>50s    | 523<br>526       | 519<br>516     | 511                | 513               | 517          |    |
| t. 14 \$ 520<br>515                                | 513<br>515  | 512<br>510 | 205          | 516<br>514<br>512                      | 513          | 503                 | 510               | 511<br>514         | 510                 | Jus<br>Jus         | 508<br>510          | 505<br>510        | 398               | ,51a<br>510     | 525<br>550          | 521<br>522   | 561           | 577<br>580       | 5 m<br>555     | 527<br>512         | 560<br>503        | To a         | 3  |
| Mean 518   | 514         | 511<br>510 | 506<br>506   | 51.                                    | 51           |                     | 195               | 512                | Se66<br>102         | 5i 6i<br>4i 9      | 500<br>500          | 518               | 50_L<br>550       | 512b<br>549     | 425                 | 529<br>523   | 560           | 578<br>500       | 517<br>5-2     | 534                | 502               | 510          | ,  |
| t. 15)   510<br>Mean 512                           | 509         | 510        | 5: 6         | 54.0                                   | 520          | - Las               | 1./5              | Total co           | 5.00                | 10.00              | r ml                | 51-               | 55t h             | 5095            | 1256                | e3b          | 531           | 500              | 50.7           | , thu              | ā66               | (10)         | ,  |
| t. 16 5 507  | 510         | 507        | 510          | 569<br>54.1                            | 41           | 1                   | 11                | 50.6               | 197                 | 1.3                | Po.                 | Vie               | 111               | a12             | 521                 | 511          | 527           | 547<br>547       | 590<br>554     | 305                | 504               | 511          | -  |
| Mean 507   | 511         | 504<br>552 | . 12<br>510  | 510<br>516                             | 511          |                     | 5 4               | 150                | 15.6                | 5424               | 102                 | 7.14<br>3.11      | 530               | 514             | da                  | 782<br>729   | 526<br>520    | 517<br>513       | 388            | 791                | 503               | 140<br>5 6   |    |
| t. 17 } 525<br>Mean 526                            | 5c0<br>492  | 554        | 514<br>513   | 23                                     | 168          | 19                  | 2                 | ald<br>Mer         | 541<br>540e         | . 16<br>516e       | 50g<br>497a         | 51a<br>5186       | 5 (7 5016         | 556<br>5546     | 513                 | 527<br>5250  | 564<br>512    | 497<br>505       | 3.4            | 510                | 507               | 511          | -1 |
| t. 18 ( 512  | 512         | 500<br>500 | 499<br>300   | 52.3                                   | 2-3          | 109<br>112          | 500               | 08                 | 549                 | 191<br>458         | 500                 | 500<br>510        | 005<br>508        | 504<br>504      | 1.6                 | 322<br>5, 1  | 50 90<br>50 9 | 519<br>521       | 529            | 521                | 31.1              | 72           | ř  |
| Hean 514   | 511<br>508  | 500<br>508 | 140          | 511                                    | 3.4          | 10                  | 512               | 510                | 524<br>526          | 490<br>512         | 5/11                | 515<br>515        | 522               | 5115            | 2.7                 | 122          | 521           | 520<br>516       | 530<br>519     | 50.0               | 5.2               | 519          |    |
| t. 19 512<br>dean 511                              | 510         | 368<br>368 | 510<br>510   | 511                                    | 514          | 516                 | 1.                | .17                | 5.4                 | 516<br>514         | 516                 | 513               | 531               | 327             | 522<br>522          | 526<br>526   | 556<br>558    | 5_0<br>519       | 521<br>520     | 522<br>524         | 520<br>515<br>519 | 45           |    |
| 20 517   | 508<br>519  | 515        | 516          | 518<br>516                             | 318<br>317   | 317                 | , 19<br>5.9       | 519                | 119                 | 515<br>517         | 516                 | 510<br>518        | 5.3               | 516<br>520      | 537                 | 5.7<br>525   | 527<br>527    | 528<br>527       | 5.9            | 526                | 528<br>520        | 51.7<br>51.4 |    |
| dean 516   | 56%<br>517  | 516<br>516 | 516<br>516   | 317                                    | 51×          | 518                 | 519<br>515        | 118                | 519                 | 516                | 514                 | 519<br>521        | 522<br>515        | 515             | 540<br>525          | 526<br>521   | 527<br>532    | 528<br>519       | 530<br>528     | 794<br>592         | 500               |              | ,  |
| 1.21 515<br>Ican 516                               | 517         | 516<br>516 | 516<br>516   | 519<br>519                             | 518<br>518   | 419                 | 517               | 3 9                | 515<br>516          | 515<br>516         | 510<br>514          | 519<br>520        | 5 0               | 515             | 502<br>521b         | 521          | 543           | 540<br>530       | 531<br>530     | 525<br>504         | 50 s<br>50 s      | 50           | 1  |
| 22 . 520   | 5 10        | 518<br>519 | 516<br>514   | 520<br>520                             | 517          | 5.1                 | 50 A              | 310<br>315         | 545                 | 513                | 519                 | 525<br>523        | 520<br>520        | 533             | 531                 | 561          | 5/1<br>517    | 538<br>533       | 570            | 600<br>566         | 555               | 540<br>510   | 11 |
| Ican . 529   | 515         | 515        | 515          | 520<br>516                             | 517          | 512                 | 500<br>400        | 512<br>539         | 5.11                | 516<br>555         | 517                 | 524<br>510        | 5.2               | 504<br>523      | 5.4<br>5.21         | 501<br>514   | 519           | 536<br>529       | 576<br>599     | 553<br>529         | 335               | 5.6          | 1  |
| 123  | 522         | 500        | 515          | 509<br>512                             | 500<br>500b  | 508<br>510b         | 500<br>498c       | 535<br>532e        | 520<br>522a         | 518<br>536d        | 476<br>480b         | 505<br>508b       | 104               | 525<br>5246     | 524<br>522a         | 515<br>514a  | 534<br>533    | 529              | 525<br>524     | 52 k<br>52 k       | 521               | 51 -         |    |
| . 24 } 510   | 515         | 516        | 517          | 514<br>501                             | 500          | 474                 | 183               | 475                | 478                 | 505                | 523<br>530          | 187               | 110<br>161        | 550<br>5e3      | 531                 | 513          | 508<br>542    | 5 /5<br>526      | 533            | 522<br>528         | 518<br>515        | 512          | *. |
| fean 511   | 516<br>510  | 516<br>521 | 517<br>516   | 508<br>518                             | 496<br>520   | 170                 | 500<br>476        | 178<br>418         | 1-4                 | 501<br>518         | 526<br>522          | 451<br>171        | 17.0<br>512       | 566             | 500<br>527          | 512          | 510           | 526<br>516       | 536<br>544     | 525<br>525         | 516<br>326        | 515          | ā. |
| . 25 { 517<br>515<br>fean 516                      | 500         | 517<br>519 | 503          | 516                                    | 325<br>322   | 492<br>490          | 47.3<br>47.6      | 450<br>149         | 390                 | 5.25               | 509<br>516          | 484<br>478        | 545<br>544        | 533             | 500                 | 5 4          | 528<br>530    | 503              | 589<br>542     | 3110               | 532<br>309        | 512          | -  |
| 26 500   | 510<br>512  | 585<br>588 | 5.5          | 518<br>524                             | 519<br>521   | 528<br>531          | 540               | 594<br>521         | 525<br>.524         | 502<br>507<br>527  | 522<br>520          | 519<br>520        | 513               | 5.36<br>5.36    | 533<br>536          | 542<br>539   | 523           | 562<br>547       | 585<br>588     | 532                | 520<br>530        | 217          | 1  |
| lean 502   | 511<br>514  | 529        | 517          | 5.1                                    | 5.0<br>523   | 570                 | 581<br>756<br>501 | 5, 2<br>521        | 6524<br>457         | 197                | 501<br>508          | 520<br>520<br>426 | 529<br>721<br>559 | 5.17            | 5.6                 | 540<br>518   | 525<br>524    | 554<br>.519      | 582<br>542     | 55.0<br>531<br>520 | 5.5               | 51.1<br>50.0 | 1  |
| 510  | 513<br>514  | 514        | 517          | 525<br>522                             | 523<br>523   | 520                 | 503<br>202h       | 523<br>523e        | 464                 | 514                | 508<br>504          | 448               | 533               | 528<br>528      | 541                 | 512          | 512<br>512    | 540              | 550<br>546     | 523<br>523         | 512<br>518        | 50.9         | 1. |
|  | 510         | 535        | ,512         | 515                                    | 512          | 507                 | 472               | 446                | 460a<br>525         | 518                | 5.12                | 437<br>510        | 518               | 495             | 546                 | (51a<br>(546 | 532           | 537              | 555            | 525                | ,620              | 140          | 1  |
| 28 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \               | 515         | 550        | 514          | 512                                    | 513<br>5126  | 499<br>500 <i>b</i> | 481               | 450<br>418         | 522<br>522          | 520                | 517<br>520          | 511               | 408<br>508        | 490<br>492      | 558<br>550          | 536          | 530<br>531    | 544<br>540       | 512            | 570                | 611               | 200          | 34 |
| $.29 \dots \begin{cases} .515 \\ .505 \end{cases}$ | 515         | 530        | 508<br>507   | 517                                    | 502<br>513   | 517                 | 515<br>515        | 530<br>530         | 486<br>500          | 432                | 492<br>511          | 467               | 515<br>512        | 545             | 527                 | 508<br>512   | 553<br>560    | 568              | 625<br>558     | 520<br>516         | 500<br>512        | 4.5          | 30 |
| lean 510<br>. 30 521<br>. 52 <b>2</b>              | 518<br>500  | 524<br>515 | 508<br>514   | 516<br>514                             | 508<br>504   | 516<br>519          | 508<br>530        | 530α<br>519        | 493 <i>b</i><br>518 | 420<br>578         | 502 <i>b</i><br>490 | 408<br>562        | 514               | 542<br>520      | 508 <i>b</i><br>504 | 510b<br>519  | 55Fb<br>527   | 566<br>520       | 606<br>542     | 518                | 506<br>510        | 512          | 31 |
| Can 522  | 503<br>502  | 515<br>515 | 489<br>502   | 509<br>512                             | 528<br>524   | 517<br>518          | 534<br>530        | 524<br>522         | 518<br>518          | .553<br>566        | 495<br>492          | 531<br>546        | 535               | 542             | 535<br>534          | 522<br>520   | 533           | 518<br>519       | 555<br>548     | 527<br>524         | 516<br>518        | 315          | 11 |
| . 31: \$ 521                                       | 517<br>520  | 515<br>520 | 502<br>508   | 523<br>524                             | 524<br>525   | 525<br>522          | 525<br>528        | 525<br>523         | 520<br>521          | 520<br>520         | 515<br>513          | 539<br>528        | 510<br>509        | 525<br>528      | 527<br>528          | 524<br>529   | 524<br>523    | 530<br>529       | 525<br>523     | 529<br>532         | 512               | 5 0<br>526   | 51 |
| ean 520  | 518         | 518        | 505          | 524                                    | 504          | 524                 | 526               | 524                | 520                 | 520                | 514                 | 534               | 510               | 506             | 528                 | 525          | 524           | 530              | 52 ,           | 530                | 1516              | 5.3          | 51 |

<sup>\*</sup>Correction to reduce to uniform system, -22.0 \*\* (Correction to reduce to uniform system, -19.0 \*\*, Correction to reduce to uniform system, -19.0 \*\*, Correction to reduce to uniform system, -19.1 \*\*, Monthly mean, 514.6 \*\*, correction, -19.0 \*\*, corrected mean, 495.0 \*\*,

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, November, 1882.

524 524 527

| 522 | 527 | 527 | 528 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529 | 529

5,520, 4,511, 5,504, 8

form system, -10.1

|                         | _           |             |              | ,           |             |               |              |                  | -           |             |                     |             | _                   |              |               |             |                 |                 |                     |                      |             |                |               |      |
|-------------------------|-------------|-------------|--------------|-------------|-------------|---------------|--------------|------------------|-------------|-------------|---------------------|-------------|---------------------|--------------|---------------|-------------|-----------------|-----------------|---------------------|----------------------|-------------|----------------|---------------|------|
| Date.                   | Фр          | 1h          | 20           | 8h          | 44          | 514           | €li          | 7h               | Ah          | gu          | 104                 | 10          | Nuon.               | 135          | 144           | 15h         | 16h             | 475             | 1Nh                 | 194                  | 20h         | 215            | 33)           | 28   |
| ov. 15 56               | 02          | 517         | 524          | 525         | 518         | 521           | 522          | 530              | 525         | 519         | 559                 | 475         | 518                 | 532          | 537           | 534         | 501             | 511*            | 523                 | ,535                 | 531         | 500            | 502           | 498  |
| Manual 54               | 1.8         | 517         | 524          | 525         | 518         | 521           | 522          | 530              | 525         | 519         | 559                 | 475         | J18                 | 532          | 537           | 504         | 591             | 511             | 523                 | 535                  | 531         | 500            | 562           | 49%  |
| v. 25 30                | 90          | 515         | 500          | 505         | 500         | 510<br>511    | 510          | 197              | 512         | 512         | 516                 | 180         | 552                 | 510          | 511           | 518         | 520             | 518             | 520<br>527          | 514                  | 519         | 520            | 500           | 511  |
| ean a                   | JU.         | 510         | 505          | 5116        | 508         | 510           | 511          | 51.4             | 512         | 520b        | '510cc              | 181         | 734                 | 520          | 50%           | 5110        | 520             | 512             | 524                 | 516                  | 514         | 521            | 511           | 580  |
| 3/ 11                   | UG          | 511<br>510  | 405          | 519         | 504         | 515<br>512    | 51.6         | 508              | 517         | 518         | 510<br>511          | 510         | 520                 | 514          | 542           | 512         | 105<br>503      | 511             | 519                 | 500                  | 519<br>525  | 520<br>515     | 510           |      |
| eith 4f                 | 99          | ,510        | 194          | 516         | 518         | :514<br>: (b) | 187          | 495              | 511h<br>486 | 5175        | 510e                | 5125        | Feli                | 5100         | 490           | 518<br>485  | 501             | 516<br>497      | 518                 | 127                  | 193         | 51×            | 31 -          | 116  |
| . 45. ]<br>enn          |             |             |              |             |             |               | 404          | 101              | 185         | 187         | 18. b               | 191         | 458                 | 193          | \$50<br>\$9.1 | 487         | 500             | 40%<br>45%      | 490<br>100          | 492                  | 4593        | 495            | 4234          | 185  |
| , n (. 1)               | hiji<br>o a | 485         | 180          | 182         | 484         | 185           | 1-13         | 150              | 175         | 1×7         | 199                 | 1-19        | [ n()               | 100          | 4:10          | 192         | 191             | 1-3             | 184                 | 495<br>490           | 508         | 176<br>166     | 1 ~ ( )       | 114  |
| ean H                   | 85          | 484         | 4200         | 484         | 15.8        | 1 4 7         | 1-1          | 120              | 1116        | 1mm         | 1 = 65              | 1-7         | 181                 | 1-1          | \$nn<br>\$49  | 49.6        | \$1915<br>\$102 | 1-7             | 4×7                 | 102                  | 510         | 10-            | \$754<br>1m.2 | 14   |
| . 6, 4                  | 76<br>70    | 166         | 484          | 473         | 169<br>468  | 481           | 183          | 181              | 102         | 183         | 485                 | \$85<br>179 | 491                 | 41-61        | 495           | 400         | \$1-10          | 510             | 514                 | 509<br>517           | 480         | 184            | 485           | 50   |
| ean 15                  | 78<br>90    | 1500        | ,4F0<br>183  | 406         | .468        | 152           | 152          | 182              | 494         | 182         | 1×5                 | 1 2         | 1 (2)               | 45.0         | 194           | 1-4         | 100             | 509<br>195      | 414<br>507          | 519                  | 50.5        | 152            | 150           | 113  |
| . 90                    | 57          | 500         | 482          | 190         | 1H5         | 473           | 465          | 490              | 170         | 498         | 478<br>176e         | 111         | 478                 | 455          | 492           | 492         | 400             | 50-8            | 518                 | 510                  | 403         | \$20<br>\$16   | 155           | 17   |
| CHI B                   |             | 480         | 500          | 4 4         | \$115       | \$341)        | 182          | 492              | 151         | 163         | 5010                | 171         | 152                 | 5 10         | 438           | 496<br>503  | 500             | 15-6            | 511                 | 5.46                 | \$90<br>500 | 503            | 1-2           | 17   |
| ean B                   | 00<br>02    | 493<br>482  | 501          | 485         | 482         | 144           | 1-5          | 595              | 48.1        | 183         | 49: 6               | 168<br>171  | 1 6                 | 15.5         | 472           | 400a        | 11.9<br>200b    | \$19.8<br>459.8 | 518                 | 50 9<br>30 5<br>57 5 | 702         | 199<br>504     | 101           | 17   |
| . o E                   | 70<br>70    | 478         | 472          | 492         | 476         | 47:           | 474          | 1-5              | 195         | 487<br>175  | 476<br>151          | 196         | 1 - 5               | . 4          | 509           | 533         | 548             | 5.15            | 6, 0                | 51.5                 | 575         | 505            | 170           | 17   |
| ean F                   | 70          | 471         | .474<br>180  | 492         | 473         | 16n           | 171          | kette            | 1926        | 1817        | West                | 10-1        | 16: 6               | : _6         | 1:2-1         | 522         | 542             | 575             | 1.10                | 621                  | 162         | 530<br>183     | 1.0           | 1    |
| 7.107 40                | 61          | 475         | 478          | 470         | 181         | 176           | 155          | 1-1              | 163         | 482<br>482  | 179                 | 178         | \$ 415              | 480          | 206           | 181         | 4×7             | 4=5             | 1.0                 | 450                  | 182         | 1-4            | 1 - 1         | \$ 1 |
| 1.4"                    | 59<br>70    | 1473        | .478         | 474         | 484         | 1-7           | [24]<br>[24] | 12.4             | 153         | 182         | 179                 | 171.6       | 1:6                 | 4×0          | 1-7           | 1520        | 456             | 195             | 513                 | 489<br>492           | 154         | [59]           | 1: 5          | 17   |
| 11], ()<br>ean 15       | 733         | 474         | 480          | 483         | 480         | 12:1          | 1-1          | \$ =15<br>\$ H12 | 475         | 175         | 4-3                 | 180<br>176  | 191<br>188          | 480          | 1-3           | 190         | 541             | W 7             | 511                 | 502                  | 1914        | 501            | 51 (          | 1    |
| .12 5                   | 30          | 4102        | 465          | 476         | 461         | \$80          | 161          | 810-             | 111         | 162         | 456                 | 513         | 498<br>199          | 5:20         | 511           | 192         | 5.7             | 46.2            | 781                 | 500                  | 463         | \$115          | 113           | *1   |
| lean 5                  | 00<br>15    | 495<br>(454 | .468<br>[486 | 461<br>468  | 470         | 483           | \$195        | \$11%<br>\$1.36  | 1.6         | 164c        | 446<br>151 <i>d</i> | 5206        | 1916                | 505<br>5196  | 5136          | 543<br>7126 | 5516            | 376             | 573<br>577 <i>u</i> | 514                  | 456<br>456  | 411            | 107           | 1    |
| - en Al                 |             | 470         | 152          | 480         | 439         | 450           | 470<br>474   | 418<br>140       | 163<br>455  | .038        | 543                 | 100         | 10                  | 184<br>478   | 102           | 549         | 500             | 526             | 71:0<br>510         | 545                  | 160         | 540            | 515           | 1    |
| lean 1                  | 54          | 466         | 460          | 436         | 444e<br>486 | 456c<br>495   | 172b<br>507  | 429d             | 459d<br>158 | 335e        | 512d                | 414c        | 472d                | 481a         | 406           | 550d        | 538             | 520e            | 7550                | 562                  | 464         | 524<br>490     | 593<br>453    | 3    |
| .14, 4                  | 72          | 470         | 485          | 497         | 475         | 194 a         | 516          | 1×3              | 173         | \$652       | 400                 | 505         | 450                 | 191          | 515           | EDM         | 162             | 1905            | 59-0                | 8102                 | 5*19        | 8.333          | 3-1-2         |      |
| $\{can, 4' \\ r, 15\} $ | eÚ.         | 478         | 402          | 499<br>520  | 473         | 491c<br>497   | 512b<br>146  | 4F96             | 166d        | 159e<br>R 0 | 462 <i>b</i><br>112 | 510e<br>503 | 138b<br>138         | 100a<br>556  | 5150<br>490 h | 5986        | 1686            | 50%<br>476      | 376a<br>492         | 496<br>523           | 577<br>500  | 450            | 1.2           | -    |
| fean 50                 | 03          | 47B         | 462          | 520         | 473         | 497c          | 416          | Liste            | 111         | 190d        | 4126                | 50.0        | 13hc                | 5566         | 1936          | 502         | 1850            | 1760            | 1026                | 523                  | 500         | 493            | 1,00          | 1    |
| 7.16                    | 52          | 461<br>485  | 479          | 473         | 483         | 493<br>487    | 478          | 191              | 455         | 522<br>520  | 432                 | 37.5        | 119<br>105          | 510          | 110           | 510<br>510  | 518<br>519      | 50.8            | 502<br>510          | 493<br>500           | 499<br>489  | 493<br>199     | 192           | 1    |
| lean 4                  | 53          | 473         | 479          | 474         | 486         | 490           | 175a         | 190b             | 1576        | 521d        | 430d                | 31:4/       | 1120                | 5116         | 418c          | 5116        | 5186            | 504a            | 706                 | 196                  | 494         | 4:41           | 50            | 4    |
| 1.14, 5                 |             | 449         | 496<br>500   | 502<br>499  | 494<br>498  | 495<br>504    | 191          | 470<br>568       | 495         | 453<br>456  | 454<br>408          | 562         | 310                 | 302          | 2.15          | 500<br>172  | 640<br>C50      | 603<br>514      | 693                 | 519<br>492           | 563<br>644  | 630            | 5 1           | 1    |
| lean 4                  | 88<br>50    | 446         | 498          | 500<br>460  | 496         | 500<br>426    | 361          | 519h<br>419      | 467         | 371         | 4615<br>C39         | 3435        | $\frac{515b}{725}$  | 734          | 313<br>520    | 4850        | 500             | 5610            | 686c                | 501<br>574           | 572         | 690            | 1.6           | -    |
| v. 18 5                 | 60          | 645<br>554  | 478          | 468         | 445         | 414           | 332          | 431              | 461         | 376         | 530                 | 342         | 710<br>718          | 159          | 523<br>5220   | 503<br>500a | 523<br>511 at   | 103             | 523<br>596b         | 562<br>568           | 634         | 402            | 576           |      |
| v. 105 4                | 70          | 500         | 521          | 454         | 517         | 461           | 723<br>697   | 502              | 462         | 157         | 186<br>504          | 178         | 358                 | 2 to<br>545  | 113           | 300         | 114             | 451             | 7.40                | 184                  | 502<br>499  | 560<br>502     | 179           | 1    |
| fean 4                  | 65          | 605<br>552  | 496          | 487<br>446b | 508b        | 456<br>4580   | 710a         | 500              | 462         | 4600        | 195                 | 450<br>479  | 364                 | 512          | 204           |             | 526<br>1×1      | 574<br>528      | 497<br>518          | 508<br>496           | 500         | 1032           | 1-1           | 1    |
| v. 20 5 4               | 81<br>71    | 505         | 560<br>563   | 569<br>575  | 447         | 381           | 362          | 424              | 416         | 190         | 761                 | 250         | 512<br>403          | 478          | 369           | 172         | 605             | 421             | 503                 | 514                  | 500         | 175            | 11.5          | 1    |
| fean 4                  | 76          | 475         | 562<br>478   | 572<br>442  | 452         | 380           | 376<br>497   | 433b<br>490      | 412b        | 150-        | d 780e              | 2.527       | 10sc<br>185         | 160.0        | 110           | 181         | 50.1            | 4200            | 118<br>8.0          | 516                  | 570<br>636  | 479            | 45%           | 1    |
| v.21 4                  |             | 486         | 468          | 472         | 471         | 492           | 499          | 497              | 47ti        | 1103        | 4894                | 193         | 1-1                 | 479          | 451           | 1-7         | 526             | 394             | 5.20                | 505<br>te 558        | 717         | 400            | 1             | 1    |
| 1ean 4<br>v.22 4        | 50          | 491<br>433  | 473          | 457<br>468  | 468         | 493           | 498          | 494              | 470<br>494  | 192         | 194                 | 492         | 484<br>470          | (480<br>500  | 430<br>489    | 484<br>492  | 524<br>509      | 497             | 493                 | 490                  | 454         | 504<br>501     | 458           | 1    |
| lean 4                  | 68          | 463         | 488          | 480         | .498        | 1487          | 488          | 488              | 478         | 494         | 458                 | 417         | 406                 | 119          | 1-4           | 193         | 499             | \$11.8<br>\$516 | 197                 | 195                  | 176         | 41914<br>5 511 | 1-1           | 1    |
| v.2354                  | 80          | 484         | 470          | 486<br>490  | 481         | 491           | 481          | 527<br>495       | 500<br>490  | 493         | .132                | 476         | 153                 | 500          | 497           | 522<br>562  | 450             | 518             | 540<br>530          | 531<br>599           | 467         | 481            | 470           | 1    |
| Ican 4                  | 77          | 180         | 480          | 488         | 480         | 491           | 479          | 511              | 495         | 45.5        | 1200                | 441.4       | 1.9                 | 193          | \$1163        | 542         | 150             | 518             | 305                 | 526                  | 170         | 4~6            | 171           | 1    |
| .245                    | 77          | 488<br>489  | 476          | 491         | 487         | 476           | 496          | 490              | 476<br>485  | 475         | 504<br>510          | 137         | 401                 | 49.2<br>450  | 480<br>469    | 494         | 492<br>199      | 551<br>514      | 529                 | 504<br>509           | 492<br>501  | 181            | 411G          |      |
| ean 14                  | 82          | 488<br>490  | 474          | 492         | 486         | 475           | 493          | 488              | 4d0<br>469  | 474         | 512                 | 482         | 161                 | 491          | 174           | 540         | 496<br>590      | 552             | 526<br>537          | 566<br>572           | 496         | 482            | 450           | 1    |
| v.25\ 5                 | 00          | 498         | 463          | 489         | 490         | 492           | 484<br>486   | 491              | 475<br>475b | 464<br>447c | 4596                | 165<br>474  | 128<br>110 <i>c</i> | 509<br>51 fe | 496           | 1427        | 586<br>566      | 508             | 542<br>540 b        | 553                  | 519         | 534            | (0)           |      |
| lean 5<br>v.28 5        | 04          | 460         | 440          | 509         | 1479        | 496           | 501          | 466              | 328         | ,495        | 475                 | 190         | 1-9                 | 151-0        | 512           | 115         | 517             | 537             | 540                 | 502                  | *00         | 190            |               |      |
| fean 4                  | 96          | 418         | 446          | 502<br> 566 | 480 $480$   | 502<br>3499   | 505          | 470<br>468b      | 355<br>375d | 512<br>70%  | 170 0               | 497         | 185<br>187          | 425<br>496   | 314<br>314    | 423         | 5332            | 519<br>528      | 491<br>516          | 496                  | 5.6         | 199<br>494     | 47.1          |      |
| 1.275 4                 | 80          | 169         | 484          | 478         | 484         | 460           | 493          | 483              | 465<br>466  | 457         | 478                 | 441         | 145                 | 516          | 195           | 408         | 5.03            | 519             | 506                 | 487<br>519           | \$60        | 155            | 17/           |      |
| Mean 4                  | 80          | 470         | 482          | 479         | 484         | 462           | 493          | 478              | 466         | 46816       | 4786                | 1377        | 1117.               | 516          | 456           | 4' 6        | 532             | 500<br>508      | 508<br>195          | 503                  | 465         | 492            | 174           |      |
| $v.28_{24}^{514}$       | 85          | 480<br>483  | 478          | 167         | 490<br>402  | 490<br>458    | 478          | 482              | 477<br>480e | 543<br>569  | 413                 | 106         | 174<br>1826         |              | 487           | 487         | 497<br>196      | 50 8            | 4199                | 501                  | 4 (2        | 1×2            | \$79<br>\$75  | 1    |
| Mean 1                  | 34          | 482         | 483          | 4855        | 491         | 489<br>472    | 1480         | 4825             | 478         | 511d<br>491 | 1407                | 417b        | 457                 | 4707         | t 488<br>495  | 489a<br>502 | 196a<br>190     | 450             | 489                 | 500                  | 196         | 181            | 175           |      |
| v.29 14                 | 75          | 486         | 483<br>483   | 478         | 477<br>476b | 479<br>4766   | 488<br>487b  | 484              | 492         | 187         | 491                 | 473         | 182                 | 490          | 198           | 498         | 191             | 490             | 489                 | 458                  | 190         | 150<br>488     | 1.5           |      |
| Mean 4<br>v.3054        | 80          | 485<br>480  | 483          | 484         | 485         | 486           | 1478         | 483              | 1491        | [452]       | 473                 | 505         | 490                 | 493          | 467           | .481        | 519             | 466             | 511                 | 493                  | åt ti       | \$ 11.76       | -, -          |      |
| Mean 4                  |             | 481         | 483          | 485         | 485         | 488           | 478b         | 483<br>483d      | 489         | 458<br>454d | 463                 | 196         | 493                 | 1490         | 469<br>L 468  | 483         | .511            | 464             | 511                 | 501<br>497           | 502         | 185<br>186     | \$111         | 4    |
| www.cerr .g             |             | 100         |              | 101         | -           |               |              | 1 486. 5         | -           | 1010        | 1000                | ,           | 1045                |              | 100           |             |                 |                 | 0 508. 0            |                      | 5 514       |                |               | -    |

\* Both scales made to read 500 at 45 520 p.m. by readjustment of instrument. Correction to each reading November 1, 05 to 17 inclusive,—16.0 | Readjusting instrument, new determination of scale value. N. B.—November 20 at 65 magnet off scale below 180 divisions; again November 21 at 18 off scale above 820, the intended extensions to the scale not have been made. Monthly mean, 430.8

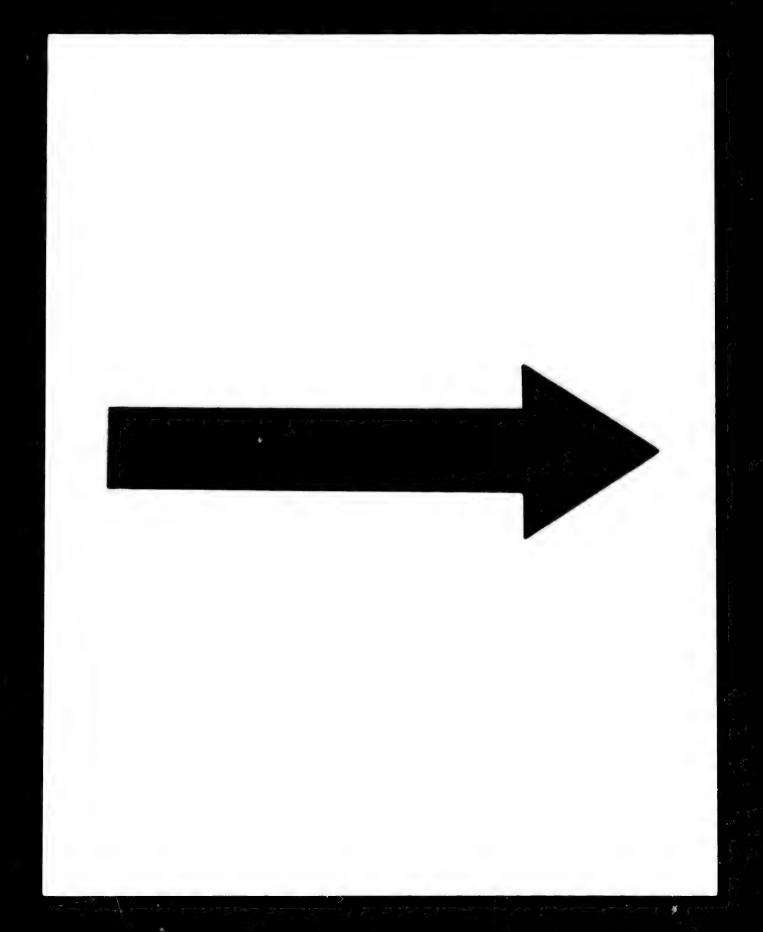
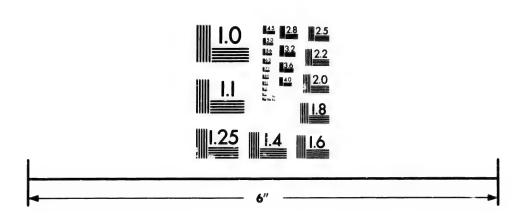
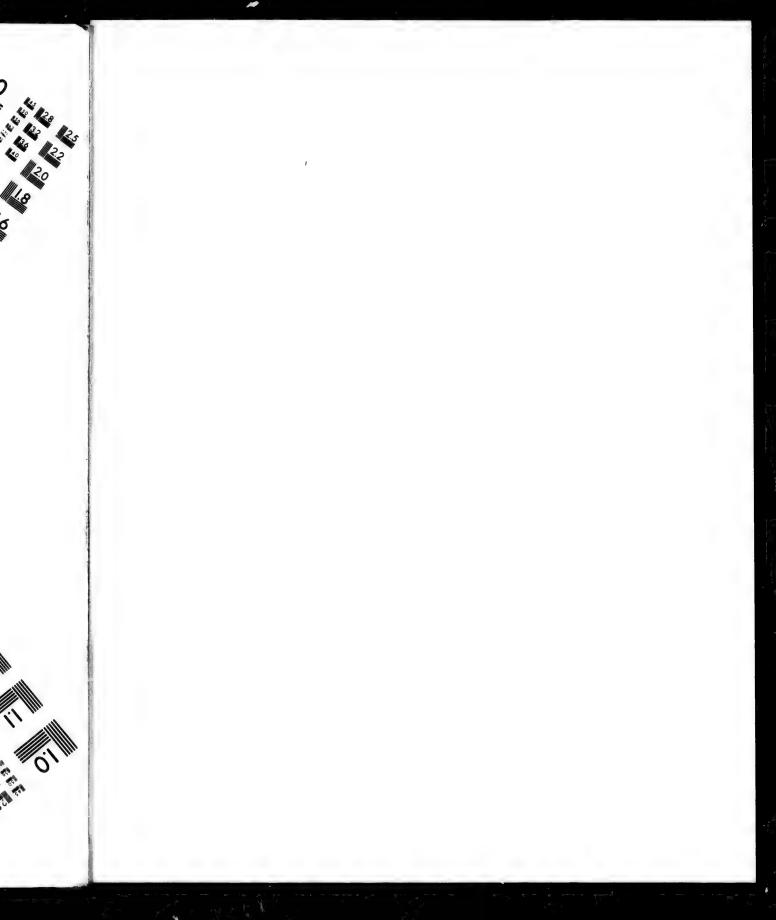


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREEY WEBSTER, N.Y. 14580 (716) 872-4503 STATE OF THE STATE



Hourly readings of the Brooke declinometer, Uglaamie, Alaska, December, 1882.

| Date.             | <b>0</b> <sub>P</sub> | <b>1</b> h        | 2h                | 34                 | ±1·                 | 5a                   | €h                 | 7h                  | Sh                         | 94                         | 104                 | 115                        | Noon                       | 13h                        | 14h                        | 15h                        | 16h                        | 175  | 19h                 | 19h                        | 20h                           | 21"                        | 225               | 23h               |
|-------------------|-----------------------|-------------------|-------------------|--------------------|---------------------|----------------------|--------------------|---------------------|----------------------------|----------------------------|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|---------------------|----------------------------|-------------------------------|----------------------------|-------------------|-------------------|
|                   | 475                   | 469               | 484               | 1×2                | 183                 | 487                  | 474                | 47G                 | 490                        | 488                        | 483                 | 486                        | 181                        | 510                        | 487                        | 492                        | 455                        | 474  | 490                 | 514                        | 500                           | 495                        | 198               | 502               |
| Mean              | \$60<br>507           | 469<br>458        | 484<br>187        | 482b<br>498        | 483c                | 487a<br>491          | 4740               | 476c<br>897         | 490 <i>a</i><br>476        | 488a<br>486                | 483<br>474          | 486<br>485                 | 481<br>480                 | 510d<br>485                | 187c<br>482                | 492b<br>491                | 455a<br>499                | 474<br>516                                 | 490<br>482          | 514                        | 500                           | 405                        | 493               | 502               |
| Dec. 2            |                       | 467<br>462        | 185<br>486        | 493<br>493<br>195b | 185<br>483          | 185<br>188           | 489<br>4846        | 497<br>497 <i>b</i> | 193<br>484b                | 487<br>486b                | 380<br>477c         | 493<br>189a                | 474<br>477 <i>b</i>        | 484<br>484c                | 486<br>481c                | 495<br>493 <i>b</i>        | 497<br>498b                | 519<br>518                                 | 497                 | 508<br>510                 | 495<br>492                    | 472<br>430<br>476          | 484<br>486<br>485 | 492<br>459        |
| Mean              | 493<br>488            | 481<br>483        | 483               | 181                | 486                 | 488<br>485           | \$48<br>487        | 495<br>496          | 491<br>490                 | 468                        | 486                 | 487<br>490                 | 484                        | 486                        | 488<br>486                 | 505<br>515                 | 495<br>498                 | 497  | .511<br>.516        | 529                        | 515                           | 499<br>509                 | 17 ±<br>17 ±      | 490<br>479<br>173 |
| Mean              | 41993                 | 182<br>493        | 182<br>485        | 479<br>485         | 1×6<br>492          | 486<br>493           | 488                | *496<br>481         | $\frac{490}{485}$          | 467<br>448                 | 484 <i>a</i><br>478 | $\frac{488b}{505}$         | 484c<br>525                | 4866                       | $\frac{487b}{485}$         | $\frac{510b}{500}$         | $\frac{490b}{572}$         | $\begin{array}{c} 497b \\ 493 \end{array}$ | 514a<br>512         | 534<br>480                 | 504<br>570                    | 504                        | \$76<br>502       | 176               |
| Mean              | \$73                  | 194<br>494        | 487<br>186        | 4×6<br>4×6/r       | 490<br>4916         | 496<br>4945          | 488                | 480h                | 485c<br>485c               | $^{415}_{432d}$            | 482<br>480d         | 441<br>473e                | 542<br>534c                | 452<br>448a                | .487<br>486h               | 199<br>500a                | 574<br>573                 | 191<br>492 <i>b</i>                        | 503<br>508a<br>403  | 489<br>484c                | 565<br>568                    | 549<br>541                 | 560<br>561        | 1.0               |
| Dec. 5 {          | 482                   | 481<br>481        | 487<br>482<br>484 | 180                | 489<br>489          | 486<br>486           | 487                | 484<br>477<br>150a  | 494<br>496<br>495 <i>b</i> | 495                        | 488<br>487<br>4886  | 483<br>481<br>482a         | 477<br>475<br>476b         | 504<br>506<br>505b         | 458<br>453<br>456c         | 487<br>487<br>487a         | 492<br>493<br>493          | 491<br>487<br>480                          | 493<br>491<br>492   | 497<br>494<br>496a         | 491<br>492<br>492             | 189<br>488                 | 146               | 172               |
| Mean              | 192<br>490            | 478<br>480        | 483               | 486                | 159                 | 487<br>486           | 190<br>189         | 892<br>490          | 192<br>186                 | 406b<br>500<br>491         | 514                 | 181                        | 482                        | 487                        | .500<br>402                | 491                        | 495<br>493                 | 492  | 501                 | 500                        | 522                           | 489                        | 486<br>480<br>476 | 175<br>151<br>183 |
| Mean<br>Dec. 7    | 491                   | 179<br>485        | 184<br>490        | 146                | 158                 | \$86<br>\$84         | 190<br>491         | 1916                | 1896<br>487                | 49tic<br>492               | 511 <i>b</i><br>488 | 484b<br>486                | 4836                       | 486c<br>492                | 196a<br>491                | 492                        | 494<br>492                 | 1492<br>.515                               | 500<br>.515         | 494                        | 512<br>484                    | 488<br>502                 | 178<br>184        | 151               |
|                   |                       | 480<br>482        | 481<br>486        | 183                | 484                 | 485<br>484           | 492<br>492         | 188<br>488          | 489<br>488                 | 188<br>190                 | 4×9<br>4×8          | 488b                       | 485<br>486                 | 490<br>491c                | 492<br>492c                | 495<br>497 <i>b</i>        | 495<br>494a                | 514<br>514b                                | 515<br>515b         | 508 - 506a                 | 485                           | 509<br>500                 | 479<br>192        | 186               |
| Dec. 8 {          | 480                   | 487<br>486        | 478<br>478        | 487<br>496<br>492  | 487<br>487          | 483<br>485<br>184    | 488<br>482<br>485  | 487<br>487<br>487   | 184<br>1485<br>484         | 481<br>491<br>486a         | 486<br>482c         | 183<br>182<br>482h         | 485<br>485<br>485c         | 470<br>474<br>472c         | 505<br>507<br>506h         | 494<br>493<br>494c         | 491<br>491<br>491a         | 489<br>489                                 | 489<br>489<br>489   | 490<br>492<br>491          | 491<br>490<br>490             | 489<br>4×9<br>489          | 190<br>190<br>190 | 193               |
| Mean<br>Dec. 9    | 483<br>483            | 488               | 486<br>486        | 486<br>484         | 489<br>488          | 182<br>182           | 487<br>486         | 450<br>389          | 483<br>486                 | 502<br>500                 | 490                 | 490<br>485                 | 489                        | 480<br>473                 | 199<br>500                 | ,506<br>.505               | 500                        | 535  | 500<br>499          | 518<br>486                 | 485<br>488                    | 489<br>472                 | 500F<br>450F      | 191<br>173<br>179 |
| Mean }            |                       | 488<br>475        | 486<br>488        | 485<br>190         | 488                 | 482<br>184           | 486c<br>484        | 410d<br>489         | 483                        | 501a<br>486                | 1925<br>190         | 488a<br>493                | 486b<br>186                | 476c<br>494                | 500b<br>1487               | 506                        | 502a                       | 538<br>493                                 | 500n<br>491         | 502b<br>490                | 486a<br>492                   | 480                        | 504<br>488        | 176<br>193        |
| Meau              | 4611                  | 467<br>471        | 481<br>484        | $\frac{484}{187b}$ | 183<br>480h         | 483<br>484 <i>ii</i> | 484                | 491<br>490b         | 485c                       | 486<br>486b                | 487<br>488b         | 496<br>494 <i>b</i>        | 48#<br>487a                | 497<br>496d                | 492<br>490c                | $\frac{493}{492b}$         | 488b                       | 497<br>495α                                | 491                 | 400<br>400                 | 480<br>490                    | 490<br>490                 | 189<br>188        | 191<br>192        |
| Dec. 11 {         | 493<br>483            | 486<br>483<br>484 | 483<br>482<br>482 | 490<br>4×6         | 484<br>484<br>484   | 482<br>487<br>484    | 491<br>487<br>489  | 470<br>471<br>472   | 492<br>495 <i>a</i>        | 478<br>479                 | 594<br>610<br>602d  | 500<br>508<br>504          | 491<br>484<br>488          | 498<br>479<br>488          | 494<br>495<br>494          | 495<br>492<br>494          | 501<br>503<br>502a         | 515<br>516<br>516                          | 552<br>566<br>559   | 450<br>490<br>470 <i>b</i> | 553<br>528<br>.540a           | 450<br>486                 | 472<br>457<br>484 | 180<br>476        |
| Mean<br>Dec. 12 { | 478<br>478            | 485               | 495<br>500        | 488<br>187<br>191  | 477<br>482          | 489<br>490           | 494<br>496         | 500<br>194          | 496<br>493                 | 478c<br>489<br>482         | 188                 | 481                        | 369                        | 528<br>532                 | 487<br>490                 | 493                        | 512<br>515                 | 548<br>542                                 | 535                 | 485<br>492                 | 467                           | 482                        | 515<br>470        | 178<br>186<br>188 |
| Mean              | 4=1)                  | 488<br>490        | 498<br>481        | 489c<br>484        | 480c<br>487         | 490 <i>b</i><br>488  | 4955<br>486        | 197e<br>493         | 494 <i>c</i><br>484        | 486b<br>492                | 488b<br>484         | 480d<br>485                | 3266                       | 530b<br>435                | 488c<br>503                | 494<br>509                 | 514 <i>b</i><br>488        | 545b<br>191                                | 528b<br>509         | 488a $500$                 | 468                           | 483<br>480                 | 192<br>492        | 187               |
| Mean              | 4×2                   | $\frac{485}{488}$ | 481<br>481        | 184                | 488<br>488          | 484<br>486           | 483<br>884         | 493<br>493          | 481<br>483                 | 492<br>492                 | 484<br>484          | 491<br>488                 | 466<br>462b                | 487<br>461                 | 508a                       | 508<br>508a                | 187<br>4886                | 190<br>490                                 | 511<br>510          | 498α                       | 494                           | 188<br>484                 | 490<br>491        | 183<br>482        |
| Dec. 14 }         |                       | 480               | 4°5<br>485<br>485 | 190<br>190         | 488<br>488<br>488   | 488<br>488<br>488    | 489<br>1488<br>488 | 487<br>491          | 489                        | 489                        | 491                 | 484<br>480<br>482b         | 487<br>491<br>489c         | 442<br>460<br>451c         | 492<br>492<br>492 <i>b</i> | 504<br>515                 | 186                        | 490  | 490<br>490<br>490α  | 498<br>494<br>496          | 494<br>495<br>194             | 489<br>483<br>486          | 194<br>499        | 190<br>486        |
| Mean              | \$56<br>\$54<br>183   | 481<br>483        | 484               | 190<br>500         | 485                 | 488                  | 488                | 489<br>486          | 4886<br>484                | $\frac{490b}{487}$         | 490 <i>c</i><br>483 | 479                        | 168                        | 489                        | 493                        | 510 <i>b</i><br>499        | 486 <i>b</i><br>493        | 4≻8a<br>197                                | 501                 | 500                        | 510                           | 519                        | 495               | 168               |
| Mean              | 1-8                   | 483<br>476        | 184<br>556        | 500<br>474         | 485<br>453          | 488<br>472           | 488<br>476         | 488a<br>458         | 484<br>500                 | 187 <i>b</i><br>400        | 483e<br>374         | 479a<br>543                | 168a<br>517                | 489<br>538                 | 493<br>430                 | 499                        | 493 <i>b</i><br>492        | 497a<br>492                                | 504a<br>530         | 500a<br>498                | 510<br>518                    | 519<br>527                 | 495<br>475        | 468<br>466        |
| Mein              | leā.                  | 490<br>483        | 549<br>552        | 132<br>1786        | 496<br>494 <i>h</i> | 475<br>474b          | 512<br>494b        | 446<br>452e         | 490d                       | 410<br>405c                |                     | 485<br>514c                | 528<br>522e                | 533<br>536d                | 425<br>428b<br>487         | 453<br>450e                | 494c                       | 491<br>492b                                | 539b                | 495<br>4966                | 532<br>525a                   | 520<br>524                 | 425               | 198<br>182        |
| Dec. 17 }         | 191<br>197<br>194     | 473<br>475<br>474 | 476<br>473<br>474 | 175<br>183<br>479  | 488<br>486<br>487   | 488<br>488<br>487    | 483<br>479<br>481  | 181<br>190<br>486   | 491<br>485<br>488          | 491<br>491<br>491 <i>b</i> | 483<br>190<br>486b  | 483<br>477<br>480a         | 491<br>491<br>491          | 500<br>506<br>503          | 490<br>488b                | 494<br>492<br>493 <i>a</i> | 497<br>497<br>497 <i>a</i> | 494<br>495<br>494 <i>a</i>                 | 492<br>492<br>402   | 490<br>487<br>488          | 493<br>490<br>492             | 496<br>496<br>496          | 190<br>492<br>491 | 191<br>196<br>194 |
| Dec. 18 . 5       | 190                   | 475<br>475        | 184<br>186        | 184                | 481<br>481          | 184                  | 478                | 493<br>496          | 192                        | 495<br>480                 | 495<br>486          | 492                        | 486                        | 494                        | 486<br>486                 | 193                        | 490                        | 486  | 492                 | 484<br>488                 | 189<br>493                    | 500<br>499                 | 498<br>511        | 493<br>510        |
| Mean              | 190<br>192            | 475<br>476        | 486<br>487        | 483<br>486         | 481<br>481          | $\frac{482b}{471}$   | 481b<br>479        | 494<br>596          | 491a<br>450                | $\frac{492}{330}$          | 490<br>482          | 491<br>477                 | 486                        | $\frac{492a}{503}$         | 486<br>497                 | 491<br>494                 | 190<br>198                 | 486  | 493<br>487          | 486<br>510                 | 491<br>490                    | 500<br>494                 | 504<br>500        | 502<br>4-7        |
| Mean              | 500<br>196            | 472<br>474        | 472<br>470<br>489 | 176<br>181         | 484<br>482c<br>481  | 467<br>469a          | 479<br>479         | 598e                | 458<br>454b                | $\frac{292}{311c}$         | 502<br>492e<br>435  | 478<br>478a                | 505<br>506                 | 505<br>504<br>494          | 495<br>496<br>595          | 496<br>495                 | 196<br>197a                | 489<br>491<br>610                          | 484<br>486<br>461   | 506<br>508<br>580          | 492<br>(491 <i>b</i> )<br>502 | 500<br>497                 | 498<br>499<br>510 | 490<br>188        |
| Dec. 20 {         | 192<br>182            | 484<br>485<br>484 | 488<br>488        | 185<br>185<br>185  | 483<br>482          | 481<br>482<br>482b   | 489<br>486<br>488  | 475<br>473<br>:74b  | 473<br>176<br>4716         | 481<br>574<br>528d         | 486<br>486          | 481<br>480b                | 482<br>484<br>483 <i>a</i> | 500<br>497                 | 814<br>704a                | 575<br>621<br>598a         | 481<br>470<br>476a         | 661<br>636                                 | 462<br>462          | 570<br>575b                | 545<br>554 <i>a</i>           | 402<br>420<br>411 <i>a</i> | 505<br>508        | 485<br>485<br>485 |
| Mean<br>Dec. 21   | 510                   | 500<br>483        | 486<br>184        | 176<br>171         | 451<br>457          | 479<br>477           | 472<br>481         | 478<br>479          | 465                        | 630                        | 446<br>435          | 504<br>531                 | 530<br>506                 | 475                        | 522<br>513                 | 507                        | 452<br>458                 | 501<br>500                                 | 513<br>515          | 590<br>585                 | 532<br>633                    | 1472                       | 469<br>450        | 499<br>485        |
| Dog 99            | 185                   | 492<br>473        | 485<br>482        | 174                | 454<br>486          | 478<br>478           | 478<br>476         | 478e<br>500         | 478d<br>495                | 614b                       | 440a<br>185         | 518c<br>220                | 518b<br>507                | 478<br>550                 | 518a<br>451                | 508a<br>501                | 455<br>507                 | $500 \\ 502$                               | 514α<br>508         | 588 <i>b</i><br>530        | 5926 $493$                    | $\frac{488a}{512}$         | 460<br>466        | 492<br>481        |
| Mean              | 184                   | 470<br>472        | 486<br>484<br>478 | 186<br>186         | 181<br>184<br>487   | 180<br>479 a         | 475<br>476a        | 190<br>495 <i>b</i> | 198<br>196c                | 530<br>506c                | 488<br>4865         | 254<br>237a                | 508<br>508b                | 549<br>5505<br>502         | 452a<br>490                | 508<br>504                 | 505                        | 490<br>496a                                | 520<br>514a<br>496  | 502<br>516<br>508          | 472<br>482                    | 529<br>520                 | 460<br>463<br>462 | 486               |
| Dec. 23 }         | 100<br>102<br>194     | 490<br>490<br>190 | 877<br>378        | 490<br>486<br>488  | 486<br>486          | 493<br>494           | 482                | 179<br>176<br>478   | 568<br>562<br>565¢         | 491<br>495<br>493c         | 454<br>474<br>464b  | 477<br>461<br>469 <i>a</i> | 305<br>258<br>282          | 500<br>500                 | 501<br>496                 | 495<br>495<br>495          | 510<br> 504<br> 507a       | 539<br>539<br>539                          | 493<br>494 <i>a</i> | 508<br>5084                | 476<br>482<br>479a            | 484<br>487                 | 470<br>466        | 485               |
| Dec. 24 5         | 185                   | 189               | 189<br>189        | 187<br>488         | 485<br>486          | 490                  | 487                | 489<br>101          | 496<br>495                 | 483<br>476                 | 565<br>558          | 411                        | 540                        | 490                        | 519<br>520                 | 480<br>483                 | 541                        | 435  | 471                 | 502<br>500                 | 480<br>474                    | 499<br>508                 | 483<br>490        | 19/3<br>48/8      |
| Mean<br>Dec. 25   | 184                   | 190<br>482        | 4×9<br>486        | 488<br>188         | $\frac{486}{485}$   | 490<br>468           | 485                | 490b<br>482         | 496b<br>498                | 480b<br>469                | 552b<br>510         | 402b<br>520                | 540<br>442                 | 488<br>585                 | 520a<br>482                | 482<br>492                 | 520<br>567                 | 438a<br>503                                | 470<br>502          | 501<br>496                 | 477<br>485                    | 504<br>450                 | 486<br>482        | 490<br>485        |
| Mean              | 182                   | 483<br>482        | 486<br>486        | 488<br>488         | $\frac{481}{483}$   | $\frac{475}{472}$    | 489<br>487         | 480<br>481          | 486<br>492c                | 471                        | 516<br>513          | 525<br>522                 | 451<br>446                 | 586<br>586                 | 480                        | 492<br>492                 | 508<br>508                 | $500 \\ 502$                               | 500<br>501          | 501<br>498                 | 480<br>482                    | 183<br>182                 | 480<br>481        | 181<br>483        |
| Dec. 26 { }       | 156<br>186            | 489<br>490<br>490 | 486<br>486<br>486 | 188<br>188         | 487<br>486<br>486   | 187<br>187<br>187    | 495<br>489<br>492  | 188<br>187<br>188   | 189                        | 488<br>488                 | 484                 | 465<br>475<br>470          | 490<br>496<br>493          | 491<br>490                 | (484<br>(482<br>483        | 508                        | 520<br>522<br>521          | 525<br>532<br>528                          | 490<br>492<br>491   | 492<br>492<br>492          | 491<br>495<br>493             | 489<br>480<br>484          | 476<br>478<br>477 | 478<br>480<br>479 |
| Mr. 1111          | 1011                  | 4×3<br>4×3        | 474<br>472        | 188<br>482<br>482  | 486<br>482          | 187<br>183<br>485    | 480<br>479         | 480<br>486          | 489<br>403<br>470          | 488<br>501<br>505          | 190<br>493<br>488   | 470<br>482<br>487          | 493<br>493<br>480          | 490<br>490<br>(487         | 497<br>495                 | 510<br>497<br>497          | 492<br>490                 | 492<br>490                                 | 489<br>487          | 492<br>490<br>484          | 491<br>490                    | 480<br>481                 | 476<br>479        | 459<br>484        |
| Mean              | 194                   | 183<br>480        | 473<br>472        | 182                | 184a<br>480         | 484a<br>165          | 180a               | 483b<br>452         | 466c<br>475                | 503d<br>516                | 490d<br>500         | 484 <i>b</i><br>491        | 4916<br>475                | 488a<br>515                | 496a<br>520                | 497a<br>502                | 491<br>489                 | 491  | 458<br>487          | 487<br>490                 | 490<br>481                    | 480<br>486                 | 478               | 486<br>487        |
| Mean              | 178<br>179            | 468<br>474        | 463<br>468        | 177                | 484<br>185b         | 174<br>170b          | 485<br>4816        | 461<br>456b         | 455<br>465¢                | 512<br>514b                | 500a                | 48H<br>490a                | 478<br>476b                | 486<br>500b                | 508<br>514a                | 493<br>498a                | 490<br>490a                | 488  | 486<br>486          | 488<br>489                 | 483                           | 188<br>180                 | 486               | 490               |
| Mean<br>Dec. 29 { | 188<br>183            | 486<br>486        | 482<br>482        | 472<br>471         | 478<br>482<br>480   | 173                  | 474<br>465         | 471<br>480          | 466<br>471                 | 504<br>506                 | 466                 | 489<br>190                 | 341                        | 495                        | 635                        | 471<br>517                 | 560<br>550                 | 521  | 556                 | 570<br>559                 | ,534<br>541<br>538 <i>a</i>   | 180<br>478                 | 482<br>485<br>484 | 465<br>478<br>479 |
| Mean {            | 186<br>188<br>185     | 483<br>485<br>488 | 482<br>457<br>478 | 472<br>479<br>472  | 480<br>480<br>485   | .168<br>.183<br>.482 | 479<br>491         | 488                 | 468a<br>493<br>498         | 505c<br>130<br>186         | 470b<br>490<br>489  | 190<br>170<br>167          | 342<br>525<br>545          | 496 <i>b</i><br>456<br>459 | 622c<br>410<br>450         | 494b<br>500<br>497         | 555b<br>480                | 518b<br>511<br>510                         | 552b<br>432<br>433  | 564b<br>523<br>522         | 538a<br>532                   | 478<br>478                 | 466<br>469        | 470               |
| Mean              | 132                   | 486<br>468        | 468<br>460        | 476                | 4825                | 482c                 | 485b<br>492        | 486c<br>490         | 496b<br>496                | 488b<br>479                | 1905<br>182         | 168c<br>185                | 535c                       | 458b<br>557                | 430d<br>524                | 498e<br>497                | 482a<br>493                | 510<br>493                                 | 432                 | 522b<br>552                | 556b<br>496                   | 185a<br>502                | 468               | 480               |
| Dec. 31 }         | 185<br>182            | 189<br>278        | 470<br>465        | 444                | 482<br>478a         | 183                  | 491                | 489                 | 494<br>495e                | 474                        | 479                 | 492                        | 480                        | 574                        | 503                        | 494<br>496                 | 492                        | 495<br>494                                 | 504<br>504a         | 539<br>546b                | 500<br>498a                   | 509<br>506                 | $\frac{480}{478}$ | 493               |
| Means             | 87. 9                 | 481.5             | 484. 1            | 484.5              | 483. F              | 483. 2               | -                  |                     |                            | 485. 6                     | 487.3               | 476. 4                     | -                          |                            |                            | 499. 0                     | 498. 3                     | 504. 1                                     | 499, 9              | 507. 7                     | 504. 8                        | 491. 8                     | 481. (            | 484.5             |

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, January, 1883.

| Date.           | 0h                | 1h                | 24                | 3h                | 4h                  | 5h                         | 6h                | 7h                  | Sh                  | 94                  | 10h                 | 115                 | Noots.                     | 131                | 14h                | 15h                        | 16h                 | 171                 | 185                 | 19h                 | 201                        | 20                | 224               | 1   |
|-----------------|-------------------|-------------------|-------------------|-------------------|---------------------|----------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------------|--------------------|--------------------|----------------------------|---------------------|---------------------|---------------------|---------------------|----------------------------|-------------------|-------------------|-----|
| m. 1 {<br>Mean  | 490<br>452<br>471 | 461<br>468<br>464 | 481<br>480<br>480 | 476<br>477<br>476 | 475<br>475<br>475a  | 480<br>484<br>482a         | 492<br>491<br>492 | 481<br>482<br>482a  | 467<br>476<br>472b  | 491<br>495<br>493e  | 487<br>486<br>486a  | 402<br>405<br>404e  | 423<br>448<br>436 <i>b</i> | 516<br>510<br>513b | 486<br>479<br>482c | 474<br>493<br>484 <i>e</i> | 528<br>514<br>421a  | 509<br>499-<br>504α | 494<br>482<br>488a  | 192<br>*488<br>490  | 503<br>515<br>509          | 490<br>481<br>486 | 476<br>471<br>474 | 4   |
| . 2 {           | 476<br>480<br>478 | 482               | 481               | 480               | 488<br>488 <i>b</i> | 485<br>485h                | 489               | 188<br>488b         | 156                 | 185                 | 480b                | 4846<br>4846        | 485                        | 146a               | 402                | 526<br>526                 | 515<br>515          | 484                 | 512<br>512          | 513                 | 536                        | 519<br>519        | 485               | - 4 |
| 3 {             | 476               | 485<br>485        | 183               | 1487<br>1485      | 484<br>486          | 481<br>482                 | 485               | 185<br>185          | 180                 | 470<br>476          | 160                 | 491<br>495          | 188                        | 153<br>462         | 491<br>486         | 528<br>524                 | 482<br>482          | 487                 | 492<br>491          | 490<br>498          | 486                        | 482<br>488        | 493<br>491        | 4   |
| an              | 476<br>489        | 485<br>480        | 482               | 486<br>485        | 485<br>486          | 482                        | 186               | 485                 | 484<br>490          | 473b                | 460b                | 493 <i>b</i><br>473 | 155a                       | 457a<br>455        | 188                | 526<br>186                 | 482<br>489          | 486a<br>488         | 492<br>498          | 489<br>184          | 486                        | 485               | 492<br>490        |     |
| 4               | 482<br>486        | 485<br>487        | 482<br>483        | 485<br>485        | 487                 | 487                        | 485               | 185                 | 483<br>486          | 490b                | 487<br>486a         | 476<br>474b         | 486<br>486b                | 500α               | 186<br>484a        | 185<br>486                 | 188<br>488          | 487<br>488          | 196                 | 486                 | 489                        | 490<br>490        | 487<br>488        |     |
| - 5             | 484<br>485        | 495               | 481               | 481               | 475<br>473          | 478<br>480                 | 475<br>478        | 481<br>471          | 487<br>492          | 460<br>159          | 503<br>108          | 493                 | 492                        | 180                | 185                | 484<br>480                 | 192<br>490          | 190                 | 493<br>492          | 490<br>492          | 500<br>493                 | 530<br>523        | 407<br>486        |     |
| Ican            | 484               | 496               | 481<br>469        | 481               | 474<br>472          | 179<br>189                 | 476a              | 476b                | 4900                | .009                | 500b                | 189a<br>188         | 192<br>492                 | 482                | 486                | 482                        | 491                 | 190                 | 492                 | 491                 | 496                        | 526<br>520        | 492               |     |
| 1.6             | 480               | 483<br>482        | 461               | 429<br>439        | 470                 | 492                        | 484<br>486<br>485 | 484                 | 469<br>472          | 170<br>457          | 436                 | 215                 | 196                        | 176<br>179         | 543<br>522         | 498<br>435                 | 565<br>560          | 487                 | 525<br>532          | 526<br>517          | 572<br>559                 | 490               | 477               |     |
|                 | 476<br>469        | 485               | 180<br>480        | 481               | 481                 | 490                        | 487               | 484<br>477<br>483   | 470a<br>457         | 464e                | 432<br>487          | 508                 | 494<br>352                 | 478<br>442         | 532b<br>510        | 400b<br>500                | 562b<br>533         | 492a<br>680         | 528b<br>550         | 522b<br>482         | 566a<br>582                | 505               | 467               |     |
| Ican            | 472               | 486               | 484               | 482               | 480                 | 481<br>480                 | 474<br>480b       | 180c                | 458<br>458d         | 491<br>492b         | 484<br>186b         | 195<br>502e         | 347<br>350a                | 145                | 512<br>511a        | 506<br>503                 | 524<br>528b         | 678<br>676b         | 558<br>554          | 478<br>480          | 575<br>578                 | 572               | 474               |     |
|                 | 467               | 478<br>478        | 482               | 480<br>478        | 480<br>478          | 482<br>480                 | 473<br>454        | 485<br>497          | 478<br>478          | 483                 | 488<br>190          | 506<br>510          | 480<br>482                 | 100                | 528<br>524         | 495<br>498                 | 473<br>472          | 508<br>510          | 503<br>50 <b>6</b>  | 532<br>520          | 480<br>507                 | 470<br>450        | 453<br>470        |     |
| n. 9 {          | 174<br>174        | 478               | 182<br>481        | 479<br>481        | 4796                | 481<br>481                 | 464c<br>475       | 491c<br>487         | 478c                | 488b<br>478         | 189a<br>491         | 508b                | 181 <i>a</i><br>179        | 160a<br>165        | 52 <b>6</b><br>502 | 496<br>515                 | 472<br>430          | 199                 | 504<br>498          | 528<br>562          | 494                        | 460<br>469        | 462               |     |
| Ican            | 480<br>477        | 480<br>478        | 181<br>481        | 481<br>481        | 480<br>482α         | 189<br>185                 | 173<br>471a       | 193<br>488b         | 194<br>1946         | 178<br>178a         | 485<br>486 <i>a</i> | 470<br>168          | 171<br>476a                | 414<br>410         | 501<br>502b        | 516<br>516c                | 4926                | 500<br>500b         | 501<br>500 <b>b</b> | $553 \\ 558b$       | 190<br>1⊬4α                | 468<br>468        | 481               |     |
| a. 10 {         | 483<br>482        | 189<br>492        | 492<br>494        | 482<br>480        | 483<br>484          | 183                        | 488<br>490        | 482<br>480          | 488<br>490          | 488<br>486          | 500<br>500          | 100<br>457          | 482<br>484                 | 185                | 486<br>487         | 457                        | 156<br>158          | 560<br>500          | 490<br>491          | 489                 | 192<br>191                 | 492               | 182<br>181        |     |
| dean            | 482<br>460        | 190<br>467        | 493<br>480        | 481<br>472        | 184                 | 484a<br>477                | 189<br>190        | 18!a<br>191         | 489 <i>b</i><br>485 | 487<br>482          | 500<br>483          | 188                 | 4836                       | 4865<br>488        | 456<br>486         | 187                        | 487<br>488          | 500<br>488          | 490a<br>490         | 490a<br>486         | 192<br>486                 | 493               | 490               | 1   |
| lean            | 466               | 166               | 480               | 470               | 478a                | 483<br>480b                | 491<br>490a       | 491<br>491a         | 484<br>484a         | 182a                | 481<br>182a         | 487<br>486b         | 485<br>486a                | 187<br>188b        | 486                | 188<br>488                 | 488<br>488          | 187<br>188          | 490<br>490          | 486<br>486          | 188                        | 489<br>488        | 483               |     |
| a. 12 {         | 456<br>456        | 488               | 484               | 488               | 485                 | 486                        | 489<br>485        | 487<br>182          | 486                 | 480                 | .484<br>.488        | 185                 | 494                        | 457                | 492<br>492         | 488                        | 490                 | 495<br>496          | 504<br>506          | 510<br>512          | 490                        | 483               | 479               |     |
| dean            | 486<br>479        | 488<br>485        | 486               | 488<br>485        | 484                 | 486<br>484                 | 487               | 4846<br>486         | 4906                | 191a<br>1485        | 486a<br>492         | 48 <b>6</b><br>488  | 492b<br>189                | 455b<br>492        | 402α<br>487        | 488<br>514                 | 488a<br>529         | 196a<br>500         | 505b                | 511b<br>483         | 491                        | 484<br>489        | 458               | ì   |
|                 | 179<br>1479       | 485<br>485        | 483               | 484               | 484                 | 483                        | 485<br>485        | 484                 | 495                 | 489                 | 494                 | 184                 | 488                        | 488<br>490         | 489<br>488b        | 5166                       | 511<br>520c         | 498<br>4996         | 504 - 502b          | 485                 | 483                        | 488               | 487               |     |
|                 | 185<br>185        | 480<br>180        | 476<br>478        | 483<br>181        | 486                 | 485                        | 486               | 487                 | 482                 | 187                 | 184                 | 483<br>480          | 485<br>484                 | 491                | 492                | 485                        | 498<br>498          | 497<br>198          | 504<br>505          | 513                 | 502<br>198                 | 499<br>197        | 493               |     |
| Ican            | 485               | 480<br>482        | 477<br>480        | 482<br>482        | 480                 | 185<br>184                 | 486<br>481        | 487<br>490          | 480b<br>487         | 486c<br>486         | 181c<br>184         | 482b<br>486         | 184 <i>b</i><br>180        | 490b<br>495        | 491a<br>646        | 4946<br>490                | 498 <i>b</i><br>490 | 496a<br>523         | 504b<br>490         | 516b<br>512         | 500<br>501                 | 198               | 492<br>488        |     |
| n. 15 }<br>Mean | 476               | 482               | 480               | 182               | 480                 | 484                        | 481               | 490                 | 187                 | 186                 | 184                 | 4866                | 180b                       | 495e               | 6466               | 490a                       | 1996                | 523a                | 1906                | 512                 | 501                        | 484               | 488               |     |
| n. 16 }         | 484               | 474               | 483<br>478        | 177<br>478        | 488<br>493          | 185<br>481                 | 492<br>485        | 491                 | 492<br>482          | 492<br>484          | 187                 | 489<br>485          | 488                        | 404<br>404         | 502<br>495         | 487                        | 503<br>498          | 50 <b>6</b>         | 474<br>478          | 491                 | 493                        | 480<br>480        | 487<br>489        |     |
| Mean            | 494<br>483        | 478<br>481        | 480<br>471        | 478<br>485        | 490                 | 483                        | 488<br>484        | 494                 | 487a                | 488 <i>c</i><br>185 | 189                 | 487b<br>456         | 189a<br>198                | 493b<br>502        | 198a<br>514        | 486a<br>494                | 500<br>525          | 506                 | 476                 | 490<br>182          | 492<br>488                 | 480<br>510        | 458<br>476        |     |
| n. 17 }<br>ɗean | 485               | 482               | 473<br>472        | 485<br>485        | 176<br>478          | 482<br>482                 | 483<br>484        | 487<br>487          | 474                 | 497<br>491          | 395                 | 490<br>1473         | 520<br>500                 | 504                | 511                | 490<br>492c                | 527<br>526a         | 608<br>588æ         | 473<br>476a         | 484<br>483          | 479<br>484                 | 493               | 480<br>478        |     |
| n. 18 {         | 172<br>160        | 475<br>476        | 478<br>472        | 190               | 482<br>481          | 481                        | 474               | 488<br>489          | 181                 | 410<br>431          | 475<br>464          | 490                 | 481                        | 500<br>501         | 516                | 402<br>402                 | 496<br>494          | 493                 | 495                 | 534<br>535          | 555                        | 478<br>483        | 476<br>474        |     |
| dean            | 466<br>465        | 470               | 475<br>481        | 190<br>4-1        | 482<br>487          | 179<br>186                 | 474b<br>488       | 4×86<br>487         | 4846                | 420a<br>481         | 470a                | 5026                | 4695                       | 500a               | 517<br>490         | 102a<br>494                | 195a<br>503         | 191 <i>b</i><br>507 | 500b<br>507         | 534a<br>478         | 535<br>489                 | 480<br>491        | 475               |     |
| 1. 10 {         | 471<br>468        | 483<br>478        | 478<br>480        | 482<br>482        | 485<br>486          | 188                        | 486<br>487        | 487                 | 486                 | 484                 | 491<br>491a         | 490<br>486          | 186                        | 194<br>500b        | 482                | 493<br>494a                | 502                 | 510                 | 510                 | 476                 | 490<br>490                 | 491<br>490<br>490 | 491               |     |
| fean<br>1. 20 { | 493               | 400               | .193              | 492               | 489                 | 483                        | 486               | 487<br>493          | 491                 | 182e<br>174         | 182                 | 543                 | 486<br>305                 | 438                | 486a<br>502        | 501                        | 502a<br>537         | 508b                | 508b                | 477b<br>505         | 490                        | 486               | 478<br>478        |     |
| fean            | 494               | 491<br>490        | 492<br>492        | 490<br>191        | 187<br>188          | 485<br>484                 | 486<br>486        | 492<br>492          | 500<br>496α         | 160<br>167 <i>b</i> | 476<br>479c         | $\frac{485}{514b}$  | 387<br>346b                | 440<br>439a        | 500<br>501b        | 502<br>502α                | 551<br>544 <i>b</i> | 588<br>582b         | 1089                | 507<br>506a         | 498<br>494                 | 490<br>488        | 476<br>177        | 1   |
| n. 21 {         | 178               | 478<br>477        | 475<br>477        | 472<br>481        | 484<br>487          | 478<br>481                 | 480<br>486        | 480                 | 482                 | 174<br>175          | 189<br>506          | 504<br> 520         | 195<br>185                 | 448<br>459         | 457<br>464         | 1506                       | 510<br>511          | 523<br>524          | 499<br>503          | 505<br>519          | 466<br>470                 | 465<br>461        | 486               |     |
| dean            | 478<br>468        | 478<br>476        | 476               | 476<br>484        | 486<br>481          | 480a<br>483                | 483e<br>484       | 483 <i>b</i><br>483 | 484b<br>485         | 174c<br>.184        | 498c<br>483         | 512b<br>480         | 490b<br>523                | 454c<br>387        | 160a<br>500        | 499a<br>483                | 510<br>485          | .524a<br>490        | 501<br>491          | 512<br>488          | 168<br>191                 | 463<br>480        | 400               |     |
| nean            | 476<br>472        | 475<br>476        | 480<br>478        | 483<br>484        | 486<br>484          | 485<br>484                 | 184<br>184        | 483<br>483          | 484<br>481          | 484                 | 184                 | 478<br>479          | 518c                       | 380<br>384b        | 510<br>505a        | 481<br>482                 | 482<br>484a         | 491                 | 491<br>491          | 490<br>480          | $\frac{492}{492}$          | 481<br>480        | 488<br>489        |     |
| n. 23           | 469<br>470        | 473<br>475        | 479<br>478        | 481<br>484        | 482<br>483          | 482<br>,4°3                | 482<br>482        | 185                 | 183                 | 483                 | 482                 | 483                 | 458<br>470                 | 504<br>487         | 528                | 486                        | 498<br>498          | 503<br>504          | 481<br>484          | 482<br>484          | 183<br>482                 | 492<br>493        | 198               |     |
| n. 24 {         | 470<br>482        | 474               | 478<br>488        | 482<br>483        | 484                 | 482<br>1486                | 482               | 1485                | 482                 | 1483                | 182                 | 184                 | 464<br>485                 | 496                | 1529<br>495        | 486<br>497                 | 498<br>501          | 504                 | 482<br>515          | 483<br>540          | 482<br>530                 | 492<br>473        | 498               |     |
| Mean            | 488<br>485        | 481               | 180               | 483<br>483        | 484                 | 484                        | 485<br>484        | 487<br>486          | 484<br>484          | 185                 | 483                 | 485<br>488          | 486<br>486                 | 492<br>490         | 494                | 491<br>494a                | 491<br>496          | 534<br>534          | 518<br>516          | $550 \\ 545a$       | 480<br>505                 | 462               | 510               |     |
| n. 25 {         | 109               | 494<br>492        | 182<br>176        | 172<br>480        | 490<br>492          | 476                        | 189<br>487        | 184<br>182          | 485<br>487          | 498                 | 189                 | 480<br>472          | $635 \\ 670$               | 480<br>486         | 501<br>494         | 199<br>511                 | 548<br>525          | 521                 | 486 - 483           | 575<br>562          | 680<br>749                 | 430<br>500        | 519               |     |
| dean<br>n. 26 } | 472<br>461        | 493<br>476        | $\frac{470}{472}$ | 476<br>455        | 491<br>478          | 475<br>164                 | 488               | 483<br>491          | 486<br>474<br>478   | 496b                | 188                 | 476<br>530          | 652c                       | 4834               | 498b               | 505a                       | 538a                | 519<br>486          | 484a<br>526         | 568 <b>b</b><br>504 | 714<br>514                 | 165<br>660        | 432               |     |
| Mean            | 158               | 462<br>469        | 471<br>472        | $\frac{480}{482}$ | $\frac{472}{175a}$  | [146<br>455¢               | 470<br>471c       | 192<br>492b         | 4766                | 181<br>478b         | 469<br>468c         | 537<br>534b         | 460<br>458b                | 498<br>496a        | 505<br>494b        | 527<br>508c                | 495<br>501c         | 481                 | 541<br>534a         | 510<br>507a         | 526<br>520                 | 575               | 100               |     |
| n. 27 {         | 445<br>435        | 161               | 472<br>466        | 176<br>474        | 481<br>482          | 190                        | 191               | 487<br>486          | 496                 | 482<br>484          | 500<br>495          | 182                 | 397                        | 492<br>498         | 485<br>491         | 494                        | 516<br>443          | 558                 | 468                 | 527<br>516          | 502                        | ,493              | 182               |     |
| Moan            | 1440              | 162<br>178        | 460               | 175<br>170        | 482a<br>1487        | 48°b<br>482                | 492a<br>467       | 486b<br>1470        | .488b<br>490        | 1483b<br>1405       | :498d               | 4830                | 400a<br>489                | 4950               | 488b<br>490        | 4926                       | 480e                | 560b                | 471a                | 522<br>529          | 50 <b>6</b><br>52 <b>6</b> | 496<br>484        | 156               |     |
| n. 28 {<br>Mean | 450               | 183<br>480        | 469               | 482<br>476        | 491<br>489a         | 480<br>481 <i>b</i>        | .463<br>405c      | 480<br>475c         | 495<br>492c         | 196<br>496e         | 484<br>4886         | 490b                | 188a                       | 493<br>492a        | 487<br>488         | 489<br>488                 | 484                 | 493<br>492b         | 491<br>492a         | 523<br>526          | 522<br>524                 | 493               | 476<br>174        |     |
| n. 29 {         | 475<br>472        | 479<br>469        | 477               | 471<br>473        | 477                 | 493<br>492                 | 189               | 184                 | 486                 | 1494                | 500                 | 1488                | 485<br>486                 | 481                | 491                | 500                        | 506                 | 500<br>498          | 500<br>500          | 507                 | 504                        | 488               | 482<br>486        |     |
| Menn            | 474               | 174<br>180        | 178<br>475        | 472<br>181        | 178a<br>181         | ,192<br>181                | 489<br>488        | 187b                | 1898                | 4925<br>483         | 496c                | 491a                | 486<br>467                 | 4824               | 491b               | 507b<br>498                | 500b                | 499                 | 5006                | 503                 | 506<br>497                 | 493               | 184<br>486        |     |
| n. 30 {<br>Mean | 175               | 176               | 180<br>178        | 481               | 481                 | 181<br>181 <i>a</i>        | .486<br>.487a     | 186<br>1*6a         | 188                 | 187                 | 485<br>484c         | 510<br>508c         | 170<br>168c                | 486<br>486b        | 199<br>197a        | 494<br>4966                | 489<br>489          | 516<br>517e         | 478<br>478a         | 488                 | 495                        | 496               | 480<br>488        |     |
| Menu<br>n. 31 { | 166               | 163               | 476<br>180        | 190               | 479<br>479          | 181 <i>a</i><br>179<br>180 | 181               | 175<br>183          | 1587<br>168         | 103                 | 1433<br>.413        | 182<br>183          | 550<br>614                 | 508<br>1500        | 498                | 496<br>496<br>495          | 408<br>(41:6        | 528<br>530          | 516<br>520          | 502<br>511          | 550<br>543                 | 492<br>489        | 191               |     |
| Mean            | 407               | 169               | 478               | 190               | 179                 | 180                        | 1883              | 479e                | 578d                | . 195<br>. 191d     | 423d                | 184e                | 582d                       | 503h               | :500a              | 495<br>496a                | :407a               | 529                 | ,518                | 506                 | 546                        | 490               | 194               |     |

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, February, 1883.

| Date.             | 0h                | Lis.              | 21                | 31                | - 41              | : ah              | $\boldsymbol{\theta}^{h}$ | 7h                | : Sh                | gh.               | 10h         | 18h                 | Noon.             | 18k                 | 14h                 | 154         | 16h                 | 17h                | 184                | 194               | 204               | 212               | 22h               | 2004            |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|-------------------|---------------------|-------------------|-------------|---------------------|-------------------|---------------------|---------------------|-------------|---------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-----------------|
| 22-2- 4           | 468               | 475               | 474               | 488               | 479               | 470               | 488                       | 485               | 483                 | 486               | 483         | 482                 | 470               | 470                 | 486                 | 483         | 499                 | 498                | 534                | 795               | 459               | 589               | 652               | <br>69 <b>9</b> |
| Feb. 1<br>Mean    | 4±5<br>486        | 475               | 474               | 488               | 479               | 470               | 468                       | 485               | 483                 | 486               | 483         | 18 a                | 4700              | 470d                | 4HCc                | 4836        | 4996                | 49₹₺               | 5346               | 7956              | 459               | 580               | 652               | 693             |
| Feb. 2            | 468               | 438               | 491               | 487<br>520        | 448<br>442        | 494               | 472<br>463                | 493               | 491<br>483          | 461<br>463        | 490         | 532<br>418          | 475<br>477        | 270<br>295          | 494<br>480          | 514         | 4⊱9<br>486          | 512<br>517         | 525<br>515         | 519               | 496               | 489               | 419<br>593        | 1 4             |
| Mean<br>Feb. 3    | 468               | 450<br>495        | 485<br>478        | 514<br>483        | 443<br>486        | 492<br>466        | 468<br>476                | 492a              | 487a                | 462<br>500        | 486c<br>470 | 475b<br>538         | 476b<br>527       | 282c<br>438         | 492a<br>725         | 538c        | 488a<br>476         | 514b<br>514        | 520a<br>533        | 516<br>622        | 495               | 490<br>500        | 506               | 4 1             |
| Feb. 3<br>Mean    | 100               | 498<br>496        | 479<br>478        | 487<br>485        | 482<br>484        | 480               | 467<br>472                | 418<br>450e       | 515<br>520c         | 484               | 466<br>468c | 540<br>509c         | 5346              | 432<br>435c         | 604<br>604a         | 481<br>474b | 471                 | 519<br>516b        | 520<br>526         | 444<br>533        | 602<br>548        | 449               | 456               | 1               |
| Feb. 4            | 476<br>473        | 481<br>492        | 433<br>482        | 471<br>460        | 477<br>481        | 477<br>475        | 483<br>484                | 479<br>480        | 464<br>466          | 490               | 541         | 438<br>452          | 444               | 500<br>420          | 440                 | 572         | 506<br>507          | 460                | 553                | 602<br>591        | 425<br>450        | 488<br>172        | 113               | 4. 1            |
| Mean              | 474               | 486<br>482        | 488<br>488        | 466               | 479<br>485        | 470               | 484a                      | 450a              | 465b                | 468a              | 508a        | 4456                | 4416              | 46°c<br>408         | 446a<br>495         | 194         | 50€ <i>b</i><br>500 | 457b<br>566        | 554                | 596<br>476        | 438               | 480<br>487        | 416               | 10.3            |
| Feb. 5<br>Mean    | 482               | 467               | 479<br>454        | 408<br>468        | 482               | 483<br>484a       | 500                       | 474<br>466        | 482                 | 475<br>476        | 473<br>469  | 414                 | 455<br>458        | 502<br>500          | 493                 | 495<br>494  | 509                 | 507                | 535<br>538         | 493               | 489               | 485<br>486        | 496               | 176<br>476      |
| Feb. 6            | 474<br>486        | 469<br>469        | 480               | 481               | 463               | 479<br>476        | 491                       | 472               | 489                 | 486               | 483<br>482  | 494                 | 484               | 402                 | 494<br>503          | 182         | 494<br>493          | 566<br>571         | 662                | 569<br>494        | 463               | 642               | 463               | 420             |
| Mean              | 480               | 469<br>490        | 483<br>476        | 483               | 470<br>478        | 478<br>481        | 400e<br>485               | 475c              | 486<br>480          | 488<br>491        | 482         | 494                 | 484<br>488        | 404<br>495          | 49≥c<br>484         | 452c<br>490 | 494c<br>184         | $\frac{568c}{485}$ | 671b<br>489        | 502<br>492        | 462<br>506        | 597<br>499        | 461               | 1-1             |
| Feb. 7<br>Mean    | 480               | 476<br>483        | 480<br>478        | 481               | 475<br>476        | 485<br>483        | 455<br>455a               | 481<br>4≥0        | 493<br>491          | 485<br>488        | 484         | 487                 | 488<br>488        | 494                 | .184<br>484         | 488         | 485<br>484          | 486<br>486         | 189<br>489         | 194<br>493        | 507<br>506        | 500<br>500        | 183               | 456             |
| Feb. 8            | 476               | 467<br>467        | 482<br>480        | 481               | 179<br>479        | 479<br>410        | 479<br>478                | 456               | 487<br>482          | 489<br>481        | 480<br>478  | 575<br>570          | 172<br>169        | 487<br>483          | 492                 | 500<br>500  | 191                 | 486                | 508<br>507         | 496<br>495        | 498               | 500<br>496        | 4.1               | 151             |
| Mean              | 477               | 467               | 481               | 4e1<br>476        | 479<br>484        | 480<br>485        | 177<br>177                | 486<br>481        | 181                 | 485b              | 479b        | 571b<br>482         | 470e              | 485b<br>478         | 4924                | 500e<br>484 | 492e<br>484         | 4×66<br>493        | 508                | 496<br>509        | 498               | 498<br>733        | 1 1               | 479<br>480      |
| Feb. 9            | 478<br>478        | 481               | 478               | 1479              | 484<br>482<br>483 | 485<br>485<br>485 | 178                       | 481<br>482<br>482 | 485                 | 491<br>490<br>490 | 484         | 482<br>482<br>482   | 487<br>485        | 476                 | 484                 | 487<br>486  | 4-3                 | 493                | 493<br>195<br>494  | 510               | 539               | 520               | 45.0              | 170             |
| Mean<br>Feb. 10 } |                   | 480<br>472        | 480<br>478<br>478 | 178<br>466<br>474 | 488<br>474        | 485<br>481        | 178<br>159<br>493         | 482<br>482<br>479 | 484<br>480          | 187<br>180        | 479<br>479  | 471                 | 488<br>484        | 477<br>480<br>485   | 490<br>493          | 492<br>496  | 484<br>503<br>510   | 493<br>488<br>491  | 494<br>491<br>492  | 510<br>499<br>495 | 508<br>496<br>493 | 526<br>490<br>485 | 304<br>452<br>190 | 472             |
| Mean              | 478               | 472<br>472        | 178               | 170               | 489               | 478               | 191                       | 480               | 480                 | 188               | 479<br>487  | 472<br>472          | 486               | 482                 | 492b<br>487         | 491a<br>493 | 506a                | 490b<br>497        | 192                | 497               | 494               | 458               | 4:11              | 478<br>351      |
| Feb. 13 }         | 493               | 490<br>491        | 186               | 486               | 482<br>483<br>482 | 483               | 483<br>483                | 483               | 485<br>485          | 488<br>486b       | 486<br>4864 | 460<br>450          | 442<br>454h       | 489<br>491          | 487<br>487          | 496         | 530<br>513<br>5266  | 498<br>498h        | 505                | 457<br>453        | 471               | 458<br>490        | 4×6<br>1 5        | 1-1             |
| Mean<br>Feb. 12 } | 482               | 490<br>492        | 486<br>483        | 486<br>485        | 483               | 483<br>484        | 183                       | 483a<br>485       | 493                 | :482              | 481         | 460b<br>479         | 438               | 400c                | 488                 | 494b<br>522 | 499                 | 486                | 50 <b>6</b><br>491 | 485<br>491        | 477<br>489        | 4±9<br>4±4        | 186<br>4-2        | 153             |
| Mean              | 482               | 484               | 482<br>482        | 485<br>485        | 482<br>482        | 483<br>484        | 183<br>483                | 484<br>484        | 485<br>489          | 483               | 482<br>482  | 479<br>479          | 442               | 498<br>500          | 492<br>490          | 517<br>520  | 505<br>502          | 486                | 491<br>491         | 491<br>491        | 189<br>480        | 483<br>484        | 182               | 4.7             |
| Feb. 13 {         | 480               | 482<br>482        | $\frac{483}{484}$ | $\frac{183}{483}$ | 483<br>483        | 483<br>483        | 183<br>183                | 483<br>481        | 463<br>483          | 483               | 485<br>484  | 485                 | 482<br>483        | 485<br>486          | 487<br>486          | 485<br>485  | 498<br>510          | 497<br>497         | 494                | $\frac{492}{490}$ | 403<br>492        | 485<br>486        | 408               | 4×2             |
| Mean<br>Feb. 14 { | 480<br>478        | 482<br>479        | 484<br>480        | $\frac{483}{482}$ | 483<br>481        | 483<br>479        | 181                       | 482<br>486        | 483<br>457          | 484<br>462        | 484<br>481  | 486<br>496          | 482<br>475        | 486                 | 480<br>518          | 485a<br>525 | 499a<br>535         | 497<br>507         | 486<br>489         | 191<br>501        | 402<br>452        | 180<br>489        | P6<br>5:0         | 195             |
| Mean              | 478<br>478        | 481               | 481<br>480        | 481<br>482        | 481<br>481        | 483<br>481        | 482<br>482                | 485<br>486        | 459<br>458          | 466               | 464<br>472c | 495<br>496b         | 479<br>477b       | 488<br>490a         | 513<br>516a         | 488<br>506  | 545<br>540          | 493<br>500         | 458<br>458         | 485<br>493        | $\frac{473}{462}$ | 512 - 500         | 1.5               | 11+1<br>11+3    |
| Mean<br>Feb. 15 { |                   | 482               | 183               | 180               | 495               | 487               | 186                       | 484               | 479                 | 482               | 484         | 479                 | 482               | 490                 | 490                 | 487         | 487                 | 485                | 469                | 468               | 41-9              | 485               | 181               | 478             |
| Mean }            | 487               | 482<br>479        | 481<br>481        | 480<br>179        | $\frac{495}{472}$ | 486               | 180<br>187                | 484<br>484        | 479                 | 482               | 484         | 479                 | $\frac{482}{532}$ | 490<br>487          | $\frac{490a}{484}$  | 487<br>495  | 467<br>531          | 485<br>486         | 469                | 488               | 489<br>485        | 485               | 483<br>482        | 178             |
| Mean              | 487               | 485<br>482        | 482<br>482        | $\frac{483}{481}$ | 471<br>472        | 486               | 188                       | 483<br>484        | 485<br>482b         | 486<br>487a       | 491<br>48≈b | 479<br>482a         | 510<br>521c       | 482<br>484 <i>b</i> | 482<br>482α         | 500<br>498  | 533 - 532a          | 4×3<br>4×4a        | 472<br>470         | 493<br>496        | 491<br>488        | 484<br>486        | 487               | 483             |
| Mean              | 478<br>478        | $\frac{482}{482}$ | 482<br>482        | 483               | 482<br>482        | 483               | 182<br>483                | 480<br>480        | 469<br>473          | 404               | 489         | 498<br>501          | 485<br>489        | 484<br>485          | 541<br>540          | 473<br>476  | 487<br>489          | 570<br>573         | 540<br>545         | 496<br>456        | 484<br>487        | 501<br>504        | $\frac{486}{472}$ | 478<br>476      |
| Mean              | 410               | 482<br>472        | 482               | 482<br>496        | 482<br>481        | 484               | 482                       | 480<br>485        | 471                 | 4640              | 491c<br>481 | 500a<br>478         | 487               | 484                 | 540<br>485          | 474         | 488<br>489          | 572<br>503         | 542<br>477         | 491               | 486<br>489        | 502<br>517        | 479               | 477<br>470      |
| Heb. 18<br>Mean   | 462<br>461<br>462 | 475<br>474        | 478<br>478        | 496<br>496        | 481<br>481        | 482               | 479<br>480                | 481<br>483        | 485<br>486          | 481               | 478         | 484                 | 482               | 483                 | 485                 | 485         | 489<br>480          | 503<br>503a        | 479<br>478         | 488               | 490<br>490        | 510<br>514        | 479<br>478        | 475             |
| Feb. 19 {         | 470<br>467        | 480<br>481        | 478<br>479        | 475<br>475        | 473<br>471        | 478<br>470        | 472<br>472                | 487               | 489<br>489          | 486               | 487         | 486<br>485          | 481               | 485                 | 486                 | 486<br>487  | 489                 | 486<br>485         | 486<br>485         | 458<br>458        | 488<br>486        | 489<br>489        | 457               | 4-41            |
| Mean              | 468<br>488        | 480<br>484        | 478<br>481        | 475<br>1478       | 472<br>480        | 474<br>480        | 472                       | 486               | 489<br>473          | 486<br>467        | 486         | 486                 | 482               | 484<br>684          | .486<br>546         | 486         | 489<br>420          | 486<br>515         | 486<br>4-9         | 488<br>490        | 487<br>486        | 489<br>488        | $\frac{488}{495}$ | 4-3             |
| Feb. 20 }<br>Mean | 486               | 483<br>484        | 481<br>481        | 476               | 480<br>480        | 481<br>480        | 476<br>476                | 483<br>483        | 475                 | 468               | 439<br>460  | 472                 | 491               | 712<br>658          | 554<br>550a         | 456<br>453b | 490<br>490          | 516                | 489<br>489         | 494<br>492        | 488               | 485<br>486        | 458               | 155             |
| Feb. 21 }         | 481               | 483<br>480        | 482<br>480        | 484               | 483               | 484               | 484                       | 484<br>483        | 487                 | 481               | 474         | 478<br>482          | 483               | 483<br>483          | 529<br>538          | 494<br>491  | 503<br>515          | 497<br>495         | 484                | 494               | 490<br>492        | 516<br>511        | 493               | 494<br>500      |
| Mean              | 482               | 482<br>462        | 481<br>450        | 184               | 483<br>472        | 484               | 484                       | 484               | 486<br>499          | 482<br>490        | 477<br>469  | 480<br>650          | 484               | 484                 | 534                 | ,492<br>529 | 569<br>661          | 496<br>800         | 430                | 466               | 491<br>503        | 508<br>485        | 450               | 497             |
| Feb. 22 {<br>Mean | 495               | 453<br>458        | 439               | 498<br>496        | 470<br>471        | 450<br>452        | 476<br>480a               | 471<br>470b       | 479<br>489 <i>b</i> | 478<br>484b       | 470<br>170a | 503<br>576 <b>b</b> | 437<br>445a       | 489<br>488          | :552a               | 518<br>524b | 581<br>621 <i>b</i> | 710<br>755c        | 547<br>488         | 479<br>470        | 477<br>490        | 512<br>498        | 500<br>495        | 503<br>505      |
| Feb. 23 }         | 453<br>453        | 486<br>498        | 471<br>456        | 462               | 508<br>504        | 480<br>480        | 4-4                       | 403               | 547                 | 507<br>601        | 610         | 414<br>418          | 494               | 491<br>487          | 544                 | 472         | 509                 | 517<br>508         | 531<br>515         | 470<br>475        | 511<br>510        | 518<br>515        | 478               | 158             |
| Mean              | 453               | 492<br>740        | 464<br>483        | 465               | 508<br>473        | 480<br>475        | 480a<br>476               | 422e<br>513       | 580d<br>485         | 581e<br>494       | 509c<br>478 | 416a<br>560         | 492<br>505        | 480                 | 540c<br>494         | 466         | 508<br>557          | 512<br>445         | 523<br>515         | 472<br>463        | 510<br>585        | 516<br>582        | 482<br>573        | 457<br>416      |
| Feb. 24 {<br>Mean |                   | 474<br>472        | 482<br>482        | 474               | 476<br>474        | 471<br>473        | 485<br>480b               | 503<br>508c       | 481<br>483b         | 482<br>488        | 475<br>476b | 582<br>571c         | 518<br>512b       | 483<br>485a         | 495<br>494a         | 495<br>488a | 1498<br>528e        | 428<br>436a        | 479<br>497         | 469<br>466        | 530<br>558        | 578<br>580        | 5.10              | 550<br>498      |
| Feb. 25 }         | 465               | 468               | 458<br>501        | 440<br>446        | 484<br>475        | 462<br>460        | 474<br>480                | 472               | 490<br>483          | 360<br>368        | 490<br>499  | 355<br>372          | 472<br>451        | 476<br>459          | 436<br>414          | 494<br>494  | 483<br>482          | 490<br>493         | 507<br>487         | 4:6<br>4:2        | 475<br>493        | 462<br>488        | 484               | 481             |
| Mean              | 464               | 468<br>472        | 480<br>477        | 443               | 480<br>479        | 461<br>478        | 477a                      | 470b              | 486d<br>473         | 364b              | 494c<br>500 | 384c                | 462c              | 468a<br>476         | 425b<br>564         | 494a<br>465 | 482<br>509          | 492<br>498         | 497                | 484               | 484               | 490               | 486               | 482             |
| Feb. 26 {<br>Mean | 471               | 471               | 483               | 477               | 472<br>476        | 4×5<br>4×2        | 481<br>482                | 475<br>473d       | 470                 | 484<br>479d       | 497<br>108a | 492                 | 189<br>489        | 470<br>473e         | 575<br>570a         | 460<br>462  | 502<br>506          | 494<br>496         | 534                | 582<br>592        | 539               | 517               | 182               | 477             |
| Feb. 27 {         |                   | 470<br>490        | 488               | 478<br>469        | 476<br>478        | 479<br>476        | 479<br>476                | 467               | 500                 | 460               | 452<br>439  | 485                 | 375<br>391        | 470<br>482          | 494<br>492          | 486<br>486  | 507<br>544          | 523<br>515         | 610                | 570<br>533        | 584               | 519               | 460               | 478<br>478      |
| Mean              | 468               | 480               | 490               | 474<br>495        | 477<br>467        | 478               | 478<br>473                | 476a<br>472       | 495e<br>543         | 465c              | 446c<br>564 | 4818                |                   | 476b                | 493 <i>b</i><br>556 | 486b<br>499 | 526b<br>559         | 519<br>622         | 620<br>442         | 752<br>520        | 515<br>550        | 530<br>524        | 462               | 482<br>468      |
| Feb. 28 {         |                   | 433<br>432        | 463<br>474        | 493<br>494        | 479<br>473        | 471<br>473<br>472 | 464<br>468                | 478<br>475        | 541<br>542d         | 434<br>428<br>431 | 566         | 403                 | 482<br>480        | 398<br>404          | 568<br>562          | 494<br>496  | 566<br>562          | 648<br>635         | 491<br>466         | 537<br>528        | 459<br>489        | 450<br>472        | 443<br>491        | 456<br>462      |
| Mean              |                   | -                 |                   |                   | -                 |                   |                           | -                 | -                   | -                 | 865c        | 466a                | -                 |                     |                     |             | -                   |                    | -                  | -                 | 474               |                   | 467               |                 |
| Means             | 476.              | 476. 0            | 479. 3            | 479.              | 5 478,            | 9,479. 0          | 481. 4                    | 478, 2            | 489. 1              | 478. 0            | 485, 6      | 488. 7              | 476. 4            | 476, 6              | 507. 7              | 491.        | 507. 1              | 513.               | 513. €             | 513. 8            | 494.              | 505.              | 491.              | 1 41-7. 6       |

Monthly mean, 489.4

Hourly readings of the Brooke declinometer, Uglaamie, Alusku, March, 1883.

| Date.  | O <sub>2</sub> | 1h                | 2h         | 8,                | 4h         | 5 h        | 6h                | Ţh.                 | 8h                  | gh                  | 16h                 | 11,                        | Noon.            | 13h                 | 14h                        | 15h                 | 16h               | 175               | 15h                                       | 1Ch               | 201                | 21h               | 224               | 2          |
|--------|----------------|-------------------|------------|-------------------|------------|------------|-------------------|---------------------|---------------------|---------------------|---------------------|----------------------------|------------------|---------------------|----------------------------|---------------------|-------------------|-------------------|---|-------------------|--------------------|-------------------|-------------------|------------|
| r. 1 { | 470<br>475     | 490               | 480        | 468               | 465        | 473        | 457               | 407                 | 477                 | 491                 | 581                 | 445                        | 418              | 250                 | 179                        | 513                 | 506               | 589               | 480                                       | 546               | 652                | 505               | 492               | 490        |
| ean    | 472            | 490               | 480<br>472 | 468               | 465        | 473<br>477 | 457a              | 467e                | 477                 | 4916                | 581 <i>d</i><br>461 | 445a<br>525                | 448c             | 250 <i>c</i><br>514 | 479a<br>472                | 513b<br>430         | 506a<br>456       | 589<br>568        | 480                                       | 546<br>515        | 652<br>480         | 505<br>520        | 492<br>488        | 490<br>528 |
| }      | 447            | 487<br>486        | 463        | 524<br>515        | 465        | 483        | 479               | 498                 | 486<br>486d         | 499                 | 338<br>400c         | 521                        | 462<br>5166      | 496<br>505a         | 108<br>440a                | 432<br>431 <i>b</i> | 451<br>454a       | 572<br>570a       | 525<br>522                                | .506<br>510       | 472<br>476         | 479               | 602               | 486<br>507 |
| ş      | 476<br>465     | 480<br>488        | 485        | 464<br>460        | 476        | 481<br>466 | 509               | 495                 | 450                 | 4£0d<br>515<br>430  | 446                 | 496<br>504                 | 479<br>481       | 478<br>477          | 500                        | 529<br>525          | 496<br>497        | 514<br>514        | 453<br>506                                | 510               | 489<br>483         | 499<br>509        | 483<br>480        | 509        |
|        | 470<br>468     | 484<br>486        | 486        | 462               | 478        | 474        | 525d<br>489       | 493c                | 453c                | 472c                | 452<br>449c         | 5000                       | 4) ()a           | 478b                | 501a<br>494                | 527 <i>b</i><br>496 | 496a<br>503       | 514<br>495        | 480                                       | 519               | 186                | 504               | 480<br>482<br>499 | 498<br>504 |
| į      | 474            | 489               | 463        | 476<br>474<br>475 | 494        | 473<br>478 | 492               | 380<br>498          | 474                 | 473<br>474          | 487<br>492          | 456<br>481                 | 487<br>485       | 432                 | 500                        | 486                 | 508               | 469               | 569<br>505                                | 503               | 499<br>501         | 500<br>500        | 497               | 474<br>473 |
| 5      | 470            | 468               | 472<br>482 | 408               | 493        | 476<br>458 | 490a<br>471       | 438 <i>b</i><br>478 | 4740                | 474c<br>449         | 11.0c<br>491        | 468b<br>491                | 180a<br>160      | 427c<br>479         | 497b<br>479                | 496 <i>b</i><br>476 | 50.6a<br>522      | 492<br>492        | 512                                       | 188               | 500<br>479         | 500<br>482        | 498               | 485        |
|        | 477            | 477<br>476        | 482        | 464<br>466        | 473        | 461        | 474<br>472a       | 476<br>477c         | 476<br>470b         | 468<br>458c         | 490<br>490 <i>b</i> | 498<br>494 <i>c</i>        | 374<br>417b      | 490<br>484a         | 480a                       | 475<br>476          | 516<br>519        | 490<br>491        | 509<br>510                                | 484               | 482<br>480         | 487               | 486<br>484        | 48         |
| į      | 480            | 475               | 479<br>484 | 483<br>482        | 473        | 479<br>477 | 484               | 478<br>478          | 482                 | 477<br>484          | 482<br>486          | 490<br>484<br>4:7a         | 483<br>502       | 518<br>405          | $\frac{468}{465}$          | 497<br>496          | 515<br>522        | 527<br>530        | 491                                       | 522<br>511        | 542<br>530<br>536  | 532<br>550        | 462               | 48         |
| 5      | 480<br>490     | $\frac{477}{472}$ | 482<br>470 | 482<br>471        | 474        | 478        | 464               | 478<br>476          | 474                 | 480a<br>453         | 484b<br>487         | 486                        | 492<br>455       | 476b<br>471         | $\frac{466a}{492}$         | 496 <b>6</b><br>568 | 518<br>463        | 528<br>503        | 490<br>574                                | 516<br>480        | 470                | 541<br>481        | 466               | 46         |
| 1      | 493<br>492     | 475               | 468        | 469<br>470        | 488<br>487 | 480        | 464<br>463a       | 481<br>47: b        | 472<br>170 <i>b</i> | 457<br>455c         | 497<br>492d         | 494<br>490d                | 465<br>460 b     | 472<br>472a         | 500<br>490 <i>b</i>        | 510<br>509b         | 453<br>458a       | 504<br>504        | 554<br>564                                | 484<br>486        | 473<br>472         | 176<br>178        | 486<br>487        | 46         |
|        | 483            | 477               | 491<br>4£0 | 465               | 484        | 468        | 469               | 483<br>478          | 473                 | 461<br>330          | 455                 | 500<br>455                 | 487<br>490       | 465<br>483          | 481<br>478                 | 570<br>573          | 501               | 506               | 487                                       | 506<br>501        | 540<br>530         | 547<br>520        | 515               | 484        |
|        | 484<br>460     | 470<br>473        | 475        | 467               | 462        | 456        | 4677              | 480c                | 478b<br>490         | 396d<br>495         | 453d<br>474         | 492c<br>404                | 488 a 408        | 474 <i>b</i><br>455 | 480a<br>485                | 572a<br>481         | 508<br>497        | 569               | 486<br>502                                | 504<br>562        | 535<br>499         | 534               | 513               | 470        |
| ł      | 464            | 472<br>472        | 476        | 423<br>428        | 453<br>458 | 498        | 494               | 485                 | 489<br>490b         | 491<br>49:.b        | 48-6<br>486b        | 468<br>466 <i>b</i>        | 463<br>466d      | 452<br>154a         | 486a                       | 457                 | 493               | 503               | 519<br>510                                | 602<br>582        | 493<br>498         | 476               | 475               | 45         |
| į      | 487<br>484     | 474<br>475        | 483        | 475               | 474<br>476 | 476<br>476 | 474               | 484<br>483          | 482<br>470          | 479<br>478          | 498<br>503          | 479                        | 410              | 472<br>475          | 498<br>496                 | 507<br>508          | 406<br>402        | 504               | 510<br>510                                | 464<br>459        | 511<br>516         | 490               | 491<br>496        | 480        |
| ;      | 486<br>470     | 474               | 482        | 476               | 475<br>480 | 476<br>481 | 474<br>474<br>485 | 481<br>481          | 476b<br>491         | 478 b               | 560e<br>481         | 477 <i>b</i><br>492        | 102c<br>486      | 474a<br>520         | 497b                       | 508b                | 494<br>498        | 504<br>504        | 510                                       | 462<br>493        | 514<br>490         | 488<br>491        | 494<br>496        | 48         |
| 3      | 476<br>478     | 468<br>468        | 478        | 476<br>476        | 480        | 481<br>481 | 485<br>485        | 486<br>484          | 495<br>493a         | 491<br>489a         | 479<br>48( b        | 468<br>490 <i>b</i>        | 482<br>484a      | 517                 | 508<br>514a                | 405                 | 499<br>498        | 503               | 493                                       | 495               | 488<br>489         | 490               | 199               | 49         |
| . {    | 485<br>493     | 480               | 480        | 461               | 476        | .480       | 483               | 483                 | 483<br>480          | 481                 | 482                 | 487                        | 485<br>187       | 51Fc<br>488         | 494                        | 494 <i>b</i><br>533 | 525               | 506<br>474        | 478                                       | $\frac{494}{521}$ | 492                | 490               | 182               | 46         |
|        | 450            | 481<br>480        | 481<br>480 | 451<br>451        | 476<br>476 | 480<br>480 | 483<br>483        | 484<br>484          | 482                 | 473<br>477          | 478<br>480          | 490<br>4880                | 486a             | 488<br>488          | 495<br>494                 | $\frac{534}{534}b$  | 547<br>536        | $\frac{465}{470}$ | 482<br>480                                | 530<br>526        | 490<br>491         | 500<br>495        | $\frac{471}{476}$ | 46         |
| ٠{     | 185<br>500     | 476               | 484        | $\frac{477}{479}$ | 471<br>475 | 464        | 429<br>436        | 365                 | 427                 | 434<br>432          | 467<br>459          | 43 <b>2</b><br>38 <b>6</b> | 475<br>480       | 498 - 495           | 490<br>463                 | 471<br>470          | $\frac{496}{487}$ | $\frac{495}{495}$ | 487<br>483                                | 491<br>494        | 426<br>400         | 485<br>465        | 484<br>480        | 48         |
| ç      | 492<br>487     | 476               | 484        | 478<br>482        | 480        | 463<br>480 | 432<br>470        | 376d<br>482         | 432b<br>464         | $\frac{433b}{651}$  | 463b                | 409c<br>485                | 478 <i>b</i> 643 | 496a<br>458         | 476d<br>479                | 470a<br>500         | 492<br>489        | 495<br>495        | 485<br>504                                | 492<br>514        | 488<br>479         | 486               | 482               | 48         |
| . {    | 482<br>484     | 492               | 484        | 482               | 482        | 479<br>480 | 471               | 478                 | 450<br>401 <i>b</i> | 558<br>604 <i>b</i> | 475<br>470 <i>b</i> | 479<br>481 <i>b</i>        | 691<br>667c      | 437<br>448a         | 477<br>478a                | 497<br>498a         | 489<br>489        | 492               | 502                                       | 509<br>512        | 471<br>475         | 483<br>484        | 482               | 47         |
| . {    | 474            | 480               | 479        | 451               | 482        | 177        | 481               | 410                 | 473                 | 466                 | 480                 | 527                        | 470              | 495                 | 492                        | 491                 | 510               | 500               | 492                                       | 496               | 490                | 491               | 454               | 48         |
| ċ      | 476<br>486     | 480               | 479<br>481 | 481               | 482<br>481 | 477        | 481               | 489                 | 473<br>509          | 466<br>483          | 480<br>495          | 527c<br>485                | 470d<br>483      | 495b<br>488         | 4926                       | 491<br>491          | 510<br>492        | 500<br>502        | 492                                       | 496               | 490<br>490         | 491<br>485        | 484               | 48         |
| 3      | 486            | 485               | 482        | 482<br>482        | 483<br>452 | 482<br>482 | 479               | 472<br>4716         | 514<br>512c         | 484<br>484b         | 494                 | 484<br>484                 | 482              | 488<br>488          | 485<br>484                 | 490<br>490a         | 495               | 500<br>501        | 491<br>494                                | 494<br>496        | 486<br>188         | 482               | 4×5<br>4×6        | 45         |
|        | 481<br>479     | 480<br>481        | 479        | 179<br>479        | 415        | 481        | 484               | 474                 | 489<br>483          | 490                 | 491                 | 472<br>481                 | 494              | 490                 | 195<br>496                 | 490<br>486          | 116               | 487<br>487        | 500                                       | 494               | 495<br>490         | 500<br>496        | 515<br>510        | 17         |
|        | 480<br>477     | 480               | 479<br>474 | 479<br>476        | 474        | 482        | 484               | 475                 | 486<br>478          | 488a<br>489         | 485e<br>492         | 476b<br>481                | 4946             | 489a<br>480         | 496<br>530                 | 48ea<br>507         | 486               | 487               | 501<br>482                                | 496               | 492<br>494         | 498               | 512<br>486        | 47         |
| ş      | 475<br>476     | 482<br>483        | 474<br>474 | 478               | 482<br>482 | 479        | 481<br>482        | 483<br>482          | 485<br>482          | .488<br>488         | 477<br>484          | 483<br>482a                | 185<br>486       | 485<br>482b         | 526<br>528c                | 500<br>504a         | 485               | 494<br>494        | 490<br>486                                | 494               | 492<br>493         | 499<br>560        | 183               | 48         |
| ş      | 478<br>479     | 480<br>479        | 481<br>480 | 483<br>483        | 482<br>482 | 481        | 482<br>482        | 485<br>482          | 473<br>478          | 491<br>481          | 486                 | 488<br>487                 | 483              | 490                 | 490<br>488                 | 484                 | 495<br>490        | 483               | 503<br>504                                | 499<br>494        | 191<br>495         | 4:5<br>490        | 489<br>490        | 40         |
|        | 478            | 480               | 480        | ,483              | 482        | 481        | 482               | 484                 | 476<br>486          | 486                 | 486                 | 4800                       | 4826<br>486      | 490<br>1489         | 489                        | 484                 | 492               | 486               | 504<br>492                                | 496<br>493        | 493<br>496         | 488<br>494        | 490<br>490        | 48         |
| {      | 479<br>4×0     | 479<br>479        | 478<br>480 | 481<br>481        | 460<br>472 | 484<br>483 | 486               | 484<br>484          | 487                 | 487                 | 481                 | 485<br>496                 | .485             | 492                 | 485<br>4×9                 | 490                 | 491               | 494<br>492        | 494                                       | 495               | 495                | 495               | 491               | 48         |
| ٠      | 450            | 476               | 450        | 481<br>472        | 470<br>474 | 484        | 485<br>465        | 484<br>401          | 447                 | 486<br>470          | 486<br>467          | 490<br>465                 | 486<br>502       | 490<br>440          | 487<br>485                 | 489<br>507          | $\frac{490}{502}$ | 493<br>525        | 493<br>502                                | 494<br>530        | 496<br>602         | 494<br>520        | 490<br>502        | 45         |
| )      | 486<br>486     | 474               | 480<br>4F0 | 473<br>472        | 474<br>474 | 470        | 466               | 4046                | 440<br>444 <i>b</i> | 445<br>458 <b>c</b> | 441<br>451 <i>b</i> | 470<br>468                 | 500<br>501       | 145<br>442 <i>b</i> | 48 <b>6</b><br>48 <b>6</b> | 517<br>512b         | 504<br>503        | 532               | 505<br>504                                | 523<br>526        | 570<br>586         | 511<br>516        | 723<br>512        | 48         |
| . {    | 474<br>481     | 456<br>461        | 480        | 458<br>464        | 475<br>465 | 478        | 490               | 484                 | 435<br>431          | ;393<br>434         | 448                 | 414                        | 515<br>515       | 422                 | 486<br>480                 | 511                 | 503               | 503<br>498        | 514                                       | 550<br>554        | 533<br>511         | 499<br>493        | 474               | 45         |
| {      | 491            | 458<br>464        | 469        | 461               | 474        | 476        | 456               | 484<br>495          | 497                 | 414                 | 444                 | 420                        | 512<br>478       | 124<br>482          | 467                        | 514<br>470          | $\frac{504}{485}$ | 500               | 527                                       | 552<br>511        | 522<br>499         | 496<br>491        | 476               | 45         |
| · {    | 489            | 469               | 468        | 486<br>485        | 472<br>473 | 471        | 455<br>456        | 526<br>51(b         | 503<br>500c         | 472                 | 507                 | 483                        | 479<br>478       | 482<br>482          | 4846                       | 473                 | 487               | 483               | 526<br>526                                | 522<br>516        | 564                | 495               | 480<br>478        | 45         |
| {      | 482            | 475<br>475        | 475        | 462<br>464        | 470<br>469 | 474        | 466<br>472        | 475                 | 499                 | $\frac{485}{485}$   | 494                 | 488                        | 455              | 486                 | 481<br>482                 | 480<br>479          | 491<br>489        | 487               | 498<br>501                                | 495               | 493<br>488         | 495               | 490               | 49         |
| ٠      | 480<br>480     | 475<br>464        | 476-       | $\frac{463}{472}$ | 470<br>465 | 470        | $\frac{469}{472}$ | 476                 | 494c                | 485b                | 496                 | 486<br>400                 | 486<br>479       | 484                 | 482<br>480                 | 480                 | 490<br>511        | 492<br>505        | 500                                       | 497<br>526        | 490<br>505         | 493<br>496        | 392<br>503        | 41         |
| }      | 478            | 465<br>464        | 472        | 469<br>470        | 462<br>464 | 481<br>480 | 477<br>474        | 458<br>462          | 481                 | 478<br>477          | 485                 | 488<br>489                 | 479<br>479       | 483                 | 477                        | 481<br>484          | 510<br>510        | 507               | 528<br>528                                | 522<br>524        | 511<br>508         | 493<br>494        | 198<br>500        | 47         |
| . {    | 479            | 480<br>480        | 475        | $\frac{473}{474}$ | 465<br>465 | 466        | 480<br>480        | 465<br>466          | 480                 | 461                 | 461                 | 459<br>452                 | 432<br>427       | 473<br>470          | 475<br>481                 | 522<br>530          | 483<br>486        | 486<br>486        | 513                                       | 495               | 544<br>549         | 505<br>500        | 500<br>602        | 48         |
|        | 480<br>492     | 480               | 475        | 174               | 465<br>475 | 467        | 480<br>464        | 46Cb                | 504d<br>432         | ,450c<br>434        | 458a                | 456b                       | 430              | 472<br>490          | 478<br>524                 | 526<br>467          | 484               | 4×6<br>533        | 514                                       | 492<br>650        | 546<br>560         | 502<br>505        | 581               | 41         |
| - {    | 500            | 569<br>503        | 479<br>476 | 452<br>456        | 470<br>472 | 454<br>478 | 482               | 475<br>477          | 440<br>436a         | 429<br>1432c        | 564<br>553          | 408                        | 416<br>405d      | 487<br>488          | 528                        | 463                 | 485<br>486        | 510               | 547<br>551<br>549                         | 614               | 591                | 517<br>511        | 719<br>526        | 45         |
| {      | 496<br>532     | 506<br>450        | 478<br>468 | 454<br>466        | 423        | 466<br>474 | 444               | 476<br>453          | 450                 | 358                 | 558c<br>460         | 446                        | 267              | 462                 | 526<br>461                 | .465<br>500         | 550               | 522<br>478        | 529                                       | 510               | 485                | 475               | 512               | 4          |
| . ,    | 455<br>494     | 442               | 470        | 470<br>468        | 431        | 462<br>468 | 446               | 443<br>448          | 460<br>455d         | 373<br>363c         | 489<br>474c         | 455<br>450b                | 318<br>292a      | 465<br>464          | 496<br>478                 | 511                 | 541<br>546        | 488<br>483        | 533<br>531                                | 480<br>495        | $\frac{49.1}{489}$ | 483<br>479        | 503<br>508        | 45         |
| {      | 449<br>462     | 478<br>480        | 478        | 464<br>471        | 447        | 448        | 406               | $\frac{465}{458}$   | 478<br>484          | 463<br>463          | 499<br>534          | 490<br>493                 | 532<br>521       | 468<br>525          | 483                        | 546<br>560          | 488<br>481        | 543<br>544        | $\begin{array}{c} 554 \\ 539 \end{array}$ | 548               | 461                | $\frac{465}{502}$ | 462<br>452        | 47         |
| 0      | 456<br>473     | 479<br>481        | 479<br>488 | $\frac{468}{452}$ | 449        | 456        | 468               | 462<br>480          | 481                 | 463<br>483          | 510c<br>519         | 492a<br>490                | 526<br>493       | 496b<br>438         | 482a<br> 488               | 553<br>,480         | 484<br>492        | 544<br>495        | 546<br>486                                | 540<br>488        | 464                | 484<br>492        | 457<br>480        | 47         |
| } {    | 463            | 476<br>478        | 490<br>489 | 458<br>455        | 469        | 481        | 482<br>482        | 480<br>480          | 478<br>470          | 487<br>485          | 515                 | 498<br>494                 | 500<br>496       | 412<br>425b         | 484                        | 491<br>486          | 489               | 510               | 482<br>484                                | 482<br>485        | 478                | 195               | 478<br>479        | 47         |
| 1 5    | 472<br>475     | 473<br>471        | 472        | 467               | 464<br>462 | 485<br>480 | 480               | 474<br>472          | 478                 | 466<br>466          | 465<br>465          | 462<br>489                 | 410<br>448       | 455<br>451          | 494<br>485                 | 492                 | 502<br>491        | 537<br>527        | 510<br>508                                | 519<br>519        | 492                | 483<br>483        | 4×3<br>4×5        | 46         |
|        | 474            | 472               | 472        | 467               | 463        | 482        | 477               | 473                 | 478                 | 466                 | 465                 | 490                        | 429              | 453                 | 490                        | 491                 | 496               | 532               | 509                                       | 519               | 493                | 484               | 484               | 46         |

Monthly mean, 484.7

H. Ex. 44----60

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, April, 1882.

| -                          |            |                    |                   |                   |                   |                   | 415         |            | -           | 411         | 401                 | 441                 |                   | 400         | 441                | 405        | 4.00              |                            | 46.5              |                   |                   |             |            |              |
|----------------------------|------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------|------------|-------------|-------------|---------------------|---------------------|-------------------|-------------|--------------------|------------|-------------------|----------------------------|-------------------|-------------------|-------------------|-------------|------------|--------------|
| Date.                      | $0_r$      | 15                 | 43.5              | ;;h               | 411               | 22                | 6311        | . 71       | 86          | gh          | 10h                 | 111-                | Ninti             | 19,         | 14h                | 155        | . 16h             | 17"                        | ler               | 195               | 20%               | , 91h       | 331        | 2::0         |
|                            | 466        | 167                | 439               | 465               | 450               | 460               | 170         | 470        | 478         | 460         | 482                 | 473                 | 178               | 482         | 476                | 485        | 481               | 495                        | 515               | 501               | 483               | 500         | 465        | 175          |
| Apr. 1 {     Mean          | 462<br>464 | 467                | 419               | 165               | 150               | 460               | 470         | 470        | 178         | 460         | 182                 | 473                 | 178               | 482         | 476                | 485        | 481               | 1495                       | 515               | 501               | 483               | 500         | 465        | 477          |
| Apr. 2 §                   | 170        | 473                | 171<br>174        | 177<br>176        | 466<br>164        | 179               | 482<br>184  | 488<br>477 | 480<br>468  | 462<br>465  | 468                 | 485<br>492          | 485<br>490        | 446<br>471  | 500<br>507         | 480        | 495<br>497        | 509                        | 613<br>598        | :483              | 488<br>480        | 491         | 493        | 174          |
| Apr. 2 {     Meau Apr. 3 { | 170        | 474                | 472               | 476               | 165               | 481               | 453         | 4>12       | 474a        | 464b        | 4710                | 188a                | 488h              | 4586        | 504<br>505         | 137        | 406               | 508<br>520                 | 606<br>512        | 184               | 188               | 488         | 495<br>494 | 176          |
| Apr. 3 {                   | 472        | 470                | 469               | 471<br>471        | 474<br>473        | 475<br>475        | 169         | 465<br>463 | 450<br>450  | 466<br>447  | 297                 | $\frac{470}{452}$   | 423<br>432        | 650<br>691  | 470                | 445        | 531<br>520        | 625                        | 498               | 505<br>506        | 460               | 185<br>480  | 504        | 509<br>524   |
| TATA CAST CO.              |            | 472                | 168<br>513        | 472               | 474<br>472        | 475<br>456        | 468<br>476  | 164<br>176 | 450a        | 456b<br>474 | 321 <i>b</i><br>445 | 461 <i>b</i><br>475 | 42Fb              | 670a        | 488<br>508         | 441<br>510 | 526<br>526        | 552<br>528                 | 565<br>483        | 566               | 451               | 482<br>480  | 502<br>465 | 5.22         |
| Apr. 4 { Mean              | 544        | 430                | 509<br>511        | 401               | 464               | 457<br>456        | 478<br>477  | 172<br>174 | 432<br>425a | 448<br>4615 | 425<br>437 <i>b</i> | 456<br>466b         | 498<br>490b       | 124<br>130a | 502                | 504        | 501               | 523                        | 498<br>490        | 578               | 519<br>501        | 519         | 169        | 101          |
| Apr. 5 {                   | 450        | 477                | 472               | 474               | 470<br>465        | 472<br>481        | 478<br>483  | 476        | 480<br>485  | 459<br>460  | 498<br>423          | 448<br>457          | 489<br>486        | 485         | 514                | 512<br>508 | 486<br>482        | 486<br>488                 | 496               | 483<br>492        | 533<br>534        | 514         | 450        | 162          |
| Mean                       | 448        | 487<br>482         | 471               | 475<br>474        | 468               | 476               | 480         | 481<br>178 | 482         | 460         | 4606                | 452                 | 488               | 485         | 496                | 510<br>495 | 484               | 487                        | 495               | 488<br>500        | 534               | 504         | 486<br>483 | 40 a<br>46 a |
| Mean                       | 467        | 467                | 461<br>466        | 404<br>460        | 465<br>461        | $\frac{457}{452}$ | 168<br>475  | 471<br>474 | 480<br>172  | 400<br>400  | 529                 | 490<br>485          | 485               | 472<br>468  | 482<br>487         | 483        | 486               | 493<br>495                 | 500<br>504        | 506               | 498<br>495        | 492<br>491  | 479<br>479 | 47.8         |
| Mean                       | 103        | 165                | 465               | $\frac{462}{472}$ | 463<br>475        | 454<br>476        | 481         | 472<br>484 | 476<br>483  | 490<br>482  | 546<br>183          | 488                 | 484               | 486         | 484                | 489<br>190 | 490               | 494                        | 502<br>490        | 503<br>490        | 498               | 492         | 179<br>186 | 179          |
| Apr. 7 {<br>Mean           | 474        | 471                | 470               | 471<br>472        | 172<br>174        | 477               | 479<br>180  | 479<br>482 | 490<br>486  | 489         | 478<br>480          | 489<br>486          | 488               | 181         | 487                | 184        | 484               | 488                        | 490               | 492<br>491        | 493               | 491         | 487        | 186          |
| Apr. 8 {                   | 490        | 478                | 468<br>168        | 464<br>464        | 465<br>465        | 463               | 468<br>472  | 478<br>472 | 476<br>482  | 484         | 478<br>478          | 475                 | 479               | 495         | 485<br>488         | 401        | 544               | 492<br>480                 | 527<br>548        | 520<br>525        | 511               | 400         | 482        | 181          |
| Mean                       | 491        | 480                | 468               | 464               | 405               | 464               | 470<br>175  | 475<br>474 | 479<br>478  | 463         | 178c                | 468h                | 478a              | 198         | 48 <b>6</b><br>533 | 490        | 542<br>480        | 480<br>500                 | 538<br>493        | 522<br>499        | 512<br>480        | 491         | 480        | \$14.5       |
| Apr. 9 {                   | 466        | 461                | 469               | 466               | 474<br>473        | 473<br>174        | 174         | 475        | 481         | 478         | 455                 | 470                 | 490               | 493         | 515                | 486        | 479               | 501                        | 496               | 496               | 484               | 490         | 491        | 476<br>476   |
| Mean                       | 478        | 474                | 470               | 466<br>471        | $\frac{474}{469}$ | 475               | 474         | 474<br>476 | 480         | 478<br>477  | 450b<br>479         | 482                 | 499a<br>481       | 434         | 524                | 486<br>486 | 480               | $\frac{500}{481}$          | 494<br>496        | 498<br>493        | 482<br>488        | 493         | 492<br>487 | 176<br>176   |
| Mean                       | 478        | 474                | 475               | 471               | 469<br>469        | 474               | 474<br>471  | 475<br>476 | 479         | 478<br>478  | 479<br>479          | 481                 | 479               | 428<br>431  | 474                | 486        | 494               | 479                        | 496               | 192<br>192        | 488               | 491         | 495        | 163          |
| Арт. 11 {                  | 473        | 471                | 465<br>465        | 461<br>460        | 478<br>474        | 466               | 454<br>455  | 480<br>479 | 477<br>492  | 455<br>471  | 470<br>463          | 504<br>507          | 458<br> 482       | 186<br>483  | 480<br>476         | 476<br>482 | 489               | 493<br>491                 | 501               | 496<br>499        | 502               | 488<br>180  | 486        | 1-1          |
| Mean.                      | 474        | 471                | 465               | 460<br>475        | 476<br>470        | 466<br>479        | 454<br>476  | 480<br>480 | 484         | 463         | 466<br>472          | 506<br>458          | 485<br>405        | 184<br>455  | .478<br>495        | 479<br>507 | 488               | 492                        | 500<br>519        | 198<br>522        | 501<br>491        | 458<br>490  | 486<br>482 | 1-1          |
| Apr. 12 $\left\{\right.$   | 481        | 476                | 472<br>472        | 474               | 470               | 478               | 475         | 481        | 487         | 477<br>479  | 482                 | 465                 | 184               | 481         | .490               | 499        | 484               | 494                        | 520               | 521               | 493               | 489         | 400        | 170          |
| Mean<br>Apr. 13 {          | 482        | 475                | 472<br>472        | 474<br>172        | 470<br>473        | 478               | 476         | 480<br>475 | 485<br>467  | 478<br>475  | 477<br>468          | 462<br>464          | 394<br>465        | 168<br>172  | 492<br>504         | 503<br>509 | 484               | 494<br>496                 | 520<br>491        | $\frac{522}{370}$ | 492<br>487        | 490         | 482        | 170<br>178   |
| Mean                       | 479        | 471<br>472         | 471               | 473<br>472        | 472<br>472        | 474               | 476         | 475        | 467         | 476<br>476  | 469<br>468d         | 4676                | 475               | 479         | 495<br>500         | 516<br>512 | 494<br>496        | 496                        | 491               | 592<br>581        | $\frac{472}{480}$ | 471<br>472  | 486<br>484 | 178          |
| Арг. 14 {                  | 468<br>470 | 466                | 469<br>468        | 463<br>461        | 470               | 470<br>470        | 172<br>172  | 178        | 476         | 484<br>480  | 471<br>472          | 472                 | 477<br>178        | 476         | 481                | 488        | 185               | 496                        | 403<br>403        | 490               | 489<br>487        | 484         | 482<br>486 | 151          |
| Aleith                     | 400        | 466                | $\frac{468}{472}$ | 462<br>473        | 470<br>474        | 470               | 472<br>472  | 178<br>479 | 478<br>478  | 482<br>474  | 472<br>471          | 470                 | 478               | 482         | 180<br>472         | 485        | 486<br>495        | 496<br>524                 | 493               | 189               | 488<br>482        | 485<br>486  | 484<br>478 | 1-1          |
| Apr. 15 {                  | 475        | 422                | 472               | 173               | 474               | 473               | 472         | 479        | 478         | 474         | 471                 | 170                 | 197               | 178         | 472                | 406        | 195               | 524                        | 492               | 490               | 482               | 486         | 178        |              |
| Mean                       | 180        | 175                | 471               | 461               | 161               | 162               | 474         | 471        | 467         | 466         | 470                 | 168                 | 541               | 485         | 496                | 501        | 109               | 409                        | 492               | 496               | 504               | 499         | 471        | 172          |
| Menness                    | 480        | 474                | 470               | 160<br>460        | 460<br>460        | 463<br>462        | 473         | 478<br>474 | 475<br>471  | 473<br>470  | 478<br>178          | 462<br>463          | 545<br>543        | 484<br>484  | 475                | 500        | 494<br>496        | 501<br>500                 | 494<br>493        | 490<br>493        | $\frac{511}{508}$ | 501<br>500  | 473<br>473 | 472          |
| Apr. 17 {                  | 474<br>472 | 474                | 474<br>474        | 478               | 462               | 461               | 470<br>468  | 473<br>473 | 468<br>470  | 481<br>489  | 481<br>490          | 478                 | 476               | 475<br>484  | 492<br>486         | 493<br>477 | $\frac{487}{491}$ | 498<br>498                 | $\frac{495}{494}$ | 499<br>407        | 496<br>490        | 492<br>488  | 184        | 1-1          |
| Mean                       | 463        | 474<br>470         | 474               | 1478<br>1468      | 462<br>471        | 461               | 469         | 473<br>475 | 169         | 485         | 486                 | 475                 | 474               | 180<br>471  | 489                | 485        | 189<br>507        | 498<br>541                 | $\frac{494}{522}$ | 498<br>526        | 489               | 490         | 186<br>498 | 182          |
| Apr. 18 {                  | 475        | 470<br>470         | 469<br>469        | 469<br>468        | 469               | 475               | 474         | 473<br>474 | 479<br>484  | 465<br>466  | 454<br>462          | 469<br>468          | 463               | 475         | 456                | 497<br>500 | 522<br>514        | 528<br>534                 | 522<br>522        | 529<br>528        | 183               | 491<br>492  | 500        | 5c4<br>F/5   |
| Mean                       | 460        | 472<br>470         | 472<br>468        | 454<br>154        | 441               | 474               | 467         | 415<br>410 | 424<br>426  | 438<br>435  | 457<br>456          | 455<br>462          | 518               | 438<br>431  | 481<br>488         | 176<br>478 | 478<br>491        | 494                        | 484<br>488        | 577<br>576        | 542<br>537        | 541<br>567  | 547<br>622 | 191          |
| 34                         | 464        | 471                | 470               | 454<br>452        | 442<br>468        | 474               | 465<br>451  | 112<br>459 | 425<br>455  | 436<br>448  | 456<br>516          | 458<br>485          | 510<br>485        | 434<br>492  | 484                | 177        | 484<br>504        | 492                        | 486<br>589        | 576<br>528        | 140               | 554<br>498  | 584<br>400 | 193          |
| Apr. 20 {                  | 108        | 400                | 157               | 176               | 470               | 459               | 462         | 1454       | 462         | 450         | 488                 | 465                 | 484               | 495         | 529                | 467        | 510               | 540                        | 560               | 580               | 443               | 504         | 463        | 159          |
| Mean                       | 478        | 494<br>483         | 454               | 464               | 469<br>470        | 464<br>171        | 477         | 456<br>474 | 458<br>476  | 449<br>479  | 562<br>470          | 475<br>480          | 484               | 494<br>464  | 534<br>478         | 468<br>484 | :507<br>:488      | ,536<br>,486               | 574<br>477        | 554<br>488        | 146<br>490        | 501<br>489  | 462        | 159<br>151   |
| Mean.                      | 400        | 4×3<br>4×3         | 475<br>174        | 471               | 471               | 470               | 178         | 474        | 477         | 476<br>478  | 472                 | 485<br>482          | 479<br>480        | 471         | 476<br>477         | 483        | 486<br>487        | 487<br>486                 | 491<br>464        | 486<br>487        | 491               | 187         | 481        | 1-1          |
| Apr. $22\dots$             | 480        | 465                | 480               | 471               | 478               | 479               | 476         | 479<br>478 | 474         | 481         | 476<br>486          | 176                 | 475<br>476        | 481         | 482                | 486        | 481<br>482        | 477                        | 501               | 492<br>490        | 487               | 498         | 198        | 479<br>479   |
| 3.7                        | 45.0       | 466                | 475<br>168        | 470               | 478<br>467        | 479<br>470        | 476         | 478<br>476 | 476         | 479<br>481  | 481<br>478          | 478                 | 476<br>473        | 480         | 482<br>478         | 1482       | 482<br>502        | 476<br>486                 | 504<br>493        | 491               | 188<br>188        | 497<br>511  | 498        | 179<br>154   |
| Apr 23                     | 477        | 4H4<br>4H4         | 468<br>468        | 472<br>472        | 469<br>468        | 470<br>470        | 474         | 475<br>476 | 484<br>480  | 481<br>481  | 478<br>478          | 170<br>474          | 465               | 483         | 482<br>480         | 492<br>490 | 501<br>502        | 489                        | 493               | 488<br>488        | 186               | 509<br>510  | 483        | 187<br>186   |
| Apr. 24 {                  | 171        | 473                | 471               | 160               | 468<br>468        | 469               | 471         | 472        | 174         | 476         | 473                 | 476<br>483          | 178               | 470<br>492  | 475                | 481        | 492<br>495        | 577                        | 440               | 550<br>561        | 601               | 563         | 650        | 1.0          |
|                            |            | 474<br>474         | 471               | 469               | 468               | 469               | 471         | 472        | 476<br>475  | 474         | 483                 | 480                 | 476<br>477        | 481         | 471                | 475<br>478 | 194               | 574                        | 427<br>438        | 556               | 580<br>590        | 546         | 655        | 176<br>163   |
| Apr. 25 {                  | 515        | 485<br>481         | 496<br>500        | 440               | 482               | 444<br>454        | 418         | 488        | 456         | 467         | 457                 | 438                 | 409<br>406        | 435         | 458<br>491         | 467        | 179<br>183        | 473                        | 522<br>522        | 462<br>511        | 480<br>492        | 484         | 513        | 192<br>191   |
| Mean                       | 474        | 483                | 498<br>470        | 434               | 482               | 419               | \$21<br>525 | 484        | 453         | 470<br>497  | 458                 | 441                 | 408               | 418<br>467  | 474                | 467        | 481               | 472                        | 522<br>517        | 486<br>553        | 486<br>562        | 481         | 498        | 492<br>478   |
| pr. 26 {<br>Mean           | 449        | 463                | 467<br>468        | 462               | 448               | 446<br>450        | 503<br>514  | 463<br>463 | 476<br>474  | 428<br>462  | 477<br>488          | 481<br>480          | 470<br>476        | 474<br>470  | 477                | 481<br>476 | 496               | 496<br>494                 | 523<br>520        | 502<br>528        | 523<br>542        | 477         | 461        | 12           |
| Apr. 27 {                  | 160        | 478<br>503         | 460<br>458        | 469               | 458<br>460        | 450<br>456        | 483         | 186<br>477 | 490         | 486<br>498  | 183                 | 465                 | 510               | 495<br>498  | 497                | 508<br>489 | 493<br>479        | 187                        | 522<br>532        | 515<br>509        | 492<br>491        | 527         | 507        | 252<br>150   |
| Mean                       | 104        | 490                | 459               | 466               | 459               | 453               | 481         | 482        | 494         | 492         | 490                 | 467                 | 476               | 196         | 500                | 498        | 486               | 488                        | 527               | 512               | 492               | 506         | :506       | 191          |
| Apr. 28 }                  | 176        | 482<br>49 <b>0</b> | 482               | 469<br>471        | 460<br>459        | $\frac{468}{467}$ | 459<br>461  | 542<br>531 | 496         | 475<br>476  | 480<br>484          | 465<br>470          | $\frac{485}{492}$ | 481<br>476  | 488<br>494         | 495<br>493 | 501<br>198        | 50 <b>9</b><br>50 <b>9</b> | 509<br>511        | 519<br>517        | 505<br>507        | 477         | 473        | 174<br>176   |
| Mean                       | 480<br>479 | 486                | 480               | 470               | 469<br>469        | 468<br>472        | 460<br>473  | 536<br>475 | 300<br>469  | 476         | 182                 | 468<br>489          | 488<br>487        | 478<br>471  | 488                | 494        | 500<br>503        | 50 <b>9</b><br>516         | 510               | 518<br>504        | 506<br>531        | 476<br>[482 | 473        | 475<br>472   |
| Mean                       | 180        | 470<br>470         | 470<br>470        | 466<br>468        | 470               | 471               | 473<br>473  | 473<br>474 | 470<br>470  | 460<br>463  | 468                 | 472<br>480          | 474               | 469         | 493<br>490         | 170<br>466 | 493<br>498        | 512<br>514                 | 510               | 307<br>506        | 533<br>532        | 483<br>482  | 466<br>467 | 473<br>472   |
| Apr. 30 }                  |            | 161<br>465         | 476               | 485<br>479        | 462               | 460               | .166        | 160        | 476         | 476         | 108                 | 163                 | 472<br>477        | 501<br>471  | 480                | 470<br>462 | 484               | 498                        | 501<br>506        | 554<br>582        | 539               | 534         | 486<br>498 | 113          |
| Mean                       |            | 463                | 475               | 482               | 461               | 462               | 168         | 461        | 478         | 478         |                     | 160                 | 474               | 486         | 478                | 466        | 184               | 506                        | 504               | 568               | 562               | 521         | 498        | 118          |
| Means                      | 474. 8     | 473. 1             | 471. 2            | 467. 2            | 467. 0            | 167. (            | 471. 7      | 174.3      | 472. 8      | 471. 6      | 470.4               | 472. 3              | 476. 6            | 479, 2      | 187. 7             | 485. F     | 494. 7            | 503, 9                     | 506. 8            | 514. 4            | 500. €            | 495. 7      | 492, 6     | 479 0        |

Hourly readings of the Brooke declinometer, Uylaamie, Alaska, May, 1883.

| Date.                       | 0 <sup>h</sup>     | 14                   | 2h                | an an             | 4h                 | ( åh               | <b>6</b> b                          | 7h                | Nh                | Ð <sub>l</sub>    | 10h               | 114               | Noon.                | 13h               | 146               | 15%               | <b>16</b> 311      | 17h                      | 185               | 19h               | 20%                | 215                      | 225               | 539                      |
|-----------------------------|--------------------|----------------------|-------------------|-------------------|--------------------|--------------------|-------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|-------------------|-------------------|-------------------|--------------------|--------------------------|-------------------|-------------------|--------------------|--------------------------|-------------------|--------------------------|
| Min 1                       | 156                | 166                  | 170               | 164               | 452                | 465                | 452                                 | 452               | 442               | 482               | 453               | 175               | 159                  | 459               | 175               | 480               | 477                | 192                      | 358               | 521               | 523                | 1-1-1                    | 492               | 472                      |
| Mean                        | 458<br>457<br>463  | 466                  | 470<br>475        | 464<br>460        | 452<br>142         | 465<br>163         | 452<br>476                          | 152<br>161        | 442               | 482<br>110        | 153<br>140        | 475<br>446        | 150<br>457           | 459<br>442        | 475<br>476        | 480<br>523        | 177<br>170         | 192<br>195               | 558<br>503        | 521<br>491        | 523<br>528         | \$84<br>520              | 492<br>482        | 472<br>168               |
| May 2 - }                   | 163                | 467                  | 170<br>172        | 161<br>460        | 40a<br>455         | 460<br>466         | 469<br>472                          | 168               | 162<br>464        | 430<br>435        | 132               | 118               | 449<br>453           | 397               | 502<br>189        | 503<br>513        | 472<br>471         | 15.8<br>4.6              | 506               | 193               | 1539               | 515<br>519               | 478<br>4.0        | 160<br>164               |
| Mar                         | $\frac{475}{476}$  | 174                  | 472               | 167<br>166        | 168<br>468         | 467                | 468<br>409                          | 47.3              | 479<br>182        | 163               | 466               | 452<br>464        | 498<br>471           | 507               | 465<br>1×0        | 187<br>480        | 110                | 1: 1                     | 590<br>594        | 500<br>501        | 501<br>486         | 492                      | 484<br>481        | 178<br>179               |
| May 1                       | 476<br>476         | 171<br>163           | 472<br>470<br>471 | 468<br>470<br>471 | 468<br>460         | 164<br>168         | 468<br>170                          | 172<br>177        | 180               | .467<br>464       | 408<br>475        | 158<br>138        | 180<br>167           | 518<br>460        | $\frac{472}{495}$ | 184<br>487        | 480                | 194<br>198               | 502<br>509        | 500<br>511        | 394<br>508         | 192<br>182               | 182<br>179        | 168<br>168               |
| Mean                        | 475<br>476<br>468  | 165<br>466<br>474    | 470<br>467        | 471<br>470<br>471 | 154<br>157<br>158  | 108<br>109         | 472<br>471<br>473<br>472            | 478<br>478<br>459 | 183<br>482<br>183 | 170<br>167<br>180 | 473<br>478        | 150<br>144<br>479 | 465<br>466<br>175    | 468<br>464<br>476 | 180<br>188<br>184 | 484<br>486<br>505 | 491<br>491         | 500<br>400<br>496        | 509<br>569<br>531 | 516<br>515<br>513 | 509<br>50%<br>562  | 180<br>481<br>474        | 478<br>478<br>469 | 467<br>461               |
| May Mean                    | 471<br>170         | 474                  | 466               | 109               | 459<br>458         | 467<br>168         | 172                                 | 160               | 183               | 179               | 178<br>178        | 478<br>178        | 475<br>475           | 474<br>475        | 185               | 498<br>502        | 497<br>194         | 496<br>196               | 531               | 501<br>507        | 567<br>564         | 471<br>472               | 475<br>172        | 16.5<br>16.4             |
| May 6                       | 460<br>450         | 465                  | 468<br>466        | 470<br>470        | 462<br>463         | $\frac{451}{450}$  | 456<br>457                          | 172<br>170        | 474               | $\frac{454}{453}$ | 474<br>478        | 172               | 460                  | 465<br>463        | 454               | 179<br>172        | 495<br>498         | 189<br>187               | 493<br>499        | 512<br>513        | 486                | 471<br>472<br>472<br>476 | 4×6               | 116                      |
| May 7 S                     | 155                | 463<br>453           | 467<br>456<br>458 | 470<br>463<br>169 | 462<br>468<br>466  | 450<br>453         | 456<br>470                          | 171<br>173        | 177               | 474<br>470        | 476<br>175        | 170               | 403                  | 464<br>459        | 485<br>468        | 476<br>474        | 498<br>474         | 188<br>193               | 496<br>484        | 512<br>525        | 490                | 191                      | 400               | 161                      |
| Mean -                      | 458<br>459<br>466  | 451<br>452<br>461    | 457<br>458        | 466               | 467<br>467         | 455<br>454<br>470  | 469<br>170<br>172                   | 475<br>474<br>463 | 11.3              | 473<br>472<br>471 | 479<br>469        | 138<br>110<br>169 | 491<br>486<br>413    | 454<br>176<br>481 | 473<br>470<br>466 | 473<br>474<br>485 | 475<br>,474<br>496 | 483<br>488<br>493        | 483<br>484<br>476 | 542<br>524<br>482 | 187<br>488<br>500  | 490<br>497               | 165<br>166<br>490 | 462<br>478               |
| May o                       | 163<br>164         | 462                  | 460               | 466               | 466<br>466         | 470<br>470         | 474<br>473                          | 161<br>461        | 472<br>472        | 173<br>472        | 105               | 472<br>470        | 116                  | 478<br>180        | 469<br>468        | 182               | 495<br>496         | 489<br>491               | 476<br>476        | 186<br>484        | 50 <b>3</b><br>502 | 199<br>198               | 4#3<br>1m3        | 477                      |
| May 9                       | 446<br>437         | 455<br>458           | 468<br>460        | 460               | 464<br>465         | 165<br>465         | 469<br>467                          | 470               | 470<br>470        | 472<br>473        | 467               | 465<br>468        | 444<br>442           | 175<br>167        | 470<br>468        | 179               | 494<br>197         | $\frac{480}{481}$        | 507<br>509        | 500<br>500        | 193                | 474<br>472               | 467<br>469        | 473<br>474               |
| Mean                        | 470<br>475         | 454<br>466<br>470    | 164<br>468<br>469 | 462<br>467<br>467 | 464<br>460<br>459  | 465<br>473<br>470  | 468<br>468<br>466                   | 470<br>472<br>473 | 470<br>472<br>476 | 474<br>470        | 468<br>173<br>473 | 406<br>406<br>468 | \$43<br>\$70<br>\$65 | 474<br>479        | 469<br>480<br>477 | 180<br>178<br>177 | 496<br>483<br>484  | 480<br>489<br>487        | 508<br>199<br>500 | 503<br>500<br>499 | 492<br>500<br>498  | 473<br>487<br>478        | 462<br>460        | 174                      |
| Mean                        | . 172<br>161       | 468<br>457           | 468<br>471        | 467<br>467        | 460<br>458         | 472<br>462         | 467<br>467                          | 472<br>468        | 474<br>468        | 473<br>472<br>471 | 473<br>170        | 467<br>455        | 468<br>457           | 473<br>453        | 478<br>475        | 478<br>470        | 184<br>183         | 488<br>196               | 500               | 500<br>180        | 493<br>482         | 452<br>479               | 461<br>480        | 175<br>474<br>173        |
| May 11                      | 460<br>460         | 460<br>458           | 471<br>171        | 470               | 460<br>459         | 462<br>462         | 468<br>468                          | 108               | 469               | 4×1<br>476        | 472<br>471        | 456<br>456        | 461                  | 465<br>450        | 470<br>472        | 172<br>171        | 481<br>482         | 196<br>496               | 489<br>4*8        | 178<br>179        | 182<br>182         | 480<br>180               | 479               | 474<br>173<br>174<br>174 |
| May 12 . (                  | 174                | 454<br>460<br>457    | 462<br>461<br>462 | 456<br>455<br>456 | 459<br>461         | 165<br>161<br>163  | 465<br>466                          | 452<br>455<br>454 | 167<br>468<br>468 | 469<br>470<br>470 | 475<br>472<br>474 | 158<br>456        | 470<br>.467<br>468   | 474<br>474        | 470<br>474<br>472 | 478<br>482<br>480 | 481                | 496<br>495               | 196<br>495<br>196 | 486<br>186<br>486 | 476<br>475<br>476  | 479                      | 484<br>480<br>480 | 462<br>464<br>463        |
| Mean                        | 464<br>461         | 161<br>468           | 468               | 464               | 460<br>470<br>(470 | 463<br>466         | 470<br>470                          | 469<br>468        | 470               | 477<br>478        | 461               | 457<br>174<br>470 | 472<br>475           | 474<br>478<br>480 | 465<br>459        | 166               | 180<br>478<br>480  | $\frac{496}{504}$        | 522<br>540        | 199<br>197        | 182<br>484         | 180<br>188<br>191        | 476<br>477        | 167<br>168               |
| Mean -                      | 162<br>166         | 161                  | $\frac{468}{473}$ | 465<br>456        | 470                | 464<br>443         | 470<br>443                          | 468<br>461        | 464<br>475        | 178<br>177        | 464               | 472<br>441        | 474                  | 479<br>481        | 462<br>490        | 163               | 479<br>493         | 504<br>490               | .531<br>496       | 498<br>486        | 483<br>470         | 490<br>476               | 476<br>470        | 168                      |
| May 14                      | 166<br>166         | 461                  | 474               | 458<br>457        | 451<br>451         | .444               | 432<br>438                          | 484<br>472        | 480<br>478        | 473<br>475        | 456<br>456        | 455<br>448        | 481<br>480           | 475<br>478        | 194<br>192        | 487<br>485        | 492<br>492         | 490<br>490               | 197<br>196        | 485<br>486        | 468<br>469         | 178                      | 469<br>470        | 165<br>464               |
| May 15 {                    | 461<br>462         | 463                  | 463               | 466               | 466                | 465                | 470                                 | 467               | 467               | 483               | 165<br>465        | 451<br>451        | 459                  | 482               | 481               | 181               | 498                | 495                      | 514               | 509               | 488                | 161                      | 466               | 170                      |
| Mean                        | 467                | 468                  | 467               | 470               | 159                | 467<br>164         | 466<br>465                          | 455<br>451<br>453 | 435<br>432        | 475<br>474        | 418               | 465<br>468        | 478                  | 550<br>565        | 450<br>451        | 495<br>500        | 516                | 514<br>517               | 503               | 191<br>198        | 470<br>471         | 466                      | 472<br>470        | 168<br>168               |
| Mean                        | 467                | 467<br>469           | 468               | 470<br>474        | 463                | 466<br>469         | 460                                 | 174               | 434<br>468        | 474<br>452        | 419<br>459        | 468<br>461        | 480<br>476           | 558<br>490        | 450<br>185        | 498<br>498        | 509<br>480         | 516<br>529               | 498<br>490        | 194<br>510        | 470<br>514         | 467<br>451               | 471               | 168<br>465               |
| Mean                        | 470                | 472<br>470<br>491    | 465<br>466<br>456 | 474<br>474<br>461 | 471<br>:470<br>469 | 468<br>468<br>472  | 470<br>470<br>475                   | 476<br>475<br>465 | 470<br>469<br>472 | 453<br>452<br>472 | 458<br>458<br>476 | 472<br>466<br>465 | 471<br>474<br>462    | 488<br>489<br>418 | 491<br>488<br>462 | 490<br>493<br>472 | 476<br>478         | 531<br>530<br>502        | 195<br>192<br>197 | 514<br>512<br>484 | 515<br>514         | 151                      | 468               | 465<br>465<br>467        |
| May 18                      | 480<br>1481<br>480 | 490<br>490           | 452<br>454        | 467<br>464        | 468<br>463         | 475<br>474         | 477<br>476                          | 1462<br>1464      | 474<br>473        | 472<br>472        | 471               | 464<br>464        | 464<br>463           | 455<br>452        | 464<br>463        | 470<br>471        | 470<br>479<br>478  | 502<br>502               | 494<br>196        | 480<br>482        | 479<br>478         | 476<br>476               | 477<br>475<br>476 | 464<br>466               |
| May 10 }                    | 172<br>172         | 193                  | 466<br>467        | 468<br>469        | 472<br>472         | 473<br>474         | 458<br>460                          | 461               | 486<br>486        | 480<br>483        | 460               | 450<br>442        | 454<br>469           | 486<br>472        | 495<br>499        | 476<br>472        | .468<br>474        | 491<br>493               | 516<br>525        | 529<br>518        | 470<br>403         | 459<br>157               | 471               | 188                      |
| Mean<br>May 20              | 472                | 494                  | 166<br>169        | $\frac{468}{462}$ | $\frac{472}{469}$  | 474<br>476         | 459                                 | 474               | 486<br>475        | 482<br>477        | 406               | 416               | 462<br>467           | 479               | 497<br>488        | 474<br>482        | 471                | $\frac{492}{516}$        | 520<br>516        | 524<br>590        | 466<br>650         | 438<br>518               | $\frac{472}{476}$ | 48 <b>6</b><br>458       |
| Mean                        | 472<br>472<br>478  | 478                  | 470<br>470<br>500 | 462<br>462        | 473<br>471<br>444  | 476<br>476<br>495  | 474<br>472                          | 484<br>484        | 478<br>476        | 464<br>470<br>525 | 476<br>476<br>438 | 473<br>476<br>450 | 471<br>469           | 459<br>462<br>465 | 500<br>494<br>483 | 485<br>484<br>480 | 489<br>488         | 516<br>516               | 516               | 542<br>566        | 675<br>662         | 525<br>522               | 478<br>478        | 456<br>456               |
| May 21 Mean                 | 481<br>480         | 507<br>507           | 511<br>506        | 451<br>453<br>452 | 435                | 491<br>493         | 415<br>412<br>414                   | 416<br>433<br>424 | 378<br>395<br>386 | 494<br>510        | 414               | 443<br>446        | 381<br>430<br>406    | 469<br>467        | 478<br>480        | 491               | 593<br>610<br>603  | 557<br>524<br>540        | 530<br>517<br>524 | 494<br>499<br>496 | 507<br>500<br>504  | 552<br>533<br>542        | 579<br>616<br>598 | 457<br>458               |
| May 22                      | 167                | 510<br> 554<br> 547  | 463<br>458        | 407<br>408        | 465<br>464         | 410<br>424         | 486<br>492                          | 454<br>136        | 466<br>172        | 422<br>435        | 485<br>486        | 450<br>402        | 475<br>463           | 462<br>454        | 551<br>546        | 480               | 488<br>500         | 506<br>503<br>504        | 523               | 532<br>527        | 471<br>475         | 501<br>497               | 470<br>468        | 494                      |
| Mean                        | 473<br>455         | 492                  | 460<br>453        | 408<br>472        | 464<br>472<br>471  | 451                | 469<br>456                          | 445<br>441        | 160<br>145        | 428<br>453        | 486<br>117        | 426<br>472        | 469<br>483           | 458<br>495        | 548<br>469        | 492               | 494<br>490         | 504<br>522               | 485               | 530<br>479        | 473<br>483         | 482                      | 469<br>471        | 494<br>475               |
| Mean                        | 455<br>455<br>483  | .498<br>i495<br>i469 | 446<br>461        | 462<br>467<br>465 | 472<br>466         | 448<br>450<br>468  | 458<br>457<br>475                   | 451<br>446<br>472 | 450<br>448<br>468 | 471<br>462<br>465 | 410<br>414<br>468 | 467<br>470<br>459 | 485<br>484<br>450    | 496<br>496<br>465 | 473<br>471<br>475 | 474<br>476<br>484 | 485<br>488<br>497  | 522<br>520<br>521<br>506 | 489<br>487        | 480<br>480        | 481<br>482<br>497  | 483<br>482<br>482        | 472<br>472<br>468 | 475<br>475<br>475<br>464 |
| May 24 }                    | 481<br>482         | 464                  | 462<br>462        | 465<br>465        | 166<br>166         | 167<br>168         | 475<br>475                          | 470<br>471        | 176<br>172        | 471<br>468        | 474               | 458<br>458        | 455<br>452           | 472<br>468        | 504<br>1490       | 190<br>487        | 507                | 499<br>502               | 556<br>527<br>542 | 542<br>534<br>538 | 499<br>498         | 486<br>484               | 470<br>469        | 463                      |
| May 25 S                    | 461                | 457<br>459           | 452               | 455<br>455        | 460<br>450         | 466<br>467         | 468                                 | 477<br>465        | 482<br>490        | 480<br>473        | 472<br>472        | 481               | 462                  | 466<br>467        | 483               | 499<br>497        | 1500               | 490<br>490               | 495<br>494        | .502<br>501       | 504<br>502         | 479<br>478               | 482<br>484        | 174<br>170<br>472<br>170 |
| Mean . z.<br>May 26<br>Mean | 461<br>456         | $\frac{458}{452}$    | 453<br>478        | 455<br>454        | 460<br>450         | 466<br>458         | 470<br>473                          | 471<br>474        | 486<br>450        | 476<br>.478       | 472<br>462        | 467<br>459        | 461                  | 466<br>439        | 482<br>486        | 198<br>506        | 497<br>516         | 490<br>528               | 194<br>514        | 502<br>-536       | 503<br>544         | 478<br>459               | 183<br>464        | 472<br>170               |
| Mean                        | 458                | 452<br>452           | 481<br>480        | 454<br>454        | 451<br>450<br>463  | 454<br>456<br>468  | $\frac{472}{472}$ $\frac{458}{458}$ | 478<br>476<br>480 | 144               | 473<br> 476       | 456<br>459<br>487 | 461               | 448<br>456<br>471    | 146<br>142        | 484<br>485<br>496 | 500<br>503        | 511<br>514         | 532<br>530<br>491        | 510<br>512        | 552               | 547<br>546<br>488  | 464<br>462               | 165<br>464<br>501 | 472<br>471<br>160        |
| May 27                      | 454<br>453<br>454  | 164<br>462<br>463    | 477<br>479<br>478 | 467<br>470<br>468 | 464<br>464         | 466<br>467         | 456<br>457                          | 477<br>478        | 475<br>485<br>480 | 467<br>448<br>458 | 417<br>452        | 453<br>442        | 471<br>478<br>474    | 443<br>435<br>439 | 4×0<br>488        | 475<br>480<br>478 | 484<br>482<br>483  | \$91<br>491              | 491<br>490<br>490 | 481<br>484<br>482 | 490<br>189         | 508<br>502<br>505        | -498<br>500       | 165<br>462               |
| May 28                      | 468<br>163         | 460<br>451           | 466<br>462        | 459<br>458        | 461                | 460                | 470<br>470                          | 469<br>473        | 456<br>453        | 460               | 163               | 459<br>463        | 455                  | 474<br>482        | 467               | 481<br>481        | 469<br>471         | 640<br>566               | 567<br>570        | 470               | 479<br>478         | 468<br>463               | 490<br>457        | 472<br>468               |
| Mean                        | . 466<br>148       | 456                  | 464               | 458<br>459        | 461<br>470         | 459<br>480         | 470<br>402                          | 471<br>463        | 454               | 468<br>460        | 462<br> 391       | 450               | 471                  | 478<br>463        | 71<br>454         | 481<br>481        | 470<br>496         | 603<br>493               | 568<br>487        | 472<br>496        | 478<br>482         | 467                      | 488<br>490        | 470<br>480               |
| Mean                        | . 448              | 463<br>462<br>168    | 470<br>470<br>468 | 460<br>460        | 464<br>467         | 483<br>482         | 462<br>462                          | 454<br>458<br>481 | 466<br>467        | 465<br>465        | 476<br>434<br>479 | 478<br>476<br>461 | 473                  | 461               | 467<br>460        | 486<br>484<br>490 | 510<br>503<br>493  | 494                      | 488               | 493<br>494        | 484<br>483<br>485  | 482<br>482<br>482        | 491<br>490<br>489 | 180<br>480<br>465        |
| May 30 Mean                 | 466<br>466<br>466  | 470<br>469           | 468<br>468        | 466<br>466<br>466 | 472<br>470<br>471  | .462<br>460<br>461 | 478<br>477<br>478                   | 481<br>480<br>480 | 473<br>473<br>473 | 466<br>466        | 483<br>481        | 461<br>462<br>462 | 478<br>481<br>:480   | 446<br>453<br>450 | 475<br>479<br>477 | 493<br>492        | 488<br>490         | 512<br>501<br>506        | 514<br>516<br>515 | 500<br>506<br>503 | 485<br>487<br>486  | 483<br>483<br>480        | 189<br>486<br>188 | 463<br>459<br>462        |
| May 31 }                    | 453<br>453         | 472<br>472           | 461<br>460        | 463               | 462<br>462         | 467                | 441                                 | 467<br>473        | 486               | 177<br>475        | 478<br>476        | 466<br>461        | 384<br>410           | 462<br>455        | 462<br>465        | 498               | 503                | 569                      | 527<br>527        | [499<br>[500      | 504<br>502         | 476<br>474               | 469               | 469<br>468               |
| Mean                        | . 453              | 472                  | 460               | 463               | 462                | 468                | - 436                               | 470               | 483               | 176               | 477               | 464               | 397                  | 458               | 464               | 498               | 505                | 512                      | 527               | 500               | 503                | 475                      | 171               | 468                      |
| Means                       | 465,               | 0 470.               | 7 466.            | 8 464.            | 1 462.             | 5 464.             | 0 464.                              | 6 466.            | 0 464.            | 8 409.            | 6 462.            | 2 459.            | 6 462.               | 7 170.            | 8 479.            | 5,484.            | 9 492.             | 6 504.                   | 6 509.            | 1:504.            | 1,500,             | 8 483.                   | 6 180.            | × 468.                   |

Mouthly mean, 476.9

225 275

late.

### Hourly readings of the Brooke declinometer, Uglaamie, Alaska, June, 1883.

| Date.                | 0h         | 16         | 21                | 31                | 46                | 5h                | 6,         | 71                | 5h         | gh          | 104        | 110        | Noon.      | 134               | 144        | 154        | 164               | 171               | 154        | 194         | 204        | 31,        | 224          | 23          |
|----------------------|------------|------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|------------|-------------|------------|------------|------------|-------------------|------------|------------|-------------------|-------------------|------------|-------------|------------|------------|--------------|-------------|
| June 1 }             | 466<br>468 | 460        | 465               | 459               | 459               | 459               | 473        | 485               | 485        | 474         | 464        | 447        | 446        | 462               | 483        | 476        | 517               | 510               | 490        | 527         | 553        | 525        | 173          | 1115        |
| Mean                 | 467        | 460        | 165               | 459<br>460        | 459<br>460        | 459<br>443        | 473<br>454 | 485               | 485        | 474<br>398  | 464<br>497 | 447<br>423 | 446<br>455 | 462<br>486        | 483<br>469 | 476<br>437 | 317<br>432        | 510<br>513        | 490<br>540 | 527         | 555<br>589 | 525        | 473          | 46.5        |
| June 2 }             | 450        | 461<br>462 | 461               | 461               | 465               | 445               | 446        | 466               | .483       | 108         | 498        | 441        | 454<br>454 | 442               | 482<br>476 | 430        | 433<br>432        | 300<br>506        | 547        | 564<br>562  | 580        | 460<br>437 | 546<br>554   | 519<br>513  |
| Mean<br>June 3 {     | 450        | 462<br>439 | 459<br>469        | 460               | 462<br>450        | 466               | 450<br>461 | $\frac{462}{473}$ | 413        | 403<br>428  | 424        | 472        | 483        | 461               | 473        | 482        | 467               | 552               | 510        | 487         | 5M4<br>492 | 44H        | 550<br>505   | 516<br>437  |
| Mean                 | . 497      | 458        | 470               | 458               | 449<br>450        | 467               | 461        | 475               | 411        | 422         | 414        | 470        | 475        | 466               | 479<br>476 | 481        | 465<br>466        | 547<br>550        | 506        | 183<br>485  | 503<br>498 | 490<br>480 | 402          | 412<br>110  |
| June 4 {             | 466        | 468        | 465<br>465        | 457<br>460        | 469               | 459<br>461        | 470        | 474<br>472        | 474        | 470         | 469<br>475 | 462        | 471        | 454               | 450<br>453 | 481        | 503               | 495               | 480        | 491<br>488  | 408<br>400 | 404<br>4HH | 471          | 473<br>474  |
|                      |            | 469<br>464 | 465<br>463        | 458<br>470        | 472<br>463        | 460<br>470        | 470        | 473<br>470        | 482        | 474         | 472<br>481 | 464        | 469        | $\frac{462}{472}$ | 484        | 481        | 505<br>483        | 485               | 480        | 490<br>486  | 498<br>485 | 491<br>486 | 472<br>468   | 474         |
| une 5                | 465        | 465        | 463<br>463        | 472               | 466               | 478<br>472        | 471        | 180               | 474        | 474         | 473        | 476        | 468        | 466<br>469        | 480        | 486<br>485 | 483               | 485               | 493        | 187<br>486  | 484        | 485<br>486 | 466<br>467   | 468         |
| Mean                 | Actes      | 460        | 460               | 456<br>454        | 451               | 474               | 464        | 476               | 456<br>461 | 462         | 312        | 479        | 411        | 433               | 450<br>450 | 470<br>488 | 548<br>529        | 490<br>197        | 593<br>615 | 526<br>539  | 584<br>572 | 57H        | 164          | 166         |
| Mean                 | 461        | 464        | 463<br>462        | 455               | 458<br>454        | 475<br>474        | 470<br>467 | 481<br>478        | 458        | 461<br>461  | 270<br>291 | 476        | 414        | 435               | 453        | 479        | 536               | 494               | 604        | 53R         | 578        | 512<br>515 | \$60<br>\$06 | 164         |
| une 7 {              | 463        | 478        | 470               | 468               | 464               | 448               | 460        | 475               | 418<br>466 | 476         | 485        | 488        | 464        | 482               | 470        | 467        | 487<br>489        | 195<br>496        | 516        | 498<br>499  | 512<br>508 | 476<br>474 | \$70         | 172         |
|                      |            | 476        | 468               | 467               | 464               | 167               | 461        | 469<br>462        | 462        | 477         | 476<br>161 | 456        | 140        | 479               | 490        | 466        | 509               | 498<br>557        | 517        | 408<br>543  | 510<br>508 | 475        | \$80<br>\$57 | 472         |
| une 8 {              | 462        | 454        | 469               | 458<br>458        | 460               | 465               | 458<br>456 | 470               | 474        | 470         | 460        | 458        | 453        | 517               | 484        | 486<br>188 | 314<br>512        | 563<br>560        | 531        | 539<br>541  | 496<br>502 | 4×6        | 450<br>455   | 471         |
| une 9 {              | 147.4      | 468<br>468 | 448               | 453<br>455        | 463<br>466        | 443               | 462<br>468 | 460               | 457<br>462 | .423<br>424 | 411        | 454<br>451 | 447        | 462               | 480<br>524 | 456<br>478 | 493               | 506<br>501        | 529<br>524 | -530<br>522 | 519<br>521 | 482        | 485          | 11-5        |
| Mean                 | . 462      | 468        | 448               | 454               | 4414              | 440               | 465        | 460               | 460        | 424         | 414        | 452        | 450        | 4634              | 205        | 467        | 494               | 504               | 526        | 526         | 500        | 1182       | 155          | 465         |
| une 10 }             |            | 475        | 462<br>464        | 461               | 468<br>468        | 468<br>468        | 470        | 476<br>431        | 473<br>471 | 474         | 469        | 466        | 482        | 466               | 454<br>459 | 484<br>475 | 470               | 514               | 517<br>525 | 504<br>502  | 481        | 492<br>488 | 155          | 190         |
| me 11 }              | 441        | 474        | 459               | 461               | 468               | 468               | 470        | 468               | 472        | 472<br>465  | 454        | 464        | 482        | 468               | 456<br>486 | 475        | 472               | 514               | 521<br>505 | 503<br>484  | 1×4<br>477 | 190        | 472          | 473         |
| Mean                 | 450        | 463        | 460               | $\frac{456}{456}$ | 459<br>458        | 458<br>458        | 453        | 469<br>468        | 483<br>488 | 460         | 457        | 492<br>488 | 464        | 487               | 482        | 173        | 490               | 519               | 501<br>503 | 481         | 478<br>478 | 472<br>473 | 470          | 470         |
| une 12 }             | 476        | 467        | 460<br>460        | 463<br>465        | 463<br>462        | 468               | 473        | 462<br>461        | 475        | 478         | 459        | 474        | 472<br>481 | 150<br>446        | 443        | 492<br>492 | 494               | 511               | 474        | 478         | 492<br>490 | 183        | 4-2          | \$150       |
|                      |            | 466        | 460               | 464               | 462               | 168               | 476        | 462               | 475        | 478         | 455        | 474        | 476        | 448               | 439        | 492        | 494               | 511               | 474        | 478         | 191        | 484        | 1-2          | 15:         |
| une 13 {             | 461        | 460        | 465<br>465        | 467<br>468        | 473<br>473        | 168               | 455        | 450<br>453        | 493        | 481         | 471        | 469        | 467<br>468 | 479               | 466        | 479<br>479 | 481<br>481        | 478<br>476        | 490<br>486 | 484<br>463  | 488        | 489<br>492 | 1462         | 165         |
|                      |            | 460        | 465               | 468               | 473               | 468               | 456<br>472 | 452               | 494<br>450 | 482         | 486        | 470        | 468        | 480               | 406        | 479<br>456 | 481               | 477<br>503        | 488<br>485 | 484<br>499  | 488<br>501 | 490<br>482 | 466          | 165<br>171  |
| une 14 {             | 489        | 477        | 467               | 471               | 465<br>466        | 467<br>470        | 472        | 473               | 446        | 445         | 487        | 476        | 466        | 492<br>484        | 473        | 456        | 489               | 198<br>500        | 457<br>486 | 498         | 505        | 481        | 466          | 172         |
| Mean<br>une 15 §     | 466        | 458        | 472               | 471               | 472               | 468               | 470        | 176               | 474        | 477         | 174        | 475        | 475        | 476               | 474        | 483        | 463               | 185               | 494        | 510         | 516        | 495        | 471          | 170         |
| Mean                 | 468        | 458        | 172<br>166        | 471               | 472               | 168               | 470        | 476               | 474        | 477         | 174        | 475        | 175        | 176               | 474        | 483        | 483               | 485               | 494        | 510         | 516        | 195        | 171          | 470         |
| fune 16 {            | 471        | 478        | 165               | 465<br>465        | 462<br>467        | 470<br>468        | 472        | 486               | 476        | 481         | 469        | 475        | 476<br>468 | 474               | 408<br>466 | 474        | 484               | 484               | 488<br>492 | 510         | 528<br>523 | 482        | 178          | 170         |
| Mean                 | 471        | 479        | 466<br>509        | 465 - 471         | $\frac{464}{476}$ | 469<br>465        | 471        | 482               | 476        | 478         | 463        | 474        | 472<br>410 | 473               | 467        | 474        | 503               | $\frac{184}{529}$ | 490<br>530 | 498         | 526<br>501 | 483        | 175          | 178         |
| une 17 {<br>Mean     | 452        | 467        | 501<br>505        | 473<br>472        | 470<br>473        | 459<br>462        | 476<br>474 | 370<br>393        | 432        | 437         | 463<br>463 | 443        | 394<br>402 | 496               | 491<br>490 | 478<br>478 | 506<br>504        | 528<br>528        | 531        | 495<br>496  | 493        | 492        | 452          | 440         |
| une 18 {             | 510        | 533<br>464 | 426<br>441        | 495<br>501        | 407<br>420        | 464<br>465        | 448        | 504<br>497        | 417        | 412         | :326       | 513        | 482        | 429               | 497<br>499 | 491        | 457               | 495<br>503        | 579        | 468<br>476  | 501<br>509 | 522<br>516 | 471          | 4.50        |
| Mean                 | 510        | 498        | 434               | 498               | 414               | 464               | 444        | 500               | 417        | 410<br>411  | 336        | 503        | 470        | 438               | 1498       | 486<br>488 | 466               | 499               | 571        | 472         | -505       | ;519       | 160          | 46          |
| une 19 {             | 437        | 471<br>472 | 408               | 459<br>465        | 479               | $\frac{461}{467}$ | 448        | 455<br>462        | 465        | 472<br>470  | 489        | 612        | 434<br>420 | 477               | 496        | 499        | 468               | 517               | 497        | 502<br>499  | 496<br>492 | 458        | 491          | 48          |
| Mean                 | 439        | 472        | 469<br>465        | 449               | 476<br>472        | 464               | 448        | 458<br>509        | 504        | 471         | 490        | 640        | 427<br>465 | 480               | 407        | 496        | 469               | 522<br>499        | 498<br>562 | 500<br>499  | 494        | 490        | 193          | 450         |
| me 20 }<br>Mean      | 463<br>462 | 467        | 467               | 450<br>450        | 474<br>473        | 470<br>471        | 485        | 497               | 506        | 479         | 467<br>468 | 436        | 472        | 471               | 474        | 482        | 496               | 499               | 559<br>560 | 482         | 490        | 484<br>488 | 192<br>195   | 175         |
| une 21 }             | 4.00.4     | 469        | 470<br>472        | 448               | 460<br>460        | 463               | 459        | 166<br>453        | 472        | 469         | 471        | 460        | 464        | 466               | 474        | 481        | 485<br>485        | 492<br>492        | 497        | 499         | 493<br>494 | 496        | 1471<br>468  | 46          |
| Mean                 | 470        | 468        | 471               | 447               | 460               | 462               | 468        | 460               | 472        | 469         | 470<br>470 | 474        | 465        | 467               | 470        | 482        | 485               | 492               | 498        | 500         | 494        | 492        | 170          | 463         |
| une 22 {             | 464        | 460        | 461               | 464               | 467               | 469<br>469        | 474        | 463               | 482        | 474         | 470<br>171 | 462        | 460        | 466               | 485<br>418 | 491        | 481               | 533               | 558        | 1533        | 503        | 414        | 471<br>511   | 17          |
| Mean                 | 505        | 460<br>550 | 460               | 464               | 467               | 469               | 472        | 466<br>504        | 180        | 473<br>490  | 441        | 458<br>354 | 466<br>146 | 468               | 490        | 490        | 486               | 524               | 542        | 501         | 500<br>529 | 544        | 191          | 180         |
| une 23 {<br>Mean     | 488        | 473<br>512 | 437               | 462               | 476               | 481<br>482        | 445<br>450 | 502<br>503        | 478<br>489 | 483<br>480  | 436<br>438 | 379        | 457        | 542               | 488        | 486        | 475               | 520 $520$         | 513        | 509<br>505  | 523<br>526 | 533        | 456          | 15          |
| nne 24 {             | 469        | 476        | 461               | 454               | 450<br>456        | 460               | 464<br>465 | 452               | 481        | 470         | 467        | 456<br>463 | 452        | 464               | 464        | 478        | 505               | 485<br>485        | 515<br>519 | 496<br>494  | 510        | 485        | 490          | 450         |
| Mean                 | 469        | 474        | 462               | 454               | 458               | 464<br>462        | 164        | 447               | 480        | 473<br>472  | 460<br>468 | 460        | 445<br>448 | 464               | 461<br>462 | 474        | 197<br>501        | 485               | 517        | 195         | 514<br>512 | 484        | 192          | 15          |
| une 25 {             | 463        | 464        | 457<br>456        | 445<br>446        | 474<br>472        | 468<br>467        | 462        | 478<br>478        | 472        | 474<br>470  | 472<br>470 | 465        | 471        | 453<br>458        | 463        | 481        | 475<br>473        | 531<br>.532       | 530<br>521 | 486<br>486  | 546        | 482<br>479 | 489          | 16i.<br>16i |
| Mean                 | 487        | 464        | $456 \\ 459$      | 446               | 473               | 466<br>465        | 468        | 478<br>408        | 472        | 472         | 471        | 466        | 470        | 456               | 462<br>488 | 481        | 473<br>474<br>470 | 532<br>548        | 520        | 501         | 552        | 480<br>505 | 490          | 161         |
| une 26 , . {<br>Mean | 492        | 469        | 457<br>458        | 455<br>456        | 458<br>458        | 465               | 469<br>468 | 470<br>469        | 457        | 461         | 450        | 463        | 405        | 482               | 489<br>488 | 477        | 473               | 579               | 573        | 499<br>500  | 503<br>506 | 503        | 478          | 15          |
| une 27 {             |            | 458        | 460               | 461               | 464               | 467               | 441        | 489               | 458<br>444 | 440<br>428  | 622        | 401        | 402<br>473 | 476<br>466        | 472        | 456        | 514               | 564               | 408        | 509         | 572        | 583        | 510          | 401         |
| Mean                 | 446        | 460<br>459 | $\frac{463}{462}$ | 450<br>460        | 493<br>464        | 461               | 438<br>440 | 488<br>488        | 443        | 433<br>430  | 513<br>568 | 390<br>396 | 418<br>446 | 473<br>470        | 480<br>476 | 457<br>456 | 530<br>522        | 492               | 497        | 508         | 593<br>582 | 610<br>596 | 504          | 169         |
| une 28 }             | 469<br>458 | 503        | 485               | 470<br>460        | $\frac{462}{451}$ | 438               | 481        | 492               | 479        | 459<br>461  | 477        | 447        | 422        | 467               | 441        | 474        | 4×7<br>492        | 473<br>476        | 514        | 498         | 504        | 501        | 481          | 17          |
| Mean                 | . 464      | 502<br>468 | 484<br>469        | 470<br>467        | 456<br>463        | 4°4<br>456        | 480        | 490<br>472        | 480<br>464 | 460<br>454  | 480<br>454 | 450        | 425<br>472 | 466               | 447        | 475        | 490<br>475        | 474<br>497        | 512<br>510 | 496<br>504  | 503        | 497<br>507 | 154          | 47          |
| une 29 }             | 477        | 473        | 469               | 472               | 464               | 452               | 476        | 474               | 467        | 464         | 456        | 426        | .473       | 476               | 1472       | 466        | :478              | 494               | 511        | 507         | 523        | 502        | 477          | 130         |
| Mean                 | 476        | 484        | 469               | 470<br>461        | 463               | 454<br>468        | 476        | 461               | 421        | 459<br>461  | 455        | 399        | 472        | 474<br>397        | 454        | 466<br>506 | 476               | 496<br>515        | 510        | 506<br>453  | 524<br>453 | 504<br>508 | 478<br>518   | 45          |
| une 30 {<br>Mean     | 456        | 486<br>485 | 461<br>463        | 460               | 463               | 470               | 443        | 484<br>472        | 426        | 411         | 458<br>466 | 402        | 494        | 393               | 428<br>431 | 569        | 494               | -503<br>-509      | 561<br>560 | 463<br>458  | 476<br>480 | 490        | 487<br>502   | 50          |
|                      | 467. 3     | -          | 461.              |                   | 7 462             |                   | 7 464      | 0 471.            |            | 8 459. S    | -          | 461 6      | 456. 8     | 44277             | 3 479 !    | 478.       | -                 | 6 508             |            | 1 502. (    |            |            |              |             |

Monthly mean, 475.7

Hourly readings of the Brooke declinometer, Ugluamie, Alaska, July, 1883.

| Date.          | 0,         | 14                              | 24                | 8,         | 44         | 54                | 6,         | 7.         | gh                | 93                | 104        | 111                      | Noon.             | 131        | 143                      | 154        | 16,        | 173         | 186        | 194               | 20+        | 31,        | 224        | 2   |
|----------------|------------|---------------------------------|-------------------|------------|------------|-------------------|------------|------------|-------------------|-------------------|------------|--------------------------|-------------------|------------|--------------------------|------------|------------|-------------|------------|-------------------|------------|------------|------------|-----|
| ıly 1          | 482<br>420 | 483                             | 481               | 476        | 469        | 474               | 449        | 469        | 386               | 437               | 473        | 436                      | 493               | 132        | 454                      | 443        | 494        | 463         | 583        | 531               | 576        | 509        | 473        | 19: |
| lean           | 481        | 483                             | 481               | 476        | 169        | 474               | 449        | 469        | 386               | 437               | 173        | 436                      | 493               | 432        | 454                      | 443        | 494        | 463         | 583        | 531               | 576        | 509        | \$73       | 40. |
| 2{             | 543        | 481                             | 476<br>469        | 413        | 449<br>449 | 446               | 424        | 472        | 470               | 499<br>500        | 488        | 456                      | 507<br>534        | 465        | 472<br>471               | 479        | 486        | 489         | 497<br>496 | 486<br>490        | 509<br>508 | 483        | 47H<br>47H | 16  |
| an             | 548        | 475                             | 472               | 426        | 449        | 427               | 423        | 469        | 462               | 500               | 480        | 457                      | 520               | 466        | 472                      | 479        | 48H        | 490         | 496        | 488               | 508        | 483        | 478        | 40  |
| 3 {            | 463<br>466 | 462<br>464                      | 466<br>461        | 472<br>476 | 465        | 460               | 468        | 474        | 472<br>472        | 458<br>456        | 448<br>450 | 446                      | 435<br>439        | 436        | 469<br>468               | 580<br>585 | 481        | 505         | 520<br>523 | 538               | 490<br>487 | 493        | 46#<br>471 | 15  |
| an             | 464<br>462 | 463                             | 464               | 474        | 462        | 460<br>479        | 468<br>445 | 476        | 472               | 454<br>477        | 449<br>455 | 444                      | 437<br>449        | 484<br>423 | 468                      | 532<br>480 | 479        | 506<br>509  | 522<br>507 | 535               | 488        | 494<br>473 | 470        | 48  |
| 4 {            | 462        | 463<br>454<br>455<br>454<br>468 | 460               | 442        | 463<br>458 | 479               | 454<br>450 | 466        | 482               | 469               | 460        | 467                      | 148               | 441        | 466                      | 478        | 492        | 509         | 507        | 190               | 488        | 477        | 158        | 48  |
| ·2D            | 461        | 468                             | 460<br>465        | 444        | 460<br>470 | 479               | 1441       | 465        | 478               | 425               | 458        | 469                      | 448               | 432        | 472                      | 444        | 483        | 509<br>490  | 550        | 493<br>549        | 487<br>566 | 475        | 456<br>482 | 11  |
| 5 }            | 459<br>460 | 467<br>468                      | 464<br>464        | 448<br>448 | 471        | 473<br>472        | 440<br>440 | 474        | 447               | 425<br>423<br>424 | 489<br>490 | 46.3                     | 462               | 463        | 438                      | 444<br>458 | 485<br>484 | 494         | 528<br>539 | 549<br>546<br>548 | 554<br>560 | 473        | 4H1        | 45  |
| ean {          |            | 466                             | 460               | 450        | 454        | 452               | 1457       | 470        | 444               | 471               | 472        | 468                      | 462<br>478        | 462        | 475                      | 448<br>475 | 490        | 492<br>490  | 486        | 503               | 503        | 187        | 473        | 46  |
| 6.0.93         | 14665      | 466<br>466                      | 469<br>469        | 453<br>452 | 451<br>452 | 466<br>459        | 450<br>454 | 474        | 461<br>466        | 472<br>472        | 464<br>468 | 459<br>462               | 480<br>479        | 472<br>472 | 476                      | 476        | 492<br>491 | 400<br>490  | 487<br>486 | 504               | 503<br>503 | 486        | 472        | 46  |
| 7 {            | 458        | 479                             | 469               | 461        | 470        | 431               | 463        | 449        | 445               | 489               | 455        | 468                      | 456               | 479        | 1490                     | 484        | 473        | 479         | 514        | 550               | 607<br>622 | 1472       | 469        | .43 |
| P30            | 458        | 478<br>478                      | 458<br>464<br>449 | 464<br>462 | 469<br>470 | 434               | 462<br>462 | 455<br>452 | 449               | 488<br>488        | 464<br>460 | 471                      | 460<br>458        | 483<br>481 | $\frac{495}{402}$        | 484<br>484 | 471<br>472 | 481<br>480  | 468<br>491 | 558               | 614        | 470        | 470        | 87  |
| 8 {            | 461        | 462<br>455                      | 449               | 462        | 462<br>460 | 466<br>466        | 443<br>443 | 398        | 410               | 412               | 473        | 456                      | 465               | 563        | 38H<br>405               | 455        | 381        | 610         | 509        | 483               | 474        | 557        | 452<br>458 | 41  |
| ean            | 460        | 458                             | 451               | 462        | 461        | 466               | 443        | 304        | 400               | 414               | 467        | 460<br>454               | 466               | 548        | 396                      | 460        | 410        | 618         | 597        | 490               | 166        | 1552       | 455        | 47  |
| 9 {            | 461<br>463 | 447                             | 481               | 456<br>456 | 460<br>461 | 468               | 465        | 470<br>468 | 471               | 467               | 465        | 450                      | 463               | 468        | 477                      | 480        | 495        | 491         | 492        | 493               | 489        | 488        | 468<br>463 | 41  |
| 6an            | 462        | 445                             | 478<br>483        | 456<br>445 | 460        | 468               | 464<br>464 | 469        | 470<br>390        | 470<br>438        | 468<br>459 | 452                      | 465<br>503        | 468<br>488 | 477<br>477<br>477<br>453 | 480<br>486 | 494        | 489<br>478  | 494<br>512 | 494<br>194        | 458        | 454        | 466        | 145 |
| y 10 {         | 463<br>463 | 450                             | 485               | 469        | 460        | 460               | 470        | 451        | 389               | 483               | 467        | 487                      | 496               | 487        | 451                      | 1485       | 475        | 478         | 521        | 401               | 4HH        | 452        | 458        | 4   |
| can            | 463        | 448<br>485                      | 184<br>490        | 457        | 452        | 464               | 467<br>470 | 450        | 390<br>466        | 460               | 463<br>436 | 478<br>493               | 500<br>468        | 488<br>469 | 452<br>485               | 486<br>485 | 474        | 478<br>492  | 516<br>499 | 492<br>486        | 494<br>512 | 453        | 160<br>158 | 11  |
| y 11 {         | 476        | 485                             | 493               | 448        | 448<br>450 | 456               | 469        | 461        | 467               | 144               | 433        | 480                      | 467               | 462        | 486                      | 484        | 474        | 488         | 505        | 481               | 499        | 475        | 159        | 4   |
| ean<br>7 12 {  | 578        | 485<br>532                      | 492<br>473        | 446        | 449        | 458<br>432        | 470<br>508 | 462<br>453 | 466<br>453        | 442<br>478        | 434<br>480 | 486<br>487               | 468<br>464        | 466        | 486<br>442               | 484        | 472        | 490         | 502<br>485 | $\frac{484}{478}$ | 506<br>476 | 474        | 458<br>478 | 41  |
| y 12 {         | 570<br>574 | 509<br>520                      | 484<br>478        | 465        | 434<br>436 | 429               | 511        | 468<br>460 | 463<br>458        | 464               | 477        | 190                      | 458               | 475        | 440                      | 461        | 482        | 486         | 485        | 477               | 475<br>476 | 470        | 479<br>478 | 4   |
| lean<br>y 13 { |            | 464                             | 469               | 460        | 476        | $\frac{430}{472}$ | 510<br>475 | 469        | 442               | 427               | 470        | 438                      | 462               | 471        | 441<br>470               | 481        | 466        | 511         | 533        | 510               | 501        | 488        | 478        | -   |
| y 10<br>lean   | 455        | 463                             | 469<br>469        | 470        | 468        | 468               | 474<br>474 | 463        | 443               | 421               | 484        | 488<br>408<br>447<br>442 | 454               | 473        | 477                      | 489        | 457        | 510         | 525        | 513               | 496        | 489        | 477        | -4  |
| y 14 {         | 472        | 478                             | 500               | 461        | 467        | 470               | 467        | 471        | 472               | 468               | 438        | 461                      | 452               | 492        | 488                      | 485        | 606        | 1542        | 509        | 493               | 468        | 486        | 465        | .4  |
| eun            | 472        | 478<br>478                      | 485<br>492        | 467<br>464 | 467<br>467 | 469               | 467<br>467 | 473        | 473<br>472        | 472<br>470        | 429        | 410<br>436               | 448               | 503<br>498 | 458<br>473               | 462<br>474 | 584<br>595 | 546         | 498<br>504 | 487               | 471        | 187        | 464        | 4   |
| y 15 . {       | 465        | 465                             | 467               | 470        | 469        | 469               | 469        | 475        | 466               | 488               | 475        | 475                      | 473               | 474        | 478                      | 165        | 451        | 500         | 433        | 560               | 478        | 496        | 468        | 5   |
| ean            | 466        | 465                             | 467               | 470        | 469        | 469               | 460        | 475        | 466               | 488               | 475        | 475                      | 473               | 474        | 478                      | 465        | 451        | 509         | 433        | 560               | 478        | 496        | 163        | .5  |
| у 16 {         | 452        | 436<br>435                      | 455               | 464        | 470        | 407               | 460<br>472 | 485<br>475 | 480               | 473<br>478        | 476        | 460                      | 431               | 460<br>459 | 468                      | 480        | 530        | 320<br>319  | 493<br>505 | 652               | 529<br>567 | 472<br>163 | 468        | 1 8 |
|                | 452        | 436                             | 456               | 461        | 469<br>456 | 411               | 466<br>464 | 480        | 476<br>451        | 476<br>470        | 475        | 462                      | 420               | 460        | 470<br>476               | 480        | 526<br>503 | 520         | 499<br>490 | 654               | 548<br>182 | 468<br>478 | 470        | . 4 |
| y 17 {         | 457<br>455 | 461<br>461                      | 472<br>473        | 449<br>453 | 454        | 475               | 468        | 487<br>493 | 457               | 475               | 460        | 484                      | $\frac{427}{432}$ | 477<br>475 | 475                      | 486        | 499        | 489         | 492        | 488               | 481        | 480        | 476        | 4   |
| lean           | 1456       | 461                             | 472               | 451        | 454        | 463               | 466        | 490        | 454               | 463               | 464        | 394                      | 430               | 476        | 476                      | 510        | 501<br>483 | 489<br>512  | 491<br>508 | 41-9<br>549       | 482        | 479        | 476<br>465 | 1   |
| у 18 {         | 449        | 468                             | 465               | 461        | 460        | 462               | 473        | 472        | 454               | 466               | 471        | 402                      | 446               | 415        | 468                      | .509       | 483        | 511         | 513<br>510 | 552               | 619        | 463        | 418        | 1-  |
| lean           | 452        | 441                             | 466               | 460<br>535 | 460<br>489 | 462               | 474        | 472<br>469 | 456<br>466        | 464<br>473        | 472<br>440 | 398<br>449               | 440               | 414        | 474                      | 510<br>480 | 483        | 512         | 499        | 550<br>529        | 1498       | 502        | 498        | 4   |
| y 10           | 459        | 441<br>449<br>445               | 460<br>456        | 529<br>532 | 482<br>486 | 481<br>477        | 470        | 472        | 475               | 471<br>472        | 444        | 456<br>452               | 424<br>422        | 476<br>486 | 442                      | 478<br>479 | 496        | 498         | 502        | 532               | 499        | 506        | 494        | 4   |
| y 20 {         | 496        | 452                             | 460               | 462        | 450        | 460               | 465        | 473        | 475               | 473               | 490        | 476                      | 461               | 472        | 474                      | 481        | 495        | 495         | 502        | 403               | 496        | 488        | 478        | 4   |
| y 20 {<br>tean | 480        | 454<br>458                      | 463<br>462        | 460        | 446        | 455<br>458        | 466<br>466 | 474        | 475<br>475        | 400               | 490        | 474                      | 466               | 468        | 477                      | 478        | 499        | 497         | 502        | 495               | 4904       | 488        | 479        | 4   |
| y 21 {         | 469        | 455                             | 462               | 457        | 464        | 472               | 470        | 469        | 460               | 466               | 470        | 475                      | 472               | 471        | 472                      | 480        | 488        | 491         | 491        | 493               | 498        | 483        | 17.2       | 4   |
| lean           | 471        | 452<br>454                      | $\frac{462}{462}$ | 460<br>458 | 465<br>464 | 469               | 469        | 473        | 458<br>450        | 464               | 470        | 475<br>475               | 473               | 472<br>472 | 473<br>472               | 481        | 489<br>488 | 491         | 491        | 492               | 497        | 484        | 472        | 4   |
| y 22 {         | 459        | 462                             | 461               | 461<br>462 | 460        | 474               | 470        | 470        | 472               | 470               | 467        | 469                      | 476               | 476<br>477 | 482                      | 178        | 484<br>484 | 486         | 191        | 494               | 488        | 488        | 476<br>478 | 4   |
| Ican           | 160        | 463<br>462                      | 460<br>460        | 462        | 461        | 470<br>472        | 467        | 471        | $\frac{471}{472}$ | 468               | 468        | 469<br>469               | 477<br>476        | 476        | 482                      | 478        | 484        | 486         | 491        | 495               | 1489       | 488        | 477        | 1   |
| y 23 {         | 468        | 459                             | 454<br>456        | 458<br>459 | 458        | 461               | 465        | 477        | 469               | 475               | 470        | 468                      | 457               | 477        | 474                      | 477        | 482<br>482 | 488         | 493        | 498               | 502        | 483<br>484 | 470        | 4   |
| lean           | 464        | 460                             | 455<br>454        | 458        | 458        | 462               | 464        | 476        | 470               | 475               | 468        | 470                      | 458<br>455        | 476        | 474                      | 477        | 482        | 488         | 493<br>662 | 498<br>530        | 501        | 484        | 480        | 14  |
| y 24           | 469        | 459                             | 450               | 462<br>460 | 450        | 446               | 448<br>451 | 435        | 470<br>468        | 449<br>449        | 441<br>441 | 439                      | 460               | 468        | 463<br>466               | 491        | 505<br>514 | 468<br>468  | 621        | .518              | 485        | 470        | 469        | 1   |
| tean           | 467        | 456                             | 452               | 461        | 450<br>453 | 416               | 450        | 441        | 469               | 449               | 441        | 434                      | 458               | 472        | 464                      | 1485       | .510       | 1504        | 642<br>507 | 524<br>486        | 486        | 468        | 468        | -   |
| 3 25           | 164        | 461                             | 1447              | 468        | 447        | 458               | 468        | 476        | 480               | 483               | 464        | 466                      | 445               | 460        | 485                      | 167        | 495        | 504         | 506        | 489               | 473        | 480<br>479 | 474        |     |
| dean           | 468        | 458                             | 450<br>461        | 465<br>461 | 450<br>461 | 458<br>459        | 466        | 476        | 479<br>489        | 487               | 464        | 470                      | 458<br>463        | 451<br>450 | 482<br>479               | 468<br>481 | 1515       | 504         | 553        | 348               | 474<br>554 | 468        | 475        | ij  |
| y 26           | 465        | 472                             | 463               | 462        | 461        | 460               | 466        | 459        | 491               | 480               | 472        | 469                      | 456               | 452        | 463                      | +71        | 518<br>516 | 545         | 534        | 548<br>575<br>562 | 552<br>553 | 477<br>472 | 433        | !!  |
| teau           | 466        | 172<br>459                      | 462<br>454        | 462<br>452 | 461        | 460               | 466        | 458        | 490<br>453        | 476               | 474        | 468                      | 460<br>464        | 451<br>469 | 471                      | 476        | 463        | 308         | 544<br>596 | '509              | 478        | 477        | 171        | 1   |
| y 27           | 481        | 461                             | 454               | 453        | 463        | 457               | 438        | 454        | 464               | 454               | 510        | 455<br>460               | 473               | 471        | 450<br>452               | 473<br>472 | 448        | 521         | 509<br>508 | 507               | 477        | 478<br>478 | 471        |     |
| dean           | 166        | 460<br>462                      | 454               | 452<br>466 | 465<br>467 | 458<br>471        | 471        | 453<br>475 | 458<br>474        | 457<br>170        | 501<br>473 | 479                      | 406               | 470<br>468 | 473                      | 480        | 480        | .502        | 490        | 486               | 478        | 473        | 470        | - 1 |
| ly 28<br>Mean  | 465<br>166 | 461<br>462                      | 463<br>464        | 466<br>466 | 467        | 470<br>470        | 472        | 472        | 473<br>474        | 478<br>474        | 477        | 471                      | 472               | 472<br>470 | 471                      | 478        | 481        | 502         | 491        | 485<br>486        | 477        | 475<br>474 | 469<br>470 | . ! |
| ly 20 .        | 448        | 468                             | 170               | 468        | 473        | 473               | 478        | 469        | 469               | 471               | 467        | 481                      | 476               | 474<br>475 | 478                      | 478        | 494        | 486         | 493        | 490               | 496        | 491        | 462<br>458 | 1   |
| Mean           | 168        | 468                             | 471               | 468<br>468 | 473        | 471               | 469        | 469        | 468<br>468        | 472<br>472        | 470        | 470                      | 475<br>476        | 474        | 480                      | 479        | 493        | 488         | 494<br>494 | 492               | 496        | 490        | 160        |     |
| ly 30          |            | 452                             | 458               | 484        | 434        | 464               | 403        | 344        | 250<br>257        | 483               | 515<br>515 | 462                      | 470               | 491        | 351                      | 481        | 473        | 75:9<br>520 | 511<br>492 | 545<br>536        | 652<br>659 | 523<br>509 | 498        |     |
| Menn           | 165        | 450<br>451                      | 462               | 497<br>190 | 424        | 464               | 399<br>401 | 358        | 254               | 181               | 515        | 46.1                     | 480               | 468        | 342                      |            | 475        | 520         | 502        | 540               | 656        | 516        | 496        | 1   |
| dy 31          | 148        | 491                             | 525               | 490        | 442        | 422               | 411        | 472        | 104               | 412               | 1422       | 445                      | 433               | 397<br>424 | 479                      | 455        | 431<br>465 | 552<br>575  | 534        | 612               | 562<br>544 | 470<br>463 | 450        |     |
| dean           | 15G        | 490                             | 518               | 493        | 438        | 418               | 422        | 470        | 424               | 424               | 413        | 448                      | 440               | 410        | 486                      |            |            | - 64        | 510        | C08               | 553        | 466        | 149        |     |
|                |            |                                 | 1                 |            |            |                   |            |            |                   |                   |            |                          |                   |            |                          |            |            |             |            |                   |            |            |            | . 4 |

Monthly m. an, 471.0

Hourly readings of the Brooke declinometer, Uglaamie, Alaska, August, 1883.

| Date.   | 9,                | 10         | 24         | 35         | 44         | 50          | Øn.          | 71         | 40         | ga         | 101        | 111        | Neen. | 125        | 144         | 154        | 164        | 875         | 150        | 184        | 201         | 211        | 224        | 2    |
|---------|-------------------|------------|------------|------------|------------|-------------|--------------|------------|------------|------------|------------|------------|-------|------------|-------------|------------|------------|-------------|------------|------------|-------------|------------|------------|------|
| ug.1 §  | 506               | 172        | 470        | 166        | 140        | 141         | 120          | 569        | 498        | 106        | 411        | 484        | 384   | 150        | 144         | 478        | 473        | 518         | 582        | 546        | 169         | 532        | 502        | 421  |
| Mean    | 4199              | 172        | 470        | 108        | 110        | 141         | 120          | .69        | 4894       | 106        | 411        | 184.       | 384   | 150        | 144         | 17A        | 473        | 518         | 532        | 546        | 168         | 532        | 502        | 12   |
| ug. 2 } | 171               | 105        | 431        | 166        | 17.3       | 450         | 1491         | 128        | 428        | 475        | 434        | 413        | 442   | 449        | 458         | 477        | 457        | 496         | 494        | 472        | 4F6         | 486        | 464        | 16   |
| Mean    | 471               | 156<br>165 | 165        | 168        | 118        | 1. 6        | 138          | 475        | 131        | 177        | 142        | 466        | 437   | 137        | 41912       | 475        | 4H3        | 1594        | 4199       | 477        | 487         | 487        | 1464       | , 16 |
|         | 453               | 1168       | 166        | 47/54      | 479        | 1815        | 104          | 473        | 171        | 106<br>178 | 467        | 455        | 469   | 467        | 173         | 484<br>309 | 491        | 1008        | 409        | 191        | 487         | 491        | 482        | 17   |
| Mean    | 454               | 106        | 168        | 100        | 181        | 165         | 173          | 474        | 176        | 172        | 164        | 454        | 468   | 470        | 4473<br>468 | 180        | 488        | 1-93<br>467 | 408        | 492        | 4F6<br>401  | 488        | 483        | 147  |
| ag. 4 } | 458               | 449        | 464        | 1664       | 464        | 171         | 474          | 176        | 468        | 176        | 167        | 470        | 463   | 166        | 476         | 476        | 190        | 468         | (4)-8      | 187        | 490         | 492        | 368        | 47   |
| Mean    | 458               | 149        | 463<br>466 | 165        | 169        | 168         | 174          | 473        | 409        | 479        | 466        | 472        | 462   | 463        | 472         | 478        | 491        | 469         | 388        | 514        | 490<br>544  | 490        | 168        | 41   |
| ig. 5 } | 164               | 168        | 468        | 105        | 460        | \$117       | 467          | 173        | 170        | 103        | 3415       | 475        | 457   | 160        | 174         | 474        | 483        | 474         | 495        | 498        | 543         | 465        | 160        | 1    |
| Mean    | 464               | 170        | 467        | 485        | 469        | 41.8        | 4110         | 473        | 170        | 404        | 457        | 474        | 1484  | 162        | 184         | 323        | 486        | 1472        | 516        | 506        | 344         | 484        | 400        | 4    |
| ig. 6 { | 45H<br>459        | 460        | 156        | 104        | 151        | 147         | 1433         | 173        | 1114       | 125        | :451       | SE6        | 136   | 471        | 480         | 517        | 504        | 532         | 532        | 542        | 623         | 524        | 510        | II.  |
| dean    | 474               | 460        | 456        | 460        | 148        | 142         | 436          | 172        | 14195      | 132        | 454        | 386        | 440   | 164        | 482         | 520        | 500<br>470 | 320         | 524        | 346        | 670         | 5332       | 542        | H    |
| g. 7 {  | 405               | 481        | 465        | 163        | 453<br>455 | 159         | 1115         | 472        | 479        | 168        | 470        | 170        | 173   | 465        | 469         | 474        | 481        | 190         | 504        | 498        | 473         | 495        | 469<br>468 | 11   |
| lean    | 404               | 131        | 104        | 464        | 154        | 160         | 114          | 173        | 4710       | 166        | 471        | 470        | 472   | 464        | 470         | 474        | 178        | 488         | 568        | 498        | 473         | 415        | ,168       | ill  |
| g. 8 }  | 467               | 165        | 477        | 1484       | 467        | 159         | 445          | 462        | 187        | 154        | 173        | 169        | 12:0  | 480        | 181         | 433        | 474        | 497         | 478        | 199        | 482         | 188        | 460        | 47   |
| dean    | 460               | 164        | 473        | 1456       | 107        | 159         | 444          | 160        | 4#8        | 161        | 174        | 169        | 480   | 180        | (462        | 430        | 474        | 494         | 178        | 191        | 4203        | 168        | 100        | 18   |
| g. 9 §  | 169               | 462        | 464        | 164        | 468        | 474         | 172          | 171        | 471        | 163        | 469        | 475        | 466   | 473        | 476         | 481        | 486        | 492         | 485        | 183        | 477         | 474        | 471        | 4    |
| doan    | 466               | 462        | 464        | 462        | 2469       | 474         | 172          | 470        | 476        | 166        | 170        | 175        | 167   | 472        | 470         | 1477       | 45-6       | 492         | 485        | 481        | 477         | 474        | 171        | 1    |
| g. 10 { | 468               | 170        | 461        | 166        | 471        | 467         | 468          | 468        | 162        | 164        | 476        | 463        | 179   | 172        | 486         | 45-2       | 478        | 489         | 484        | 497        | 482         | 480        | 470        | 1    |
| dean    | 470               | 170        | 404        | 4 10       | 471        | (1 🗎        | 166          | 469        | 406        | 464        | 474        | 406        | 475   | 477        | 485         | 483        | 110        | 485         | 485        | 196        | 182         | 480        | 470        | 144  |
| 11 6    | $\frac{463}{462}$ | 475        | 476<br>179 | 473        | 167        | 444         | 14H<br>142   | 423        | 5492       | 160        | 474        | 481        | 302   | 445        | 466         | 481<br>4F0 | 509        | 492         | 516        | 190        | 466         | 474        | 165        | ,10  |
| foon    | 1614              | 4784       | 178        | 472        | 466        | 444         | :845         | 412        | 334        | 190        | 177        | 483        | 376   | 440        | 465         | 480        | 506        | 490         | 516        | 198        | 1465        | 474        | 164        | 1    |
| g. 12 { | 470               | 456        | 161        | 464        | 458        | 165         | 174          | 474        | 476        | 473        | 409        | 166        | 171   | 466        | 1469        | 477        | 476        | 511         | 513        | 515        | 199         | 478        | 470<br>470 | ,10  |
| tean    | 470               | 456        | 458        | 164        | 158        | 465         | 172          | 171        | 476        | 472        | 464        | 166        | 472   | 166        | 468         | 476        | 176        | 510         | 514        | 528        | 199         | 173        | 170        | 114  |
|         | 470               | 472        | 465        | 165        | 463        | 468         | 467          | 170        | 471        | 179        | 474        | 470        | 486   | 478        | 477         | 483        | 502        | 508         | 518        | 507        | 505         | 490        | 100        | 1 11 |
| fean    | 169               | 473<br>172 | 464        | 115-8      | 164        | 106         | 468          | 470        | 470        | 176        | 470        | 474        | 46h   | 483        | 478         | 183        | 100        | 508         | 318        | 54.6       | 502         | 491        | 461        | 10   |
| g. 14 { | 164               | 165        | 165        | 460<br>460 | 469        | 455         | 471<br>172   | 456<br>469 | 451        | 452        | 142        | 469        | 467   | 487        | 478         | 475        | 488        | 504         | 516        | 488<br>489 | 493         | 493<br>488 | 415        | .13  |
| Ioan    | 155               | 165        | 464        | 100        | 468        | 151         | 472          | 158        | 460        | 150        | 440        | 468        |       | 484        | 477         | 416        | 186        | 504         | 518        | 488        | 190         | 490        | 462        | 40   |
| c 18 5  | 54.0<br>54.0      | 477        | 164        | 46/3       | 164        | 162         | \$1.8        | 170        | 168        | 1.3        | 465        | 477        | 475   | 470        | 1483        | 486        | 191        | 197         | 191        | 460        | 472         | 466        | 465        | 40   |
| lean    | 505               | 177        | 164        | 463        | 164        | 162         | 408          | 470        | 108        | 462        | 165        | 177        | 475   | 170        | 4143        | 186        | 101        | 1497        | 191        | 4>0        | 472         | 460        | 165        | 40   |
| g. 16 § | 468               | 470        | 470        | 167        | 469        | 465         | 470          | 473        | 1474       | 479        | 465        | 173        | 47.4  | 469        | 1479        | :484       | 185        | 185         | 185        | 480        | 479         | 481        | 171        | 1    |
|         | 468               | 469        | 471        | 469        | 469        | 465         | 471          | 473        | 174        | 474        | 470        | 476        | 475   | 485        | 479         | 483        | 485        | 188         | 484        | 475        | 479<br>470  | 479        | 469        | 11   |
| 17 5    | 463               | 401        | 465        | 461        | 168        | 467         | :473         | 474        | 176        | 471        | ,475       | 473        | 474   | 474        | 474         | 477        | 483        | 497         | 502        | 497        | 491         | 480        | 472        | 11   |
|         | 462<br>462        | 461        | 166        | 464        | 168<br>468 | 468         | 473          | 474        | 478<br>477 | 476        | 475        | 472        |       | 472<br>473 | 176         | 485        | 486        | 496<br>496  | 501        | 408        | 491<br>491  | 480        | 474        | 11   |
| z. 18 { | 164               | 168        | 463        | 461        | 464        | 11.6        | 479          | 100        | 453        | 1432       | 448        | 400        | 195   | 465        | 467         | 441        | 495        | 492         | 512        | 525        | 556         | 510        | 486        | - 81 |
| ean     | 162<br>163        | 168        | 463        | 464        | 165        | 465         | 476          | 1470       | 456        | 430        | 144        | 418        |       | 455<br>460 | 470         | 442        | 502<br>498 | 545         | 516<br>514 | 521<br>528 | 601<br>578  | 511        | 485        | 11   |
|         | 167               | 459        | 453        | 473        | 159        | 450         | 41-9         | 475        | 167        | 470        | 475        | 174        | 164   | 458        | 476         | 484        | 482        | 482         | 479        | 482        | 483         | 478        | 481        | 14   |
|         | 468<br>468        | 161        | 456        | 472        | 160        | 447         | 486          | 474        | 465        | 468        | 476        | 474        |       | 459<br>458 | 476<br>476  | 485        | 480        | 482<br>482  | 480<br>460 | 482        | 482<br>482  | 477        | 487        | 11   |
| . 20 {  | 165               | 454        | 461        | 160        | 165        | :481        | 472          | 470        | 466        | 476        | 441        | 460        | 482   | 470        | 179         | 488        | 488        | 488         | 483        | 477        | 490         | 485        | 17:        | 141  |
| ean     | 162<br>164        | 462<br>158 | 466        | 462        | 464        | 478         | 473<br>172   | 409        | 465        | 477        | 128        | 159        |       | 470        | 482         | 490<br>480 | 487        | 487<br>488  | 482        | 475        | 492         | 485        | 472        |      |
|         | 168               | 459        | 463        | 472        | 469        | 465         | 173          | 473        | 475        | 167        | 477        | 148        |       | 472        | 464         | 477        | 194        | 490         | 504        | 505        | 179         | 193        | 472        | 4    |
|         | 168               | 462<br>460 | 165        | 170        | 469        | 464         | 472          | 471        | 474        | 1111       | 470        | 457        |       | 474        | 465         | 479        | 497        | 488         | 505        | 501        | 479         | 494        | 474        | 4    |
| ean     | 168<br>178        | 458        | 447        | 164        | 469        | 467         | 1472<br>1475 | 472        | 1474       | 468        | 474        | 452<br>492 |       | 473<br>471 | 464<br>528  | 478<br>491 | 496<br>484 | 489         | 504        | 503<br>499 | 479<br>480  | 491        | 488        | 117  |
|         |                   | 455        | 449        | 466        | 404        | 468         | 474          | 474        | 465        | 469        | 455        |            |       | 456        | 522         | 492        | 481        | 489         | 514        | 496        | 478         | 496        | 488        | 18   |
|         | 178<br>143        | 455        | 448        | 485        | 464        | 468         | -174<br>-163 | 474        | 465        | 468        | 456        |            |       | 464        | 525<br>483  | 482        | 482<br>478 | 489<br>483  | 518        | 498<br>538 | 1479<br>507 | 494        | 494        | 1    |
|         | 135               | 47.2       | 160        | 462        | ,455       | 406         | 461          | 500        | 481        | 476        | 468        | 459        | 328   | 474        | 482         | 466        | 485        | 481         | 512        | 531        | 501         | 500        | 402        | 1    |
| enn     | 139               | 170<br>464 | 460        | 458        | 152        | .466<br>456 | 462<br>466   | 498        | 184        | 477        | 1474       |            |       | 472<br>432 | 482         | 468        | 482<br>504 | 482<br>489  | 511        | 534<br>499 | 504<br>486  | 497        | 464        | 143  |
| r. 24 { | 152               | 404        | 442        | 452        | 452        | 459         | 465          | 183        | 419        | 476        | 487        | 445        | 451   | 429        | 469         | 470        | 500        | 498         | 481        | 198        | 487         | 482        | 461        | 47   |
|         | 150<br>150        | 164        | 161        | 452        | 452        | 158         | 466          | 463        | 107        | 476        | 480        | 382<br>479 |       | 430<br>457 | 471<br>460  | 476        | 502<br>469 | 488<br>503  | 494        | 198        | 486         | 482        | 464        | 11   |
| 5. 20 { | H8                | 46.9       | 465        | 463        | 171        | 462         | 464          | 457        | 14191      | 1471       | 465        | 472        | 461   | 461        | 475         | 477        | 470        | 502         | 490        | 488        | 482         | 481        | 470        | .40  |
| ean     | 149               | 169        | 164        | 463        | 471        | 463         | 466          | 460        | 468        | 174        | 466        | 476        |       | 459        | 478         | 476        | 470        | 502         | 402        | 488        | 482         | 482        | 470        | 16   |
| r. 26 } | 164               | 166        | 166        | 468        | 470        | 469         | 467          | 169        | 171        | 168        | 462<br>461 |            |       | 474<br>476 | 490<br>490  | 479<br>476 | 481<br>480 | 493<br>492  | 492        | 484        | 476         | 476        | 472        | 41   |
| ean     | 614               | 466        | 466        | 468        | 470        | 469         | 467          | 470        | 468        | 470        | 462        | 455        | 473   | 475        | 490         | 478        | 480        | 492         | 492        | 485        | 476         | 476        | 473        | 44   |
| . 27 {  | 66                | 465<br>466 | 467        | 468        | 169        | 470         | 471          | 473        | 473        | 472        |            | 472<br>472 |       | 474<br>476 | 472         | 469<br>467 | 477        | 488         | 496        | 497        | 481<br>481  | 480        | 481        |      |
| ean 4   | 66                | 406        | 467        | 468        | 468        | 470         | 471          | 473        | 472        | 473        |            | 472        |       | 475        | 471         | 468        | 476        | 188         | 496        | 497        | 481         | 480        | 150        |      |

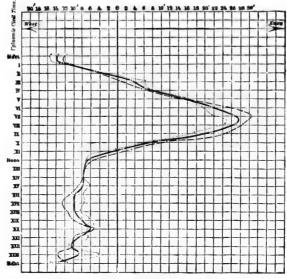
Monthly mean, 473.

| 230 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 1972 | 1972 | 1974 | 1975 | 1975 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 | 1976 |

#### SOLAR-DITRNAL VARIATIONS OF THE DECLINATION

Observed at Uglaamie, Alaska.

Disturbances included.)



Full curve mean of the year Sept. 1862 to Aug. 1863.

Broken - mean of ti months, our in north destination.

Recapitulation of monthly mean values (inclusive of disturbances) of hourly readings of the Brooke declinometer at Uglaamie, Alaska, 1882-'83.

| Göttingen civil time   |   | ja   | - Ih   | 26  | 3h   | 4h   | \$h   | 65  | Th   | - Sin   | (jh  | 10   | h  | ESh  |
|--|---|--|--|---|--|--|---|---|--|---|--|--|--|--|
| Uglaansie civil time   |   | 53.6m<br>+ 53.6m   | 13h 53.6m  | 14h 53.6m   | 155 53.6m  | 16h 53,6m  | 17 <sup>h</sup> 53.6 <sup>m</sup>   | 18h 53.6m   | 19h 53.6m  | 20° 53.6°   | 215 53.6   | 224 5  | 3.6**  | 23 <sup>h</sup> 53, <b>6</b> *   |
| 1882.<br>Sept'r epoch, the (21st)  |   | 491.7  | 492.3  | 495. 9  | 493. 8   | 491. 7   | 492. 8  | 490. 4  | 496. 0   | 496. 9  | 487. 0   | 47   | 4.7  | 492. 8   |
| керт г еросы, тио (этат)   |   | 492. 1   | 490. b   | 495. 1  | 4NH. 7   | 493. 4   | 488. 5  | 490. 2  | 491. 6   | 4HH, 4  | 486. 8   |  | 2. 8   | 475.1  |
| November   |   | 486.8  | 484, 14  | 484.7   | 487. 0   | 481.3  | 479. 9  | 486. 1  | 486. 5   | 471. 4  | 466. 2   |  | 9. 4   | 454.2  |
| December   |   | 487. 9   | 481.5  | 484. 1  | 484.5  | 413.8  | 483. 2  | 484.9   | 4H5. 1   | 487. 7  | 485. 6   | 48   | 7.3  | 476. 4   |
| 1883.  |   |  |  |   |  |  |   |   |  |   |  |  |  |  |
| Japuary  |   | 474. 2<br>476. 2   | 479. 6   | 479. 1  | 470.7  | 482. 2   | 482.3   | 483. 1  | 485, 5   | 486, 9<br>489, 1  | 481.9  |  | 2. 0   | 474. (   |
| February<br>March  |   | 478. 7   | 476. 0<br>477. 3   | 479. 3<br>478. 5  | 479. 8<br>472. 5   | 478. 9<br>472. 0   | 479. 0<br>475. 5  | 481. 4<br>475. 5  | 478. 2<br>471. 5   | 475. 3  | 469.8  |  | 5. <b>6</b><br>3. 8 i  | 4H3. 7   |
| April  |   | 474. 8   | 473.1  | 471. 2  | 467, 2   | 467. 0   | 467. 6  | 471.7   | 474. 3   | 472.8   | 471.6  |  | u 4  | 472.5  |
| May  |   | 465. 0   | 470.7  | 466. 8  | 464, 1   | 462. 6   | 464. 0  | 464.6   | 466. (*  | 461. 8  | 469. 6   | 46   | 2. 2   | 459.4  |
| Jane   |   | 467. 2   | 470.0  | 464. 0  | 461.7  | 462.8  | 463. 7  | 464. 0  | 471. 3   | 465, 8  | 459, 2   |  | H 0  | 461. 0   |
| July<br>August epoch, the (14t)  | 100   | 471.0  | 464. 8<br>463. 5   | 467. 9<br>462. 2  | 463.5  | 458, 9   | 459, 9<br>462, 2  | 450. 6<br>463. 7  | 461. 9   | 450.7   | 463. 3   |  | 7.1  | 461  |
| August (poen, the (tite)   |   | 404. 4   | 400.0  | 4110. 0   | 101. 2   | TOOL &   | 405. 3  | 400.1   | 410.4  | 410.1   | 100.1  | 40   | 1  | 401  |
|  |   | 100.0  |  |   |  |  |   |   |  |   |  |  |  |  |
| April to Sept., inclusive<br>Oct. to March, inclusive  | 9-1   | 472. 3<br>482. 5   | 472. 4<br>481. 0   | 471.3<br>483.5  | 469, 1<br>482, 0   | 467. 7<br>481. 9   | 468, 2<br>481, 4  | 460.0   | 474, 3<br>4#3 1  | 470. 1<br>483. 1  | 469. 5<br>478. 1   |  | 5, 9   | 468.1  |
| Year   |   | 477.4  | 477. 0   | 477. 4  | 475, 6   | 474. 8   | 474.8   | 476. 3  | 478.7  | 476, 6  | 473. 8   |  | 5.6  | 471.   |
|  |   |  | . 411.0  | *****   | 410,0  | 4/4.0  | -   | 470.0   | 410.1  |   | 410.0  | . **   |  | ****   |
| Göttingen civil time .   |   | 134  | 10   |   | - , -  |  | -   | 100   | 204  |   | 22   |  | 924  | 1  |
| y man y announce y   | Noon.   | -  |  | 154   | 164  | 173  | 150   |   |  | 310.0   |  |  |  | 1  |
| y man y announce y   | Noon.   | 134  | 110  |   | 164  | 173  | 156   |   | 204  | 31.   | 221  | -  | 234  | Mean   |
| Göttingen civil time   | Noon.   | 134  | 110  | 154   | 164  | 173  | 156   | 199   | 204  | 31.   | 22   | -  | 234  | Mean   |
| Göttingen civil time   | Noon.   | 13h<br>1h 53,0   | 1 th<br>2 5 5 3 6  | 15h   | 16h<br>m 4h 53,6   | 17h  | 15h<br>0533.0   | 199   | 20h  | 91° 96 53.  | 92°  | .G= 11                                       | <b>9</b> 86<br>653.6   | Mean   |
| Göttingen civil time   | Noon. 0h 53.6m 492. 0 471. 7  | 13 <sup>4</sup><br>1 <sup>3</sup> 53.0 <sup>2</sup><br>409.<br>405.                            | 5 500.   | 15h<br>m   3h 53.6  | 16h<br>4h 53,6   | 17 <sup>h</sup> 5 <sup>h</sup> 53.6  | 15h<br>0h53.0   | 199 : 75 53.0   | 20h 8h 53.6  | 9 9 53.<br>5 502  | 92°  | .G= 11                                       | 98h<br>h 50.6  | Mean   |
| Göttingen civil time  Uglaamie civil time  1882. September October November                                    | Noon. 0h 53,6m 492. 0 471. 7 474. 2   | 135<br>153,69<br>499,<br>495,<br>495,  | 5 500.<br>0 512.<br>1 470.   | 15h<br>a 3h 53.6<br>0 507.<br>5 500.<br>6 403.  | 16 <sup>h</sup> 4 53.6  2 500. 7 508. 5 617.   | 17h  5h 53.6  2 506. 5 508. 6 504.   | 9 518.<br>9 519.<br>9 519.<br>9 510.  | 19 <sup>b</sup> 19 <sup>b</sup> 17 <sup>b</sup> 53.6 3   512.7 9   517.   | 20h (h 8h 53.6 4 506. 8 512. 8 514.  | 9 53.<br>5 502<br>5 501<br>9 49   | 32 <sup>4</sup> 6= 10 <sup>5</sup> 53 4 40; 4 40; 3 48;  | .0 11 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 | 986<br>653.6<br>492.4<br>485.4   | Mean   |
| Göttingen civil time Uglanmie civil time 1482. Soptember October   | Noon. 0h 53.6m 492. 0 471. 7  | 13 <sup>4</sup><br>1 <sup>3</sup> 53.0 <sup>4</sup><br>409.<br>405.                            | 5 500.<br>0 512.<br>1 470.   | 15h<br>a 3h 53.6<br>0 507.<br>5 500.<br>6 403.  | 16 <sup>h</sup> 4 53.6  2 500. 7 508. 5 617.   | 17h  5h 53.6  2 506. 5 508. 6 504.   | 9 518.<br>9 519.<br>9 519.<br>9 510.  | 19 <sup>h</sup> 3   512. 7   527. 9   517.  | 20h (h 8h 53.6 4 506. 8 512. 8 514.  | 9 53.<br>5 502<br>5 501<br>9 49   | 32 <sup>4</sup> 6= 10 <sup>5</sup> 53 4 40: 4 40: 3 48   | .0 11 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 | 986<br>653.6<br>492.4<br>485.1   | Mean   |
| Göttingen civil time   | Noon. 0h 53,6m 492. 0 471. 7 474. 2   | 135<br>153,69<br>499,<br>495,<br>495,  | 5 500.<br>0 512.<br>1 470.   | 15h<br>a 3h 53.6<br>0 507.<br>5 500.<br>6 403.  | 16 <sup>h</sup> 4 53.6  2 500. 7 508. 5 617.   | 17h  5h 53.6  2 506. 5 508. 6 504.   | 9 518.<br>9 519.<br>9 519.<br>9 519.  | 19 <sup>b</sup> 19 <sup>b</sup> 17 <sup>b</sup> 53.6 3   512.7 9   517.   | 20h (h 8h 53.6 4 506. 8 512. 8 514.  | 9 53.<br>5 502<br>5 501<br>9 49   | 32 <sup>4</sup> 6= 10 <sup>5</sup> 53 4 40; 4 40; 3 48;  | .0 11 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 | 986<br>653.6<br>492.4<br>485.4   | Mean   |
| Göttingen civil time  Uglaamie civil time  1882. September October November                                    | Noon.  0b 53,0m  492. 0 471. 7 474. 2 474. 8                                      | 13 <sup>b</sup><br>1 <sup>b</sup> 53.0 <sup>c</sup><br>499.<br>495.<br>497.<br>477.            | 5 500.<br>0 512.<br>1 470.<br>1 498.   | 15h  15h  3 53.6  507. 5 500. 418. 419.   | 16h  4h 53,6  2 500, 7  5 517, 408,  | 2 506.<br>5 508.<br>6 504.   | 9 518.<br>9 519.<br>9 519.<br>4 490.  | 3 512.<br>7 527.<br>9 517.<br>9 507.  | 20h (m. 8h 53.6) 4 506. 3 512. 8 514. 7 504. 2 511.  | 91° 9° 53. 5 502 5 501 9 400 9 8 431  | 22 <sup>1</sup> 6= 10 <sup>3</sup> 53 4 495 3 48 8 48  | .0 11 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 | 986<br>653.6<br>492.4<br>485.4   | Mean  9   497.1  8   496.4  9   4-10.5  5   4-9.0  |
| Göttingen civil time .  1882. Soptember October Pecember Pecember 1883. January February                       | Noon. 0b 53,6m 492.0 471.7 474.2 474.8  | 13 439.<br>439.<br>495.<br>495.<br>497.<br>477.  | 5 500, 0 512, 1 470, 0 490, 1 498, 6 507,  | 15h  3 53.6  0 507. 5 500. 6 493. 5 490.  | 2 560.<br>7 502.<br>7 502.<br>7 502.<br>6 507.   | 2 506.<br>5 508.<br>6 504.<br>3 504.<br>6 514.<br>9 513.   | 9 518.<br>9 518.<br>9 510 0 538.<br>4 490.<br>9 400.<br>6 513.  | 3 512.<br>3 512.<br>7 527.<br>9 517.<br>9 507.<br>1 506.<br>6 513.  | 20h  8h 53.6  4 500.3  512.8  514.7  2 511.8   | 91°   9° 53.   5   50° 55   50° 55   50° 10° 10° 10° 10° 10° 10° 10° 10° 10° 1  | 22 <sup>1</sup> 0= 10 <sup>h</sup> 53 .4 407 .4 407 .3 48.8 48.  | .9 11 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6    | 98h<br>492.4<br>485.4<br>484.4<br>477.4  | Mean  3   497.1  4   496.4  4   499.1  5   488.4  6   4*9.1  |
| Göttingen civil time   | Noon.  0b 53,6m 492. 0 471. 7 474. 2 474. 8 481. 4 476. 4 476. 4 474. 8           | 13°<br>1° 53.6°<br>499.<br>495.<br>495.<br>497.<br>477.<br>476.                                | 5 500.<br>5 12.<br>1 470.<br>1 498.<br>1 498.<br>5 507.<br>5 487.  | 15 <sup>h</sup> 3 53.6  507, 5 500, 6 493, 5 499.   | 16 <sup>h</sup> 4 <sup>h</sup> 53.6  2 560. 7 508. 5 617. 408. 7 592. 6 507. 3 497.  | 2 506.<br>5 508.<br>6 504.<br>6 514.<br>9 513.<br>0 506.   | 9 518.<br>9 510.<br>9 510.<br>9 530.<br>4 490.<br>9 400.<br>6 513.<br>8 505.  | 3 512.7 527.9 507. 1 506.6 613.9 613.   | 20h  8h 53.6  4 500, 3 512, 3 514, 7 504.  2 511, 494, 2 506, 606, 606, 606, 606, 606, 606, 606,   | \$210<br>  \$210<br>  \$00<br>  \$50<br>  \$50<br>  \$60<br>  \$6 | 22 <sup>1</sup> 0= 10 <sup>1</sup> 53 .4 405 .4 405 .4 405 .4 48 .8 48 .7 48 .4 49 .6 6 49   | .0= 11                                       | 98h<br>492.4<br>485.4<br>484.4<br>477.4<br>487.4   | Mean  3   497.1  6   496.4  6   496.4  6   488.4  6   488.4  8   494.4   |
| Göttingen civil time .  Losz. Soptember October November December Losz, January March Aurit                    | Noon.  0b 53,0m  492, 0  471, 7  474, 2  474, 8  481, 4  476, 4  474, 3  476, 4   | 1553.09<br>409.<br>409.<br>405.<br>497.<br>477.<br>476.<br>467.                                | 5 500,<br>0 512,<br>1 470,<br>0 490,<br>1 498,<br>6 507,<br>5 487,<br>2 487,   | 15h<br>3 53.6<br>0 507.<br>5 500.<br>6 493.<br>7 495.<br>7 491.<br>5 498.<br>7 498.   | 16h 4 53.6 2 500.7 7 508.8 5 517. 0 408. 7 592.6 6 507. 3 497. 8 494.  | 2 506.<br>5 508.<br>6 504.<br>3 504.<br>6 514.<br>9 513.<br>0 506.   | 9 518.99 510.00 538.4 499.499.505.88 505.9 506.   | 3 512.3<br>7 5.7.5 50.7<br>9 517.9<br>1 506.6<br>6 513.9<br>9 313.8   | 20h  8h 53.6  4 500, 3 512, 8 514, 7 504. 2 511, 8 494, 2 506, 4 500,  | 94 53.<br>  5 502 5 501 9 40 8 4 J1   | 22° 10° 53° 10° 53° 14° 49° 18° 48° 18° 18° 48° 18° 18° 48° 18° 18° 48° 18° 18° 48° 18° 18° 48° 18° 18° 48° 18° 18° 18° 48° 18° 18° 18° 48° 18° 18° 18° 18° 18° 18° 18° 18° 18° 1  | .0= 11                                       | 98h<br>492.4<br>485.4<br>484.4<br>477.4<br>487.4<br>478.4<br>479.4                                     | Mean  3   497.1  6   496.4  6   4-0.4  6   4-10.8  6   4-10.8  7   4-10.8  9   |
| Göttingen civil time   | Noon.  0b 53,60s  492. 0 471. 7 474. 2 474. 8  481. 4 476. 4 474. 3 470. 6 462. 7 | 13 <sup>5</sup> 15 53,62 439, 495, 495, 497, 477, 477, 476, 467, 479, 470,                     | 5 500, 0 512, 1 470, 0 490, 1 498, 6 507, 5 487, 2 477, 9 479,   | 15h<br>3 53.6<br>0 507,<br>5 500,<br>6 403,<br>5 490,<br>7 495,<br>7 491,<br>5 498,<br>7 485,<br>5 481,   | 16 <sup>h</sup> 4 53,6  2 560,  5 617,  6 502,  6 507,  3 497,  8 494,  9 492,  9 492,   | 2 506. 508. 6 504. 3 504. 6 514. 9 508. 6 506. 7 503. 6 504.   | 9   518.<br>9   518.<br>9   519.<br>9   519.<br>9   549.<br>9   549.<br>9   5490.<br>9  | 3 512.7<br>7 527.<br>9 517.<br>9 507.<br>1 506.<br>6 613.<br>9 813.<br>8 814.<br>1 1 504.   | 20h  8h 53.6  4 506.  3 512.  8 514.  7 504.  2 511.  8 494.  2 506.  4 500.  4 500.   | \$\frac{1}{2}\frac{1}   | 22° 10° 53 4 495 3 486 5 48 6 49 6 49 6 49 6 49 6 6 49   | .0 11 .0 .1 .1                               | 98h<br>492.4<br>485.4<br>487.4<br>487.4<br>487.4<br>488.4  | Mean  9   497.1  8   496.4  9   4-9.5  4-9.1  0   4-9.4  4-9.4  4-9.4  4-9.4  4-9.4  4-9.4  4-9.4  |
| Göttingen civil time  Last. Soptember October November December Last. January March April May June             | Noon.  0b 53,0m  492, 0  471, 7  474, 2  474, 8  481, 4  476, 4  474, 3  476, 4   | 1553.09<br>409.<br>409.<br>405.<br>497.<br>477.<br>476.<br>467.                                | 5 500.<br>5 500.<br>5 500.<br>6 512.<br>1 470.<br>0 490.<br>1 498.<br>6 507.<br>5 487.<br>2 487.<br>8 470.<br>3 472. | 15h<br>35 53.6<br>0 507.<br>5 500.<br>6 493.<br>5 498.<br>7 495.<br>7 495.<br>498.<br>7 485.<br>5 478.  | 16h 4 53.6 2 500.7 508.5 5 517.408. 7 502.6 507.3 8 404.9 9 492.7 487.4  | 2 506.<br>5 508.<br>6 504.<br>3 564.<br>6 514.<br>9 513.<br>0 506.<br>7 503.<br>6 504.                               | 9 518.<br>9 510.<br>9 510.<br>9 510.<br>9 510.<br>9 490.<br>9 490.<br>9 490.<br>6 513.<br>6 505.<br>9 506.<br>6 500.  | 3 512.<br>3 7 527.<br>9 517.<br>9 517.<br>1 500.<br>6 613.<br>9 613.<br>8 514.<br>1 804.<br>1 804.  | 20% 8h 53.66  4 500, 3 512 8 514, 7 504.  2 511, 8 494 94 500, 4 500 512.  | 92   953.   5   502   5   502   5   502   5   502   5   502   5   502   6   402   6   402   6   402   6   402   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   400   7   409   409   7   409   409   7   409   409   7   409   409   7   409   7   409   7   409   7   409   7   409   7   409   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   7   409   409   7   409   | 221<br>3 10h 53<br>4 405<br>3 48<br>4 49<br>5 48<br>7 48<br>6 4 49<br>6 6 49<br>7 49<br>7 49<br>7 49<br>7 49<br>8 48   | .0= 11                                       | 98h<br>492.4<br>485.4<br>484.4<br>477.4<br>487.4<br>478.4<br>479.4                                     | Mean  3   497.1  4   495.4  4   4 |
| Göttingen civil time   | Noon.  0b 33,6m 492.0 471.7 474.2 474.8  481.4 476.4 474.3 478.6 4602.7 456.8     | 135<br>15 53.09<br>409,<br>495,<br>495,<br>497,<br>478,<br>478,<br>470,<br>470,<br>470,        | 5 500.0<br>0 512.1<br>170.0<br>1490.<br>1 498.<br>6 507.<br>5 487.<br>2 487.<br>8 479.<br>3 472.<br>6 463.           | 15h<br>0 507,5<br>5 500,6<br>6 403,<br>6 498,7<br>7 491,5<br>6 498,7<br>7 498,7<br>7 491,4<br>8 486,5<br>6 478,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1<br>477,1 | 16 <sup>h</sup> 4 <sup>h</sup> 53.6  2 500.7  7 508.8  7 507.0  408.7  7 502.7  9 497.4  9 497.4  9 497.7  9 487.7  9 487.7  | 2 506. 508. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. | 9 518.8<br>9 510.9<br>9 518.4<br>4 490.<br>9 6 513.8<br>8 505.9<br>6 509.9<br>0 518.7<br>7 508.8  | 3 512.7<br>7 53.6<br>3 512.7<br>7 5.7.7<br>9 517.<br>9 507.<br>1 506.<br>6 613.<br>9 613.<br>8 814.<br>1 504.<br>6 518.   | 20h 8 53.6 4 506, 8 512, 8 514, 7 504, 8 404, 4 500, 4 500, 4 500, 6 512, 2 514, 5 514 | 21n<br>  9h 53.<br>  5   5025<br>  9   41n<br>  8   4.71<br>  1   494<br>  5   505<br>  4   495<br>  6   448<br>  8   45°<br>  7   49.5<br>  5   5   48°  | 22° 10° 53° 4 49° 3 48° 4 49° 6 49° 6 49° 6 49° 6 49° 6 49° 6 48°  | .0m 11                                       | 28h<br>402.3<br>485.4<br>487.4<br>487.4<br>478.478.478.478.478.478.478.478.478.478.                    | Mean  3   497.1  8   495.4  9   488.4  10   488.4  10   488.4  10   488.4  10   476.8  10   476.8  10   476.8  10   476.8  11   476.8  12   476.8  13   476.8  14   476.8  14   476.8  14   476.8  15   474.4  16   476.8  17   476.8  18  |
| Göttingen civil time  Last. Soptember October November December Last. January March Abril May Juno July August | Noon.  492. 0 471. 7 474. 2 474. 8 481. 4 476. 4 474. 9 466. 8 462. 2 456. 4      | 134<br>1453,69<br>495,<br>495,<br>497,<br>477,<br>476,<br>467,<br>470,<br>467,<br>468,<br>463, | 5 500. 512. 1 470. 0 12. 1 498. 6 507. 2 487. 8 479. 3 472. 6 163. 6 476.  | 15 <sup>h</sup> 3 53.6  507.7  6 498.5  498.7  498.7  485.5  478.1  477.1  8 777.1  | 2 500.0<br>2 500.0<br>2 500.6<br>5 517.0<br>6 502.7<br>8 494.4<br>9 492.2<br>7 487.9<br>9 486.6<br>6 485.  | 2 506.<br>5 508.<br>6 514.<br>9 513.<br>6 514.<br>9 513.<br>6 514.<br>9 54.<br>9 508.<br>9 508.<br>9 508.<br>9 495.  | 9 518.9<br>9 518.9<br>9 518.4<br>9 538.4<br>4 490.<br>9 490.<br>6 513.8<br>505.5<br>9 506.6<br>509.9<br>0 518.7<br>7 508.8  | 3 512.3<br>5 52.7<br>9 517.<br>9 507.<br>1 500.<br>6 613.<br>8 614.<br>1 502.<br>6 518.<br>0 499  | 20h  8h 53.6  4 506, 3  8 512, 4  7 504.  2 511, 8 500, 4  500, 4 500, 4  500, 0 512, 2  514, 0 495.   | 9 53. 5 5025 5 5015 5 5015 5 5015 5 5015 6 402 8 4 4 5 5 505 6 402 8 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5  | 22° 10° 53 4 49° 4 49° 4 48° 7 48° 7 48° 7 49° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10  | .9 11 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5    | 98h<br>492.1<br>485.1<br>487.<br>487.<br>478.<br>479.<br>488.<br>479.<br>488.<br>472.<br>407.          | Mean  1 497. 497. 498. 499. 6  2 488. 499. 6  3 488. 494. 6  3 476. 8  4 475. 473. 473.  |
| Göttingen civil time   | Noon.  492. 0 471. 7 474. 2 474. 4 481. 4 474. 3 476. 6 462. 7 460. 8             | 134<br>15 53.69<br>499.<br>495.<br>495.<br>497.<br>477.<br>478.<br>467.<br>467.<br>468.        | 5 500.<br>5 500.<br>5 12.<br>1 470.<br>0 490.<br>16 507.<br>5 487.<br>2 487.<br>8 470.<br>8 470.                     | 15 <sup>h</sup> 3 <sup>h</sup> 53.6  507, 5 500, 6 483, 7 494, 5 498, 7 495, 5 498, 7 495, 5 484, 6 77, 8 577,  | 2 500, 27 508, 5 617, 0 408, 7 50, 3 497, 487, 9 494, 492, 485, 4 492, 4 | 2 506. 508. 6 504. 3 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 504. 6 506. 6 504. 6 508. 6 508. 6 508. 7 503.        | 9 518.<br>9 518.<br>9 518.<br>9 510.<br>9 400.<br>6 513.<br>8 505.<br>9 506.<br>6 513.<br>8 505.<br>9 506.<br>6 513.<br>8 505.<br>8 505.<br>9 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 506.<br>8 | \$\frac{3}{7} \cdot 53.6\$ \$\frac{3}{7} \cdot 52.7\$ \$\frac{5}{9} \cdot 517.9\$ \$\frac{5}{9} \cdot 507.\$ \$\frac{6}{3} \cdot 631.8\$ \$\frac{6}{3} \cdot 63 | 20h  8 53.6  4 500.  3 512.  8 514.  7 504.  2 511.  4 500.  4 500.  4 500.  4 500.  4 500.  4 500.  4 500.  4 500.  | 91 m   9h 53,   5   502 5   501 5   9   404 1   1   404 1   5   503 4   4   402 6   | 22° 0= 10° 53 14 40° 13 48° 18 48° 19 49° 10 48° 10 | .0= 11/<br>.0= 11/<br>.5<br>.4<br>.6         | 935<br>492.3<br>485.4<br>484.4<br>487.4<br>487.4<br>488.4<br>478.4<br>478.4<br>478.4<br>478.4<br>478.4 | Mean  3   497.1  8   496.4  9   4-9.5  4-9.4  4-9.4  4-9.4  4-9.4  4-76.4  4-76.4  4-77.4  9   479.4   |

#### SOLAR DIURNAL VARIATION OF THE DECLINATION, INCLUSIVE OF DISTURBANCES.

The daily variation of the magnetic declination is found by subtracting each hourly mean from the respective daily mean, and is given in the following table for the whole year, as well as for the half years, i. e., with sun in north declination and sun in south declination:

| Göttingen<br>civil time. |      | oie civil<br>ne. | April to<br>September,<br>o north<br>declination. | October to<br>March,<br>(a) south<br>declination, | Year. | Göttingen<br>civil time. | Uglaamie<br>time. |         | April to<br>September,<br>(5) north<br>declination. | o south | Year.    |
|--------------------------|------|------------------|---|---|-------|--------------------------|-------------------|---------|---|---------|----------|
|                          |      | tn               | ,   | ,   |       |                          |                   | m       | ,   | ,       | ,        |
| Op.                      | Noon | +53.6            | + 7.5   | + 7.1   | + 7.3 | Noon.                    | Midnight -        | £ 53, 6 | +12.0   | +13.6   | -) 12. 8 |
| 1                        | 13   | 53. 6            | + 7.4   | + 8.0   | + 7.7 | 13                       | 1                 | 53 6    | + 5.0   | + 4.9   | + 4.9    |
| 2                        | 14   | 53. 6            | + 8, 5  | + 6.1   | + 7.3 | 14                       | 2                 | 53, 6   | - 0.1   | - 6.5   | - 3.3    |
| 3                        | 15   | 53, 6            | + 10.7  | + 7.6   | + 9.1 | 15                       | 3                 | 54.6    | - 5.6   | - 6.9   | -62      |
| 4                        | 16   | 53. 6            | +12.1   | + 7.7   | + 9.9 | 16                       | 4                 | 5.:. 6  | -12.9   | -15.7   | -14.3    |
| 5                        | 17   | 53. 6            | +11.6   | + 8.2   | + 9.9 | 17                       | 5                 | 53. 6   | -24.0   | -10.2   | -21.6    |
| 6                        | 18   | 53. 6            | +10.8   | + 6.1   | + 8.4 | 18                       | 6                 | 53 6    | -30.4   | -21.8   | -26.1    |
| 7                        | 19   | 53. 6            | + 5.5   | + 6.5   | + 6.0 | 19                       | 7                 | 53. 6   | -18.6   | -24.7   | -26.7    |
| 8                        | 20   | 53. 6            | + 9.7   | + 6.5   | + 8.1 | 20                       | 8                 | 53.6    | -25.4   | -17.8   | -21.6    |
| 9                        | 21   | 53. 6            | +10.3   | +11.5   | +10.9 | 21                       | 9                 | 53. 6   | -11.4   | - 8,3   | - 9.9    |
| 10                       | 22   | 53. 6            | +13.9   | + 4.2   | + 9.1 | 22                       | 10                | 53.6    | - 3 3   | + 0.6   | -1.4     |
| 11h                      | 23   | 53. 6            | +11.6   | +15.2   | +13.4 | 23h                      | 11                | 53 6    | + 4.9   | + 6.8   | +5.9     |

Apparent diurnal range, 6 months, sun north of equator, 44'.3 Apparent diurnal range, 6 months, sun south of equator, 39'.9 Apparent diurnal range, year, 40'.1

The most pronounced feature of the diurnal variation is the morning extreme easterly deflection between 7 and 8 a. m. This is in perfect accord with the times of eastern elongation at stations in lower latitudes: thus at Sitka,\* 8h a. m.; at Madison, Wis., 81; at Toronto, 73; at Philadelphia, 73: and at Key West, 84. The afternoon westerly deflection, however, appears to be delayed when compared with stations to the south of Ughamie. We have a maximum about 5 p. m., and a second and greater maximum about midnight, undoubtedly produced by disturbances, as shown in the accompanying diagram. At Sitka the westerly elongation occurs about 34 p. m.; at Madison. 14; at Toronto, 03 p. m.; at Philadelphia, 14; and at Key West, 13. At Sitka there is no trace of the irregular western deflections recorded at Uglaamie between 8h p. m. and about 2h a. m., as shown by the table in the foot-note. If we now refer to the observations made at Point Barrow during 1852, 1853, and 1854 (Phil. Trans., vol. 147, 1857), we find 8 a. m. to be distinctly the hour of the maximum of the easterly disturbances, which thus re-enforce the regular solar-diurnal variation about this time and produce the great easterly deviation exhibited by the diagram. On the other hand, the waterly disturbances reach their maximum between the hours 11 p. m. midnight and 1 a.m., when they obliterate the regular solar-diurnal variation. Retaining the disturbances, the eastern maximum deflection is recorded between 7 and 8 a.m.; excluding the larger ones, it occurs near 7 a.m.; the western maximum, disturbances included, is recorded at 5 p.m. (with a second maximum between 10 and 11 p. m.), but excluding the larger ones, the elongation reverts

It is also a noteworthy fact that the diurnal variations seem to depend little on the season, the deviations from the annual course for the half year with sun north of the equator, and for the half year with sun south of the equator, being small.

# SEPARATION OF THE LARGER MAGNETIC VARIATIONS, OR SO-CALLED DISTURBANCES, AND THEIR DISCUSSION.

In the present state of our knowledge there appears to be no other means of recognizing socalled disturbances in a series of observations except by their magnitude; that is, for any one observation or reading taken at random it is impossible to say how much of the measured quantity is due to the regular daily variation, and how much to other variations following different laws. Having formed preliminarily for any one month hourly average or normal values, and compared each observation at any hour with the normal value at that hour, the series of differences so obtained will disclose the amount of the so-called disturbances; and a certain limiting value requires to be found which shall separate the apparently regular values from the supposed disturbed values; i. e., those following different laws from the others.

In the discussion of that large body of magnetic material which had accumulated mainly through the support of the British Government about the middle of the present century, General Sir Edward Sabine was guided in his selection of a limiting value simply by practical considerations or by experience, and the eminent success which he had fully justified his method; yet when a

Diurnal variation (inclusive of disturbances) of the declination observed at Sitka, Alaska, from ten years of observations.

 $[\Lambda + {
m sign}]$  indicates deflection of north end of needle to the west; a - sign the opposite direction.]

| -      |           |     |        |       |                   |    |       |           |       |
|--------|-----------|-----|--------|-------|-------------------|----|-------|-----------|-------|
| 1      |           | h   | ,      | h h   | ,                 |    | ,     | h         |       |
| Midnis | ht. + 0.6 | - 5 | - 2.9  | 10    | - 3.0             | 15 | + 4.6 | 20        | + 1.4 |
| 1      | - 0.2     | 6   | 4.2    | 11    | - 0. <del>0</del> | 16 | + 4.6 | 21        | + 0.8 |
| 2      | - 1.0     | 7   | — 5. 3 | Noon. | + 2.1             | 17 | + 8.8 | 22        | + 0.4 |
| 3      | - 1.4     | - 8 | - 6.0  | 13    | + 3.2             | 18 | + 3.2 | 23        | + 0.6 |
| 4      | - 2.0     | 9   | - 5.3  | 14    | + 4.2             | 19 | + 2.4 | Midnight. | + 0.6 |
| 1      |           | 1   | 1      | ł     |                   | 1  |       |           | ł     |

The  $j_0$  much to be regretted that the magnetic observations taken at Sitka, Alaska, between 1848 and 1864, have a ver been fully discussed. As it appeared to me highly desirable to compare the diurnal variation of the declination of the hourly readings from the broken and irregular excise extending from 1848 to 1862. (The material for this combination had been collected by Mr. M. Baker, of the Joast and Geodetic Survey, in March, 1882.)

e casterly deflection gation at stations in at Philadelphia, to be delayed when bout 5 p. m., and a urbances, as shown p. m.; at Madison, a there is no trace 1 about 2<sup>h</sup> a. m., as a at Point Barrow distinctly the hour solar-diurnal variadiagram. On the 11 p. m. midnight g the disturbances,

tle on the season, quator, and for the

the larger ones, it at 5 p. m. (with a

elongation reverts

TURBANCES, AND

of recognizing sohat is, for any one measured quantity ing different laws, and compared each erences so obtained alue requires to be disturbed values;

ecumulated mainly at century, General tical considerations ethod; yet when a

en 1848 and 1864, have liation of the declinathe broken and irreg ed by Mr. M. Baker, of

years of observations.

+ 1.4 + 0.8 number of simultaneous observations made at different stations, as in the case of the present polar researches, require strict intercomparability of results, a more definite proceeding appears desirable.

I had made use of Peirce's criterion for the rejection of doubtful observations,\* or, here more appropriately expressed, for the separation of observations deviating largely in amount by reason of their following different laws from those to which the ordinary observations are subject; and in using the criterion in such a case it was put forward only with a view of securing some definito rale uniformly applicable.

The criterion was first employed by me in the discussion of Dr. Kane's magnetic observations of 1853, 1854, 1855, at Van Rensselaer Harbor, North Greenland;† afterwards for Dr. Bache's magnetic observations of 1840 to 1845 at Philadelphia,‡ and for the United States Coast Survey magnetic series of 1860 to 1866 at Key West, Florida.§ In these applications, where no great precision is required, its method of application may be much simplified. Thus the mean deviation or the mean difference of any hourly value from its hourly normal may be found, without the trouble of forming squares, by the simple expression of  $\varepsilon=1.25\,\frac{|J|}{N-1}$ , and the limiting value given by the criterion will be =  $\pi$   $\varepsilon$ , the value of  $\pi$  being a tabular value for the case  $\mu=1$ , is readily had from Chauvenet's Table X. The limit so found will be the widest one that may be employed, but

from Chauvenet's Table X. The limit so found will be the widest one that may be employed, but in special applications it may require contraction, for the reason that the number of the largest disturbances is found to be insufficient for their successful discussion. Instead of using Peirce's criterion, we can, however, arrive at an equally satisfactory fixation of a limit by means of the expressions of either the probable or the mean error of an observation. We may define the widest limit as that deviation or difference from the mean which exceeds 3.5 times the probable variability or probable deviation of an observation. This limit corresponds to  $\frac{3.5}{1.483}$  or to 2.36 times the mean

deviation (as already used in connection with the criterion). Thus 24 times the mean deviation would be a superior limit, whereas Dr. Lloyd (1874) adopts for the discussion of the disturbances a limit of 14 times the exerage departure of a reading from its normal. By taking this lower limit we necessarily include a number of disturbances of lesser magnitude; but should the limit be drawn still closer there is danger of confusing the results with values following different laws from those which govern the larger disturbances. It would be most desirable to investigate the disturbances by a series of graduated limits and falling between these extremes. A limit somewhere between 2 and 14 times the mean deviation will probably be found most satisfactory. To find the mean deviation  $\varepsilon = 1.25 \frac{\Sigma}{n-1}$  say from an hourly series of observations extending over one year, the diar-

nal as well as the annual variations of the disturbances must be taken into account; and it will suffice to deduce 24 numerical values for  $\varepsilon$ , using for the first month the hours 0 and 12, for the second month the hours 1 and 13, for the third the hours 2 and 14, etc., and finally to take the average  $(\varepsilon)$  from the 24 individual values so obtained.

Discussing the hourly variations of the declination recorded in the second year at Uglaamie, where the horizontal component H=1.936 English units (=0.8927 Gaussian units, or 0.08927 dynes) for October, 1882, the value of  $\varepsilon$  equals 18'.4 nearly; hence limit by Peirce's criterion = 44', and the same limit for  $2\frac{1}{3}$  times  $\varepsilon$ ; for twice  $\varepsilon$  the limit is 37', and for  $1\frac{1}{2}$   $\varepsilon$  it is 28', which limits separate, respectively, 1 disturbed observation in 17 observations, 1 in 12, and 1 in 8. General Sabine's limit in the discussion of Captain Magnire's observations of 1852, 1853, and 1854 was 22'.87, and the number

<sup>\*</sup> United States Coast Survey Report for 1854, pp. 131 to 138; Gould's Astronomical Journal, No. 83, Cambridge, Mass., April 24, 1855. It is now most readily accessible in Chauvenet's Manual of Spherical and Practical Astronomy, Vol. II (first edition, Philadelphia, 1863).

<sup>†</sup>Smithsonian Contributions to Knowledge, Vol. X, 1858.

<sup>#</sup>United States Coast Survey Report for 1859, Appendix No. 22.

<sup>§</sup> United States Coast Survey Report for 1874, Appendix No. 9.

Here, of course, the differences of the tabular hourly readings from their respective hourly normals do not, in any sense, represent errors, every one being as correct as any other; they are variations governed by unknown laws, probably of much complexity. The application of the formulae of the method of least squares to such phenomena is more or less precarious; the pure observing error may be regarded as insignificant.

H. Ex. 44----61

of disturbances separated was between  $\frac{1}{6}$  and  $\frac{1}{6}$  of the whole number; but it should be remarked here that at that time we were approaching an epoch of a sun-spot minimum, whereas at present we have just passed through a sun-spot maximum, during which the disturbances are greater.

It has been noticed that a limit adopted for a station in low magnetic latitude will not serve to deduce a limit for a station in high magnetic latitude when having regard only to the supposition that the limits are inversely proportional to the magnitude of the horizontal components of their respective magnetic intensities; the disturbances appear to increase in greater ratio as we approach the magnetic polar regions.\*

The further discussion of the differential observations must be deferred until a decision has been reached by the fourth international polar conference (which is to meet shortly at Vienna) respecting the limit of recognition of disturbances.

[April 5, 1884.]

#### THE BIFILAR MAGNETOMETER.

The length of 1 division of the scale is 1 millimeter, the radius mirror to scale is 1.719 meter, hence angular value of 1 division of scale = 1.

(1) Adjustment and determination of scale value, September 11, 1882, 1h p. m.

With plane of detorsion in the magnetic meridian the torsion circle read 54° 42′. It was then turned with the suspended weight 90°, and read 324° 42′, in which position the fixed as well as the movable mirrors were made to read 500 on the scale. The torsion weight was then removed and the magnet inserted and the torsion circle turned to read 248° 35′. The movable mirror was next brought to read 500, by means of the serew regulating the distance between the two suspension threads. The angle z=324°42′-248°35′=76°07′ was calculated to answer the desired value of one division of the scale to represent a variation of the horizontal force of .001 cos.  $\theta$ , expressed in metric units (millimeter, milligramme, s). By inadvertence a mistake was made by the observers in their calculation (in the value of H), so that the scale value neither for the horizontal nor for the vertical force corresponds to the value proposed by the President of the Polar Commission. This was not discovered by them until near the close of the observations, when they judged it best to adhere to the old value. The magnetometers were thus given a sensitiveness fully double of what was intended they should have. The consequence was that many of the largest disturbances in the horizontal and vertical components failed to be registered, the deflections falling beyond the range of the instruments.

We have the scale value k in parts of the horizontal force=cot. z times 1'=.00007190, and multiplying by H, or 1.939, the scale value becomes .0001394 English units.

(2) September 18, 1882, 2h a. m. to 3h15m a. m., Göttingen time, readjusted bifilar instrument.

Plane of detorsion read  $60^{\circ}$  41'; turned torsion circle to  $330^{\circ}$  41', and movable mirror made to read 50; magnet inserted and torsion circle turned to  $254^{\circ}$  34'; movable mirror brought to read 50 by means of the adjusting screw. The angle z equals  $76^{\circ}$  07'; hence k, or the scale value, remains as above. The apparent change in the plane of the detorsion of  $5^{\circ}$  59' is due to shifting of the instrument.

(3) November 6, 1882,  $10^{\rm h}$  p. m., to November 7,  $2^{\rm h}$   $31^{\rm m}$  a. m. Göttingen time; readjusted instrument.

With plane of detorsion in meridian torsion circle reads  $52^{\circ}$  46'; adjusted movable mirror to 50, when torsion circle reads  $322^{\circ}$  46'; suspended magnet and made torsion circle read  $247^{\circ}$  12'; brought movable mirror to 50 by means of adjusting screw,  $z=75^{\circ}$  34'; hence k=.00007487 parts of the horizontal force, and multiplying by H the scale value becomes .0001452 English units.

(4) February 27, 1883, 3h 05m a. m. to 6h 55m a. m. Göttingen time, readjusted instrument.

Plane of detorsion in magnetic meridian, torsion circle reads 52° 55'; movable and fixed mirrors adjusted to 50, with torsion circle 322° 35'; suspended magnet and turned circle to 247° 14' and brought movable mirror again to 50 by means of the adjusting screw,  $z = 75^{\circ}$  21'; hence k = .00007604 parts of the horizontal force, and the scale value .0001474 English units.

<sup>\*</sup>Thus with the Key West (H = 6.74) limit of 2'.6 the Uglaamie limit would be 9' about. With the Philadelphia (H = 4.17) limit of 3.6 the Uglaamie limit would be 8', about. With the Toronto (H = 3.53) limit of 5.0 the Uglaamie limit would be 9', about.

d be remarked reas at present re greater. will not serve he supposition onents of their

a decision has rtly at Vienna) [April 5, 1884.]

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is 1.719 meter.

". It was then l as well as the removed and irror was next wo suspension esired value of s.  $\theta$ , expressed y the observers izontal nor for r Commission. idged it best to double of what listurbances in ng beyond the

00007190, and

instrument. mirror made to ight to read 50 value, remains shifting of the

readjusted in-

able mirror to read 247° 12'; 00007487 parts lish units. strument. ble and fixed circle to 2479 50 21'; hence its.

the Philadelphia 5.0 the Uglaamie (5) February 28, 1883, 1h 13m a. m. to 3h 37m a. m. Göttingen time, readjusted instrument.

Plane of detorsion in magnetic meridian 40° 22'; turned to 310° 22', with fixed and movable mirrors at 50; suspended magnet and turned to 235° 01', with movable mirror at 50, by means of the screw,  $z=75^{\circ}$  21'; hence scale value as in preceding case.

(6) At 6 p. m., March 23, Göttingen time, the suspended mirror touched fixed mirror owing to

stretching of threads; raised suspension at 6h 45m p. m.

(7) At 6h 45m a. m., March 25, Göttingen time, suspension further shortened; again at 7h 10m p. m., same day.

(8) At 3h a. m., April 21, Göttingen time, fixed mirror read 486; changed to 500 before taking the 3 a.m. observations.

Increasing scale readings denote increase of horizontal force.

### HOURLY READINGS OF THE BROOKE BIFILAR MAGNETOMETER, AT UGLAAMIE, ALASKA, TOGETHER

[Uncorrected for temperature. The hourly readings are placed opposite a Frace in first column and the corresponding temperature inonced presed off the scale at the negative end it is indicated by (-46-5), when beyond the positive end by (1040-3). In taking the monthly offside the scale. A parallel dash (\*) In the falle indicates time of readington cut of instrument or change in value of one division, 15 2°. It is found as follows: mean of 6 days less 4 four September \*\* ) 18, inclusive, \$27.6; mean of 6 days less 4 hour September is to

Value of one division of scale

Between September 11, 1882, and November 6, 1882.
Between November 7, 1882, and February 27, 1883.
Between February 27, 1883, to close of series.

The average scale reading 419 corresponds approximately to hor izontal intensity.

#### Hourly readings of the Brooke bifilar magnet

[One division of scale .0000719

| Date.                | 0,4                | Į h          | 24            | 34         | 44              | 2,                | 6h           | 7h         | ₩h           | ցե                 | 165           |
|----------------------|--------------------|--------------|---------------|------------|-----------------|-------------------|--------------|------------|--------------|--------------------|---------------|
| E. 10                | Ç                  | 662          | 731           | 752        | 752             | 752               | 8:0          | (800 + 1)  | (800 ; ')    | (800 - ')          | (800 ; 2)     |
| Sept. 12 Temperature | <b>}</b>           | 621          | 754<br>46, 5  | 752<br>45  | 752<br>44       | 751<br>42         | 850          | 803        | (800 . 2)    | (800 ) 1           | (800) /       |
| Sept. 13             | (800 - !)          | 794          | 754           | 781        | (800 + 1)       | 809               | 816          | (800±?)    | 525          | 36. 5              | 36<br>747     |
| Temperature          | §1 (800 ± !)<br>38 | (800 ± !)    | 762<br>30     | (800 + ?)  | (800 ± /)<br>40 | 820<br>39         | 838<br>38, 5 | (800 + 2)  | 526          | 815                | 77ti          |
| Sept. 14             | ( (8(0 · ?)        | (800 - ?)    | $(800 \pm ?)$ | (800 ± ?)  | 920             | 838               | 870          | 830        | 818          | 903                | . 36<br>835   |
| "emperature          | (5.00 - 5)         | (800 ;-/)    | (800 + /)     | (800 + ?)  | 940<br>37       | 818               | 885<br>36    | 833<br>36  | 844          | 905                | 751           |
| Sept. 15             | \$1. 804           | 807          | 812           | 838        | 818             | 853               | 892          | 844        | 670          | 763                | 935, 5<br>930 |
| Temperature          |                    | 39           | 39            | 38         | 38, 5           | 36.5              | 39. 5        | 42         | 42           | 40 6               |               |
| Sept 16              |                    | 888          | (0)5          | 900        | 895             | 920               | 960          | 932        | 910          | 48.5<br>931        | 904           |
| Temperature          |                    | 85           | 870<br>47     | 885<br>46  | 893<br>45       | 956<br>42         | 925          | 930<br>39  | 9.13         | 938                | 952           |
| Sept. 17             | Ç 894              | 908          | 928           | 933        | 980             | (1040+)           | (1040 + /)   | (1040   ?) | 965          | 37<br>(1040+?)     | (1040 )       |
|                      | 910                | 935          | 928<br>40     | 920<br>40  | 990             | (1040 ± ?)        | (1040 4 /)   | (1040 + l) | 948          | (1040   /)         | (1040 - ')    |
| Temperature          |                    | 40, 5<br>940 | 1             | 40         | 40<br>509       | 39<br>51 <b>6</b> | 36<br>510    | 35<br>542  | 34. 5<br>544 | 84<br>549          | 33<br>554     |
| Sept. 18             |                    | 945          |               |            | 510             | 530               | 540          | 541        | 545          | 550                | 552           |
| Temperature          | 36, 5              | 434          | 489           | 480        | 45<br>515       | 40<br>494         | 39<br>490    | 38<br>467  | 37<br>452    | 36<br>480          | 35. 5<br>169  |
| Sep!, 19             | 423                | 428          | 492           | 483        | 5"3             | 501               | 492          | 476        | 477          | 476                | 477           |
| Temperature          |                    | 37. 5<br>516 | 39<br>532     | 506        | 40<br>539       | 39<br>508         | 38<br>514    | 37<br>545  | 36<br>543    | 35<br>518          | 35<br>482     |
| Sept. 20             | 502                | 515          | 528           | 499        | 560             | 520               | 518          | 544        | 5.13         | 503                | 455           |
| Temperature          |                    | 35<br>573    | 35, 5<br>543  | 35<br>546  | 35<br>526       | 35<br>520         | 34<br>508    | 34<br>526  | 34<br>558    | 33. 5              | 33            |
| Sept. 21             | 558                | 574          | 547           | 548        | 546             | 529               | 526          | 516        | 546          | 503<br>52 <b>7</b> | 420           |
| Temperature          |                    | 33<br>527    | 33<br>522     | 532        | 33<br>524       | 32. 5<br>513      | 32<br>528    | 32<br>508  | 31<br>535    | 31                 | 31            |
| Sept 22              | 523                | 524          | 524           | 514        | 518             | 525               | 5.6          | 638        | 542          | 556<br>561         | 501<br>486    |
| Temperature          | 32.5               | 32. 5        | 32. 5         | 32.5       | 32              | 31                | 31           | 30         | 30           | 30                 | 30            |
| Sept. 23             | 541 539            | 542<br>542   | 557<br>558    | 542<br>544 | 532<br>535      | 532<br>540        | 566<br>564   | 503<br>533 | 544<br>547   | 561<br>535         | 564<br>533    |
| Cemperature          |                    | 32           | 32. 5         | 33         | 33              | 32                | 32           | 30         | 29           | 29                 | 28.5          |
| Sept 24              | 510<br>503         | 504<br>564   | 512<br>508    | 560<br>565 | 572<br>556      | 544<br>556        | 555<br>556   | 553<br>564 | 555<br>545   | 550<br>568         | 557<br>559    |
| Temperature          | 33. 5              | 34. 5        | 34, 5         | 34         | 33              | 33                | 32           | 31         | 31           | 30, 5              | 30            |
| Sept. 25             | 551<br>551         | 563<br>565   | 581<br>602    | 561<br>591 | 668<br>702      | 696<br>687        | 651<br>625   | 456<br>480 | 467          | 524<br>516         | 378<br>381    |
| Temperature          | 31.5               | 31. 5        | 31.5          | 32         | 31              | 31                | 30           | 30         | 29. 5        | 29                 | 29            |
| Sept. 26             | 592<br>590         | 618          | 585<br>588    | 569<br>568 | 625<br>626      | 596<br>590        | 622<br>626   | 430<br>442 | 542 ·        | 202<br>205         | 325<br>278    |
| Temperature          | 32. 5              | 33, 5        | 33. 5         | 33         | 35              | 33                | 33           | 33         | 31. 5        | 31                 | 30            |
| Sept. 27             | 563<br>568         | 565<br>563   | 622           | 650<br>648 | 680<br>670      | 662<br>637        | 524<br>481   | 576<br>568 | 558          | 538<br>- 556       | 401           |
| Temperature          |                    | 34.5         | 35            | 36         | 35, 5           | 35                | 35           | 34         | 333          | 33                 | 461<br>32, 5  |
| Sept. 28             |                    | 587          | 570           | 583        | 589             | 583               | 582          | 604        | Stra         | 558                | 565           |
| Temperature          | 171100             | 574<br>37, 5 | 570<br>38     | 587        | 558<br>38       | 581<br>38. 5      | 579<br>39    | 603        | 593          | 544<br>37          | 574<br>36     |
| Sept. 29             | 551                | 556          | 560           | 558        | 572             | 565               | 568          | 571        | 594          | 548                | 394           |
| Temperature          | 558<br>38.5        | 555<br>39    | 559           | 559<br>39  | 570<br>40       | 564<br>39         | 559<br>38    | 568        | 571<br>37. 5 | 567<br>37          | 411           |
| Sept. 30             | 550                | 519          | 550           | 554        | 561             | 556               | 570          | 575        | 508          | 596                | 540           |
| Temperature          | 550<br>37, 5       | 548<br>37, 5 | 552<br>37, 5  | 556<br>38  | 538<br>38, 5    | 55 <b>6</b><br>38 | 570<br>38    | 568<br>38  | 591<br>37    | 574<br>36          | 567           |
| Mean temperature .   |                    | 37. 0        | 37. 2         | 37. 1      | 37. 6           | 36. 4             | 35. 9        | 35. 4      | 34.7         | 34. 5              | 33, 8         |
| Mean readings        |                    | 532. 0       | 530.1         | 542. 0     | 563. 5          | 558.8             | 563. 0       | 538. 9     | 518.8        | 529. 5             | 501. 8        |

#### KA, TOGETHER

temperature immeditaking the monthly value of one division, ours September 18 to

### bifilar magnet

on of scale .0000719

| <b>9</b> h         | 162        |
|--------------------|------------|
| (800 : 2)          | (800 , ')  |
| (800 + 5)          | (800 , 7)  |
| 36. 5<br>(800 ± !) | 36         |
| (800 ± ?)<br>815   | 747        |
| 36                 | 26         |
| 903                | 835        |
| 905                | 751        |
| 763                | 930 930    |
|                    |            |
| 48.5               | 44         |
| 931<br>938         | 904        |
| 37                 | 952        |
| (1040 ± ?)         | (1040 , )  |
| 1040 : 5           | (1040 - 2) |
| 34<br>549          | . 33       |
| 550                | 554<br>552 |
| 30                 | 35. 5      |
| 480                | 469        |
| 476<br>35          | 477        |
| 518                | 482        |
| 503                | 455        |
| 33. 5              | 33         |
| 503                | 420        |
| 527                | 430<br>31  |
| 556                | 501        |
| 561                | 486        |
| 30                 | 30         |
| 561<br>535         | 564<br>533 |
| 29                 | 28.5       |
| 550                | 557        |
| 568                | 559        |
| 30, 5<br>524       | 30         |
| 516                | 378        |
| 29                 | 29         |
| 292                | 325        |
| 205                | 278        |
| 538                | 401        |
| - 556              | 461        |
| 33                 | 32.5       |
| 558                | 565        |
| 544                | 574        |
| 548                | 394        |
| 567                | 111        |
| 37                 | 6          |
| 596                | 510        |
|                    |            |
| 36                 | 35         |

33, 8 501, 8

#### WITH THE CORRESPONDING TEMPERATURE (FAHR.), FROM SEPTEMBER 12, 1882, TO AUGUST 27, 1883.

ately below them. Increasing scale numbers denote increasing horizontal force. Extreme scale divisions, —40 and 1040; when the magnet means of the hourly readings, disturbances included, the respective extreme values were substituted in the place of the unknown position. To reduce readings of billiar to an approximately uniform series subtract 318 divisions from each reading from September 23, inclusive, 500-6; difference, 318 divisions. The bottom line of means of readings includes the correction of —318 divisions.

| English units. | Gaussian units. | British Asso-<br>ciation units of<br>dynes. |
|----------------|-----------------|---|
| #001PB         | 00000112        | 00000040                                    |
| , 000139       | . 0000643       | . 00000643                                  |
| .000145        | . 0000669       | . 00000000                                  |
| .000147        | . 0000080       | . 00000080                                  |
| parties.       |                 |   |
| 1, 939         | . 0, 8940       | 0, 08940                                    |

#### ometer at Uglaamie, Alaska, Neptember, 1882.

part of the horizontal force.

| 10              | Noon.           | 135             | 145             | 15h             | 16h       | 175       | 184        | 194             | 20°          | 21           | 224          | 231          | Dat   |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|------------|-----------------|--------------|--------------|--------------|--------------|-------|
| R00+1)          | (800+?)         | (800 ± ?)       | (800+?)         | (800+?)         | (800-)-?) | (800 ± ?) | (800+?)    | 820             | (800+?)      | 721          | 720          | 715          | 1     |
| 600 ( 2)        | (800+1)         | (800 + l)       | (800+?)         | (800+1)         | (800   1) | (800 + ?) | (800+7)    | 818             | (800+?)      |              | 714          | 718          | (12   |
| 35              | 35              | 34, 8           | 34. 5           | 34              | 34        | 33. 5     | 33. 3      | 33. 5           | 34           | 36. 5        | 36. 5        | 37           | ,     |
| 732             | 810             | 815             | 720             | 735             | 673       | 703       | 475        | 476             | 484          | 755          | 769          | (800 .5)     | £13   |
| 805             | 792             | 753             | 732             | 752             | 574       | 701       | 476        | 475             | 486          | 752          | 774          | (800; ')     | 13    |
| 865             | 37              | 37              | 36. 3           | 36              | 36. 1     | 35. 6     | 35. 2      | 35, 5           | 36           | 36           | 36           | 316          | ,     |
| 818             | 792             | 750             | 832             | 765             | 745       | 535       | 776        | 848             | 756          | 645          | 517          | F34          | 1     |
| 835             | 594             | 773             | 845             | 732             | 721       | 544       | 774        | 825             | 755          | 660          | 519          | 829          | 1.6   |
| 35. 4           | 35. 5           | 35. 5           | 35, 5           | 35, 5           | 35. 8     | 35. 9     | 36         | 36              | 36. 5        | 37. 5        | 38, 5        | 40           |       |
| 846             | 716             | 700             | 745             | 713             | 768       | 790       | 832        | 792             | 850          | 634          | H24          | 860          | 15    |
| 45              | 46              | 45. 2           | 45, 1           | 45              | 45        | 41        | 43.5       | 42              | 45           | 46           | 48           | 47           | ,     |
| 950             | 945             | 955             | 963             | 954             | 930       | 930       | 928        | 910             | 922          | 943          | 909          | 924          | 16    |
| 910             | 944             | 970             | 968             | 950             | 925       | 934       | 931        | 905             | 930          | 945          | 906          | 925          | 110   |
| 35, 5           | 36              | 36              | 36              | 35. 3           | 35. 2     | 35        | 35         | 36              | 36, 5        | 36, 5        | 308          | 39           |       |
| 965             | 950             | 072             | 845             | 888             | 953       | 923       | 822        | 858             | 962          | 955          | 941          | 915          | (17   |
| 978             | 960             | 958             | 854             | 868             | 960       | 917       | 791        | 861             | 955          | 953          | 940          | 930          | , , , |
| 33. 2           | 34              | 34              | 34              | 34              | 34        | 35        | 35         | 35. 5           | 35. 5        | 35, 5        | 36           | 36           |       |
| 556             | 553             | 554             | 554             | 555             | 555       | 555       | 557        | 558             | 711          | 397          | 405          | 413          | ! 18  |
| 553<br>35, 5    | 553             | 553             | 553             | 555             | 555       | 555       | 558        | 559             | 717<br>37    | 402<br>39    | 386          | 410          | 3     |
| 35. 0           | 36              | 36. 2           | 36. 2           | 36              | 36        | 36        | 36         | 35. 5           | 37           | 39           | 38, 5        | 38.5         |       |
| 502             | 498             | 590             | 486             | 444             | 498       | 461       | 444        | 428             | 401          | 472          | 167          | 495          | 119   |
| 485             | 486             | 489<br>35, 2    | 488             | 465             | 505       | 467       | 450        | 436             | 409          | 492<br>35, 5 | 464          | 497          | 1     |
| 35<br>549       | 35<br>496       | 472             | 35<br>509       | 34<br>501       | 35<br>507 | 36<br>494 | 35<br>535  | 35<br>514       | 35. 5<br>476 | 475          | 35. 5<br>472 | 35, 5<br>467 |       |
| 510             | 525             | 479             | 510             | 492             | 493       |           | 477        | 515             | 488          |              | 173          | 454          | (20   |
| 510             | 32. 8           | 32. 5           | 32. 2           | 32              | 32        | 492<br>32 | 32         | 32, 5           | 32           | 470<br>32    | 32           | 32           | ,     |
|                 | 540             | 528             | 522             | 526             | 509       |           |            | 517             | 509          | 515          | 518          |              |       |
| 478<br>546      | 538             | 525             | 527             | 519             | 504       | 518       | 504<br>500 | 516             | 512          | 517          | 516          | 528<br>524   | (21   |
| 31. 2           | 31.5            | 31. 5           | 202             | 32              | 32        | 522<br>32 | 32         | 32              | 212          | 314          | 910          | 32. 5        | )     |
| 5316            | 530             | 534             | 32<br>455       | 530             | 485       | 531       | 518        | 503             | 32<br>509    | 82<br>522    | 32<br>549    | 538          | ,     |
| 545             | 527             | 532             | 480             | 525             | 487       | 512       | 517        | 505             | 514          | 520          | 539          | 543          | (22   |
| 30 2            | 30. 5           | 31              | 31              | 31              | 31        | 30        | 30         | 30. 5           | 30, 5        | 30, 5        | 30, 5        | 31           | ,     |
| 528             | 553             | 539             | 390             | 205             | 435       | 453       | 300        | 4:30            | 462          | 529          | 525          | 560          | ,     |
| 541             | 551             | 552             | 436             | 325<br>395      | 386       | 481       | 399<br>396 | 422<br>419      | 459          | 518          | 523          | 567          | (23   |
| 29              | 29. 5           | 29, 5           | 29. 8           | 29              | 30        | 30        | 30         | 30. 5           | 30.5         | 30, 5        | 30, 5        | 31.5         | ,     |
| 563             | 562             | 566             | 555             | 585             | 561       | 527       | 558        | 555             | 532          | 544          | 541          | 543          | ,     |
| 514             | 568             | 57.7            | 565             | 541             | 570       | 518       | 555        | 556             | 548          | 545          | 544          | 535          | (24   |
| 20              | 30              | 30, 2           | 30. 1           | 30              | 30        | 30<br>278 | 30         | 30              | 30. 5        | 30, 5        | 30           | :51          |       |
| 432             | 465             | 575             | 570             | 321             | 522       | 278       | 378        | 509             | 516          | 465          | 522          | 568          | 125   |
| 438             | 446             | 585             | 564             | 293             | 505       | 295       | 417        | 501             | 514          | 4.33         | 768          | 570          | 100   |
| 29. 2           | 30              | 30              | 564<br>30       | 30              | 30        | 30        | 30         | 30              | 514<br>30    | 30, 5        | 30, 5        | 31.5         |       |
| 475             | 450             | 492             | 536<br>527      | 518             | 535       | 543       | 541        | 559             | 550          | 539          | 54.2         | 564          | 1     |
| 464             | 465             | 495             | 527             | 496             | 537       | 541       | 544        | 532             | 551          | 535          | 511          | 570          | \$26  |
| 29, 8           | 29              | 28.8            | 29              | 28              | 29        | 30        | 30         | 29              | 29. 5        | 31           | 32           | 33, 5        |       |
| 605             | 514             | 352             | 382             | 500             | 513       | 570       | 530        | 541             | 559          | 539          | 551          | 565          | 1.17  |
| 655             | 528             | 297             | 417             | 501             | 518       | 563       | 525        | 542             | 570          | 542          | 557          | 568          | \$ 27 |
| 32.6            | 33<br>542       | 33              | 33              | 33              | 33        | 33        | 33         | 33              | 34. 5        | 34.5         | 35, 5        | 36           |       |
| 543             | 542             | 470             | 514             | 526             | 501       | 481       | 466        | 496             | 530          | 549          | 557          | 563          | 1.28  |
| 561             | 540             | 467             | 509<br>36       | 531             | 495       | 478       | 465        | 502             | 529          | 546          | 556          | 562          | 1 -13 |
| 36, 2           | 36              | 36              | 36              | 36              | 36        | 36        | 36         | 36, 5           | 36. 5        | 36, 5        | 37, 5        | 35, 5        |       |
| 485             | 279             | 505             | 453             | 485             | 530       | 461       | 499        | 521             | 548          | 551          | 559          | 551          | 29    |
| 498             | 425             | 484             | 430             | 500             | 527       | 452       | 496        | 523             | 546          | 550          | 555          | 541          | 1 2.  |
| 36              | 36              | 36              | 36              | 36              | 36        | 37        | 37         | 37              | 37           | 37           | 37           | 37           |       |
| 475             | 498             | 535             | 526             | 515             | 460       | 479       | 508        | 544             | 551<br>552   | 561          | 562          | 000          | (30   |
| 470             | 512             | 517             | 519             | 528             | 462       | 478       | 515        | 542             | 552          | 570          | 560          | 563          | 3     |
| 35              | 34. 8           | 34. 5           | 34, 5           | 34              | 34        | 34        | 35         | 35              | 35           | 35. 5        | 36, 5        |              |       |
| 33. 8<br>526. 6 | 34. 1<br>504. 4 | 34. 0<br>508. 4 | 34. 0<br>500. 4 | 33. 7<br>487. 4 | 33.9      | 33. 8     | 33.9       | 33, 9<br>496, 9 | 34.4         | 34.9 .       | 35. 3        | 35. 5        |       |

Monthly means: Temperature, 35°.1; readings 509.1

Hourly readings of the Brooke bifilar magnet

| ** |           | v           | ,,,,,,,            |
|----|-----------|-------------|--------------------|
|    | [One divi | sion of sci | $e_{170000} = ole$ |

| Temperature  | 41.5   559   7   | 006 615 41 42 557 518 508 518 518 518 518 518 518 518 518 518 518  |   |
|--|--|--|---|
| Temperature  | 559  | 567 549 549 564 567 568 568 568 568 568 568 568 568 568 568  | 5 |
| Oct. 2   | 559  | 567 549 549 564 567 568 568 568 568 568 568 568 568 568 568  |   |
| Temperature  | 444  | 6291   575   |   |
| Oct.   | 4400   4   4408   4   4408   4   4   4   6   6   6   6   6   6   6   | 484 497 497 497 497 497 497 497 497 497 49   |   |
| Temperature  | 084   4   4   5   5   5   5   5   5   5  | 37   |   |
| Temperature  | 554   4 4556   | 4455   226<br>428<br>300   30<br>304<br>428<br>300   30<br>504<br>458<br>506<br>507<br>508<br>508<br>508<br>508<br>508<br>508<br>508<br>508  | 5 |
| Temperature  | 585 4  | 30   |   |
| Oct. 5         512         515         529         560         561         572         614         555         56           Temperature         (31.5)         311         311         32         31.3         32         31.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.8         30.9         35.5         35.8         40.9         37.7         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.5         30.8         40.9         30.5         30.8         40.9         30.5         30.0         40.9         30.5         30.0         40.0         30.5         30.0         40.0         30.5         30.0         40.0         30.5         30.0         40.0         30.0         40.0         30.0         40.0         30.0         40.0         30.0         40.0         30.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0         40.0 <td>543 5 5 5 5 3 5 5 6 5 6 5 6 5 6 5 6 5 6 6 6 6</td> <td>  536   564   567   577   578   577   578   577   578</td> <td></td> | 543 5 5 5 5 3 5 5 6 5 6 5 6 5 6 5 6 5 6 6 6 6  | 536   564   567   577   578   577   578   577   578  |   |
| Temperature  | 1   5   5   5   5   5   5   5   5   5  | 577 503 503 503 503 503 503 503 503 503 503  |   |
| Oct 6         6         550         580         583         709         475         028         404         397           Temperature         30         30         30         20         30         20         30         29         5         29         29           Oct 7         405         535         528         514         526         70         505         550         53           Oct 8         23         28         29         28         27         30         22         50         60         30         50  | 347 2 3<br>287 3 5<br>287 5<br>287 5<br>29 5<br>20 5<br>5 5<br>20 5<br>5 5<br>20 5<br>5 5<br>20 5<br>5 5<br>20 5<br>5 5<br>20 5<br>5 5<br>20 5<br>5 7<br>20 5<br>20 5 | 230   250  | 5 |
| Conferentiary   30   30   30   20   30   29   5   29   29   29   20   20   20   20   20  | 287   3 28   | 995   927<br>27   27<br>503   584<br>5650   584<br>5650   585<br>565   565<br>565   565<br>565   565<br>565   565<br>567   469<br>223   497<br>240   497<br>250   497<br>251   497<br>252   497<br>253   497<br>254   497<br>255   497<br>256   497<br>257   497<br>258   497 | 5 |
| Oct. 7         555         555         558         514         526         700         505         530         560         7           Temperature         28         60         30         60         48         50         30         60         48         50         30         60         48         50         30         60         48         50         30         60         48         50         30         60         46         48         60         48         50         60         48         60         48         60         48         60         48         60         48         48         28         28         27         26         27         27         26         25         57<  | 497 5 5 5 8 5 9 10 10 10 10 10 10 10 10 10 10 10 10 10   | 27   27   27   27   27   27   27   27  |   |
| Temperature  | 5.33 5 26.5 20.5 20.5 20.5 20.5 20.5 20.5 20.5 20  | 530 522 26 75 75 75 75 75 75 75 75 75 75 75 75 75  |   |
| Oct. 8         ( ) 507   | 186   5   5   5   5   5   5   5   5   5  | 558 557<br>25.5 12<br>487 708<br>487 108<br>28 23<br>512 497<br>29.5 21<br>512 497<br>29.5 21<br>512 497<br>19.5 51<br>19 15<br>561 477<br>588 152<br>16 17  |   |
| Temperature  | 535 5 26.5 29.0 4 460 4 4 24 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4   | 515 514<br>25.5 7 25<br>487 7 108<br>487 8 419<br>23 23<br>512 407<br>512 407<br>21.5 21<br>442 445<br>495 518<br>497 45<br>498 518<br>498 518<br>497 15<br>501 477<br>488 152   |   |
| Temperature  | 26.5 490 460 24 24 495 5525 522 522 480 4 20 5682 4 17 195 4 560 4 16  | 25, 5 25 487 708 487 419 23 23 552 562 497 512 497 21, 5 21 442 485 495 518 419 15 461 477 488 452   |   |
| Temperature  | 460 4 24 4 4 4 50 4 4 4 50 4 4 50 4 50 4 5   | 470 419 23 23 502 50- 512 407 21.5 21 442 451 195 518 19 18 601 477 488 452  |   |
| Temperature  | 24<br>495 5<br>505 5<br>925 5<br>480 4<br>20 4<br>20 5<br>508 5<br>47<br>17<br>995 4<br>4<br>180 4   | 28 23<br>542 549<br>542 497<br>24.5 24<br>495 518<br>19 15<br>501 477<br>488 452<br>488 452  |   |
| Temperature  | 525 5 4480 4 4 504 4 508 5 4 4 507 1 7 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1   | 512   497<br>21.5   21<br>412   485<br>495   518<br>19   18<br>501   477<br>488   452<br>46   15   |   |
| Temperature  | 480 4<br>4904 4<br>20 7<br>508 5<br>482 4<br>17 7<br>195 4<br>407 4<br>107 4   | 21.5   21<br>112   485<br>195   514<br>19   15<br>501   477<br>188   152<br>16   15  |   |
| Oct 11         (570         502         515         555         567         486         556         466         466         466         466         477         4           Temperature         25         25         24         23         23         22         23         21           Oct. 12         455         50         50         522         531         548         476         309         5           Temperature         485         51         305         337         533         534         480         322         30         20         50         476         309         5           Cet. 13         480         488         492         470         433         480         446         420         4         470         448         470  | 480 4<br>4904 4<br>20 7<br>508 5<br>482 4<br>17 7<br>195 4<br>407 4<br>107 4   | 195 - 518<br>19 - 15<br>501 - 477<br>488 - 452<br>16 - 15  |   |
| Temperature  | 20 )<br>508   5<br>482   4<br>17  <br>195   4<br>180   4   | 19<br>501   477<br>188   152<br>16   15  |   |
| Oct. 12  | 508 5<br>482 4<br>17 495 4<br>530 4  | 501 477<br>188 452<br>16 15  |   |
| Temperature  | 17<br>(95 : 4<br>530 : 4<br>16   | 16 15  |   |
| Oct. 13         (488         192         502         470         483         436         452         450         4           Temperature         (488)         489         488         507         475         438         430         476         469         5           Cet. 14         (472         400         455         475         435         455         475         435         455         475         435         455         467         449         503         434         440         455         47         449         503         434         440         455         47         448         433         533         542         544         564         489         455         47         458         460         488         483         533         542         544         564         488         456         6         6         488         482         535         543         454         480         456         6<  | 195   4<br>330   4<br>16   |  |   |
| Temperature  | 16 4   |  |   |
| Oct. 14         (472)         440         455         475         435         445         423         456         4 <td>16</td> <td>178   51%</td> <td></td>   | 16   | 178   51%  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |  | 15 14<br>165 128   | 1 |
| Oct. 15         4468         493         533         542         544         544         489         456         6           Temperature         177         20.5         23         24         20         25.5         26         25.5         26         25.5         26         25.5         26         25.5         26         25.5         26         25.5         26         25.5         24         22         353         480         480         537         436         482         23         364         498         449         5         480<  | 157 4  | 172 1 1 10   |   |
| Temperature  | 11.5   | 13   12 3  |   |
| Temperature 17 20 5 23 24 22 25 5 26 25 5 6 25 6 26 25 6 6 25 6 25 6 25 6  | 125 3  | 129 1 281  |   |
| Temperature  | 26   | 26 76  | • |
| Temperature 27.5 26 25 24 22 20 17.5 17  Oct. 17 (422 562 483 486 531 546 452 418 41  Temperature 16 17.5 18.5 18 20 19.5 19 18  Oct 18 (474 402 482 480 435 444 470 562  Temperature 111 17.5 17.5 13 13 13.5 14 13.5 13.5  Oct 19 (488 472 463 460 473 465 474 470 562  Temperature 111 17.5 17.5 13 13 13.5 14 13.5 13.5  Temperature 47 463 460 473 465 467 476 56  Temperature 49 463 460 473 465 467 476 56  Temperature 49 472 494 493 496 566 470 489 480 481 485  Temperature 114 14.5 15.5 15.5 15.5 15.5 15.5 15.5  |  | 330 160<br>113 215   | 1 |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 14 5   | 13 12  | 1 |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |  | 90 36<br>89 407  | ì |
| Temperatine  |  | 89 457<br>11 15  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |  | 143  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 12 42  | 86 448<br>11, 5 11   |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 11 4   | 95 175<br>172 188  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 97 47<br>14 1  |  | 1 |
| Temperature  | 74 42  | 13.5 13<br>84 , 461  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 72 46  | E4 1 11 ·  |   |
| Temperature ( 483   487   485   482   491   486   480  |  | 13 47:<br>42 1.6   |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 59 48  | 82 451   |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 14 1   | 13 12 5  |   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |  | 05 56s<br>67 54g   |   |
|  | 13 1   | 12.5 - 12  | 1 |
|  |  | 20 1 0   |   |
| Temperature 8 8.5 9.5 9 9.5 9 9 9.5 5  | 5. 5   | 4 1 2 4  |   |
| Temperature  |  | 03 261   | Ì |
|  |  | 10 21:<br>8.5 8  |   |
|  | 09 (40-  | 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-   |   |
| / 922 419 419 424 445 444 394 63 34  | 67 31<br>10  | 18 (-4)-<br>9.5 9.5  |   |
| Oct 26 ( 424 i 418   402   367   457   439   456   382   36  | 67 42  | 28 . 117   |   |
| 1 439 419 364 364 501 462 492 368 42   | 29 ' 45  | 50   110   | 1 |
| 43.4 27 5 438 436 440 436 456 447 484 348 33   | 11 1<br>54 29  | 10, 5 19<br>91 30s   | 1 |
| 436 444 461 434 460 452 471 392 31   | 11 38  | 80 1.2   | 1 |
|  |  | 5.5 ( 4.5  |   |
| ( 440 438 367 422 542 402 372 240 45   | 30 : 41  | 39 . 150   |   |
| Temperature 3 4 4 4 2 1 0 -1 -<br>O+29 5 392 372 438 415 438 450 306 400 46  |  | 2.5  |   |
| 4 442 432 420 424 439 441 398 401 46   | 51 1 50  | 97 (-41)   |   |
| Temperature  | 51   55<br>60   29   | 3.5  |   |
|  | 51 39<br>-2 2<br>60 29<br>60 32<br>4,5   |  |   |
| Temperature 0.5 1 9 2  | 51 30<br>-2 29<br>60 29<br>60 32<br>4, 5 38  |  | - |
| Oct 31 432 439 432 433 446 440 40  | 51   50<br>-2   29<br>60   29<br>60   32<br>4, 5   38<br>91   35   | 59 107   | 1 |
|  | 51   | 59   107<br>4   5<br>20   110  |   |
| The state of the s   | 51   | 59   167<br>4   5<br>20   150<br>22   60   | 1 |
| Mean temperature . 19.6 20 4 20.9 20.8 21.0 20.3 20.0 19.4 1<br>Mean readings 480.2 494.0 490.0 498.5 594.0 485.8 489.0 438.4 46   | 51   | 59   10.7<br>4   5<br>20   150<br>22   60<br>19 5   19   | 1 |
| Mean readings 480, 2 454 0 490 0 498, 5 504, 0 485 8 489, 0 458, 4 46  | 51   | 59   167<br>4   5<br>20   150<br>22   60   | 1 |

ke bifilar magnet islon of scale = .0000719

ometer at Uglaamie, Alaska, October, 1882.

| 11,                 | Noon.               | 13h             | 145                | 15h          | 16h              | 17h              | 18h                 | 196               | 20h                | 215               | 224             | 32,          | Date        |
|---------------------|---------------------|-----------------|--------------------|--------------|------------------|------------------|---------------------|-------------------|--------------------|-------------------|-----------------|--------------|-------------|
| 551                 | 621                 | 602             | 610                | 615          | 515              | 580              | 600                 | 618               | 619                | 625               | 600             | 617          | } 1         |
| 42<br>235           | 43<br>243           | 43<br>754       | 44                 | 45<br>312    | 45<br>460        | 44               | 45<br>264           | 46<br>322         | 310                | 46.5<br>500       | 46. 5<br>615    | 48<br>354    | ,           |
| 185                 | 357<br>41           | 780             | 550<br>41          | 298<br>40    | 440              | 546 : 40.5       | 237                 | 382               | 410                | 472<br>40. 5      | 461             | 402          | } 2         |
| 495<br>470          | 461                 | 469<br>448      | 534<br>527         | 430<br>450   | 410              | 33H<br>351       | 498<br>515          | 409<br>522        | 485<br>508         | 495<br>486        | 501<br>490      | 503<br>505   | } 3         |
| 36<br>651           | 487<br>35, 5<br>320 | 35<br>443       | 35<br>470          | 34<br>470    | 412<br>35<br>501 | 35<br>278        | 34<br>262           | 32                | 32.5               | 32. 5<br>455      | 33<br>482       | 33           |             |
| 498                 | 182                 | 421             | 462                | 439          | 504              | 221              | 282                 | (-40-?)           | 374                | 449               | 500             | 570          | } 4         |
| 30<br>54*           | 530                 | 30<br>475       | 30<br>482          | 30<br>540    | 30<br>500        | 395              | 32<br>545           | 30. 5<br>360      | 80. 5<br>142       | 30. 5<br>315      | 30. 5<br>372    | 30. 5<br>725 | 1 5         |
| 563<br>28           | 510<br>27           | 481<br>27. 5    | 465<br>27. 5       | 511<br>27    | 491              | 383<br>28        | 550<br>28           | 289               | 137                | 332<br>29         | 379<br>29. 5    | 750<br>29, 5 | ,           |
| RS5<br>440<br>27    | 190<br>203          | 510<br>475      | (-40-?)<br>(-40-?) | 422<br>435   | 485<br>502       | 480<br>424<br>29 | 400<br>415          | 542<br>553        | 509<br>535         | 600<br>570        | 572<br>564      | 563<br>555   | } 6         |
| 492                 | 27. 5 ·<br>512      | 27. 5<br>495    | 27. 5<br>471       | 27<br>445    | 28<br>473        | 518              | 29<br>468           | 28. 5<br>475      | 28. 5<br>510       | 28<br>485         | 28<br>516       | 28<br>507    | 3 7         |
| 518<br>25. 5        | 526<br>26           | 510<br>26       | 483<br>26          | 471<br>26    | 476<br>26        | 482<br>26        | 454<br>27           | 463<br>26. 5      | 518<br>26. 5       | 479<br>26. 5      | 504<br>27       | 496          | 3 .         |
| 520<br>523          | 515<br>485          | 506<br>487      | 496<br>490         | 450<br>479   | 485<br>489       | 473<br>469       | 468<br>475          | 489               | 430                | 442               | 512<br>517      | 520<br>518   | 3 8         |
| 25<br>4×6           | 24.5<br>460         | 24<br>474       | 24<br>490          | 23<br>465    | 425              | 24<br>459        | 24<br>504           | 23. 5             | 23.5<br>445        | 21                | 24<br>310       | 25<br>503    | 3 9         |
| 495                 | 473<br>23           | 485<br>23       | 497<br>22.5        | 481          | 440<br>22        | 457<br>23        | 505<br>23           | 516<br>23         | 419                | 400<br>23         | 302             | 535<br>24    | 3 "         |
| 450                 | 210<br>173          | 470<br>490      | 482<br>468         | 440<br>490   | 491<br>480       | 430              | 388<br>340          | 250<br>182        | 62                 | 183<br>344        | 470<br>467      | 511<br>500   | 10          |
| 20.5                | 21<br>442           | 21<br>434       | 20. 5<br>428       | 20<br>412    | 21<br>311        | 450<br>21<br>509 | 20<br>403           | 19. 5<br>95       | 19<br>352          | 19<br>426         | 20<br>488       | 21<br>500    |             |
| 460                 | 485 [               | 450<br>18       | 452<br>17          | 387          | 315<br>18        | 530              | 384                 | 120<br>17. 5      | 401                | 432<br>18, 5      | 492             | 500<br>19. 5 | } 11        |
| 435<br>405          | 510<br>518          | 486             | 468<br>495         | 465<br>475   | 418<br>427       | 391              | 460<br>496          | 462<br>458        | 479<br>445         | 462<br>471        | 480<br>477      | 478<br>476   | 1 2         |
| 15<br>472           | 15<br>478           | 15<br>480       | 15<br>475          | 15<br>460    | 15. 5<br>422     | 15<br>370        | 15<br>427           | 14<br>439         | 14<br>465          | 14                | 15<br>474       | 16           | · .         |
| 485                 | 481<br>14           | 469 .           | 482<br>14          | 456<br>13, 5 | 408              | 371<br>13. 5     | 422<br>13. 5        | 459<br>13         | 469                | 472<br>12         | 468<br>12       | 478<br>14. 5 | 313         |
| 4-9                 | 250                 | 345             | 435                | 301          | 390              | 261              | 80<br>73            | 135               | 12, 5<br>150       | 480               | 479             | 480          | <b>}14</b>  |
| 465<br>12<br>150    | 265<br>12           | 353<br>12       | 442<br>11. 5       | 315<br>11    | 379<br>11        | 239<br>11        | 11.5                | 125<br>13         | 12.5               | 482<br>13         | 470<br>14       | 468<br>17    |             |
| 26                  | 267                 | 255             | 359                | 401          | 363<br>26. 5     | 260              | 419                 | 458<br>26         | 464                | 483               | 479             | 471<br>27, 5 | } 15        |
| 240                 | 25. 5<br>375        | 4983            | 26<br>490          | 460          | 410              | 411              | 26. 5<br>392        | 190               | 24.5<br>320        | 470               | 26<br>399       | 415          | <b>\$16</b> |
| 225<br>12           | 325<br>12           | 479             | 498<br>14          | 14.5         | 411 :<br>14.5    | 440<br>14        | 381<br>14. 5        | 263<br>14. 5      | 310<br>13.5        | 452<br>13. 5      | 364             | 420<br>15    |             |
| 400<br>463          | 485<br>472          | 522<br>518      | 405<br>400         | 379<br>380   | 404<br>413       | 471<br>522       | 482<br>458          | 410<br>412        | 415<br>420         | 430<br>419        | 422<br>453      | 462<br>465   | \$ 17       |
| 12<br>85            | 11. 5<br>467        | 11<br>168       | 11<br>425          | 1)<br>407    | 451<br>451       | 11.5<br>464 ;    | 11. 5<br>471        | 11. 5<br>452      | 11<br>459          | 11<br>428         | 10<br>450       | 462          | 18          |
| 185<br>11.5         | 465<br>12           | 460<br>12       | 428<br>12.5        | 413<br>12. 5 | 460<br>13        | 465<br>13. 5     | 460<br>14           | 450<br>14         | 456<br>14.5        | 445<br>14         | 443<br>14. 5    | 462<br>15    |             |
| 4.41                | 482<br>487          | 165<br>468      | 400<br>367         | 453<br>442   | 439<br>437       | 330<br>334       | 432<br>450          | 470<br>475        | 463<br>480         | 469<br>472        | 467<br>471      | 473<br>467   | 19          |
| 452                 | 13<br>483           | 13.5 ×<br>480   | 13<br>460          | 1:3<br>469   | 13. 5<br>459     | 14<br>471        | 14. 5<br>468<br>472 | 14<br>466         | 14<br>459          | 14<br>472         | 13. 5<br>479    | 14<br>478    | <b>20</b>   |
| 405                 | 485<br>13, 5        | 483<br>13, 5    | 472<br>13, 5       | 13, 5        | 465<br>13. 5     | 460<br>13. 5     | 13. 5               | 465<br>14<br>7452 | 461<br>14          | 482               | 480<br>14       | 480<br>14    |             |
| 469                 | 480<br>484          | 450<br>485      | 402<br>440         | 465<br>448   | 478<br>464       | 434<br>421       | 460<br>460          | 452<br>469        | 467<br>485         | 480<br>479        | 482<br>480      | 481<br>480   | 321         |
| 12.5                | 12. 5<br>325        | 12<br>465       | 11.5<br>484        | 11<br>481    | 10. 5<br>458     | 10<br>241        | 10. 5<br>350        | 11<br>304         | 11<br>120          | 11<br>185         | 11<br>312       | 11<br>372    | ١,          |
| 462<br>47.1<br>11.5 | 215<br>12           | 482             | 479<br>12.5        | 484<br>12. 5 | 440<br>12.5      | 250<br>12, 5     | 405<br>1:2          | 289<br>12         | 182                | 169<br>11, 5      | 270             | 375<br>11. 5 | 3 22        |
| 2352                | 400<br>426          | 382             | 428<br>433         | 386          | 391<br>411       | 361<br>363       | 411<br>403          | 439<br>433        | 422<br>415         | 420<br>429        | 421<br>425      | 431          | 23          |
| 410                 | 3. 5<br>458         | 4. 5<br>260     | 5<br>75            | 5. 5<br>92   | 5<br>405         | 5. 5<br>401      | 5, 5<br>420         | 6<br>365          | 6. 5<br>389        | 6. 5<br>415       | 409             | 425          | Las         |
| 440                 | 392                 | 249             | 122                | 93           | 448<br>10        | 403<br>11. 5     | 408<br>12           | 360<br>11.5       | 305<br>12          | 419               | 412             | 430<br>10, 5 | 1 24        |
| 8<br>395<br>340     | 455<br>463          | 418<br>440      | 459<br>472         | 409<br>416   | 378<br>386       | 362<br>365       | 410<br>428          | 349<br>372        | 362<br>370         | 380<br>400        | 392<br>409      | 440<br>442   | 25          |
| 9.5                 | 9. 5                | 10<br>302       | 10                 | 10<br>382    | 10. 5<br>278     | 10.5             | 11. 5<br>240        | 11. 5<br>305      | 11<br>340          | 11<br>372         | 382             | 432          | 1           |
| 0×5<br>10           | 410<br>9.5          | 255<br>9        | 405<br>8, 5        | 345<br>8.5   | 295<br>8, 5      | 350              | 226<br>8, 5         | 345<br>8, 5       | 169<br>7, 5        | 380               | 397             | 428<br>7.5   | 1 26        |
| 420<br>372          | 405                 | 378             | 410                | 355          | 4:30             | 436              | 235                 | 320               | 401                | 7, 5<br>384       | 345             | 435          | 27          |
| 1.5                 | 427<br>4<br>384     | 398<br>4<br>310 | 400<br>4<br>25     | 366          | 432<br>3. 5      | 439<br>3. 5      | 239                 | 339<br>3, 5       | 399<br>3<br>202    | 395<br>2, 5<br>63 | 350<br>2<br>350 | 2.5<br>364   | . )         |
| 372                 | 386                 | 319             | 54                 | 190<br>222   | 269<br>193       | 329<br>349       | 285<br>253          | 120               | 110                | 89                | 302             | 367          | . 5 28      |
| -40-1)              | 250<br>250          | 443             | 332                | 334          | 2. 5<br>382      | 260              | 185                 | 5<br>82           | 301                | 385<br>385        | 390             | 5, 5<br>386  | 29          |
| 2.5                 | 240<br>1.5          | 427<br>0, 5     | 278<br>-0. 5       | 374<br>—1. 5 | 400<br>1.5       | 247<br>—1. 5     | 86<br>1.5           | 95<br>-1.5        | 349                | 355<br>-2, 5      | 335             | 394          | . )         |
| 350                 | 55<br>284           | 235<br>218      | 272<br>243         | 285<br>273   | 343<br>328       | 230<br>318       | 362<br>370          | 292<br>254        | 372<br>375         | 390<br>400        | 383<br>372      | 399<br>400   | 30          |
| 3.5<br>405          | 453                 | 435             | 9<br>371           | 9<br>360     | 8.5<br>410       | 402              | 7. 5<br>377         | 6<br>259          | 6.5<br>32 <b>6</b> | 7. 5<br>400       | 410             | 12<br>405    | {31         |
| 432<br>19           | 480<br>19           | 375<br>20       | 355<br>20          | 398<br>19.5  | 404<br>19        | 400<br>18. 5     | 380<br>19           | 384<br>19         | 392<br>19, 5       | 391<br>20, 5      | 399<br>20, 5    | 414<br>20. 5 | ,           |
| 17. 0               | 17. 2               | 17. 3           | 17.3               | 17. 1        | 17. 4            | 17.5             | 17.6                | 17.5              | 17.4               | 17. 5             | 17. 7           | 18. 1        | 1           |

Monthly means: Temperature, 189.4; readings, 437.8

### Hourly readings of the Brooke biftlar magnet

|             |                 |                     |              |              | (            |                      |              |                   |                    | aber   afti       | 1 11118 11  |
|-------------|-----------------|---------------------|--------------|--------------|--------------|----------------------|--------------|-------------------|--------------------|-------------------|-------------|
| Date.       | 0h              | P                   | 25           | 34           | 44           | 51                   | 65           | 2h                | 9,h                | 90                | 105         |
|             | 395             | ; 408               | 429          | 432          | 475          | 430                  | 452          | 438               | 460                | 169               | 11000       |
| Nov. 1      | 400             | 1                   | 429          |              |              |                      |              |                   |                    |                   | 290         |
| Temperature | 394             | 398                 | 503          | 26           | 26           | 361                  | 27. 5<br>378 | 385               | 28, 5<br>390       | 29, 5             | 408         |
| Nov. 2      |                 | 430                 | 526          | 342          | 405          | 378                  | 676          | 365               | 375                | 398               | 360         |
| Temperature | 22.5            | 18, 5<br>380        | 392          | 14 401       | 15<br>422    | 15<br>401            | 11.5         | 13                | 397                | 355               | 360         |
| Nov. 3      | 377             | 393                 | 384          | 389          | 378          | 397                  | 446          | 428               | 300                | 383               | 357         |
| Temperature | 7.5             | 7. 5<br>374         | 384          | 6, 5<br>392  | 408          | 6. 5<br>450          | 423          | 5<br>368          | 354                | 3, 5<br>409       | 370         |
| Nov. 4      | 403             | 364                 | 370          | 395          | 407          | 407                  | 419          | 398               | 389                | 358               | 428         |
| Temperature | 394             | 11.5<br>395         | 403          | 15<br>382    | 15, 5<br>396 | 15, 5<br>394         | 14<br>402    | 12<br>415         | 10<br>421          | 8, 3<br>420       | 3×5         |
| Nov. 5      | 395             | 398                 | 406          | 384          | 403          | 397                  | 391          | 380 .             | 415                | 400               | 421         |
| Temperature | 392             | 354                 | 5.5          | 4, 5<br>491  | 466          | 5. 5<br>425          | 5, 5<br>412  | 398               | 391                | 355               | 411         |
| Nov. 6      | 382             | 358                 | 405          | 439          | 425          | 431                  | 407          | 418               | 402                | 418               | 385         |
| Temperature | 5               | 5                   | 5            | 4. 5<br>523  | 4. 5<br>402  | 4.5                  | 5<br>487     | 470               | 3, 5<br>526        | 456               | 415         |
| Sov. 7      |                 |                     |              | 445          | 497          | 510                  | 495          | 494               | 528                | 472               | 410         |
| Temperature | 510             | 573                 | 482          | 525          | 10<br>539    | 530                  | 8, 5<br>561  | 433               | 5, 5<br>492        | 521               | 4.<br>308   |
| (ov. 8)     | 493             | 509                 | 500          | 533          | 540          | 528                  | 564          | 426               | 479                | 502               | 285         |
| Temperature | 540             | 3, 5<br>493         | 3. 5<br>525  | 524          | 5<br>558     | 4. 5<br>542          | 526          | 551               | 1, 5<br>450        | 589               | 457         |
| lov. 9      | 520             | 483                 | 525          | 524          | 564          | 558                  | 530          | 546               | 452                | 527               | 47.2        |
| Temperature | 7. 5<br>548     | 453                 | 8, 5<br>486  | 8.5<br>564   | 10<br>499    | 9. 5<br>564          | 9. 5<br>498  | 8, 5<br>493       | 478                | 6. 5<br>478       | 474         |
| lov. 10     | 554             | 468                 | 500          | 542          | 494          | 495                  | 496          | 479               | 476                | 476               | 474         |
| Temperature | 17. 5<br>473    | 18<br>469           | 19<br>465    | 20<br>470    | 21<br>485    | 460                  | 23<br>488    | 23. 5<br>492      | 522                | 24<br>526         | 24.<br>504  |
| ov. 11      | 470             | 470                 | 470          | 473          | 497          | 481                  | 502          | 488               | 458                | 512               | 528         |
| Temperature | 24<br>585       | 23. 5<br>656        | 660          | 659          | 652          | 20, 5<br>690         | 763          | 18, 5<br>603      | 16, 5<br>500       | 15, 5<br>450      | 14<br>580   |
| ov. 12      | 768             | 587                 | 673          | 672          | 670          | 662                  | 737          | 593               | 710                | 492               | 640         |
| Temperature | 9, 5<br>620     | 8, 5<br><b>6</b> 28 | 8. 5<br>583  | 609          | 642          | 5, 5<br>430          | 4, 5<br>347  | 298               | 163                | (tn!)             | 19<br>85    |
| ov. 13      | 619             | 620                 | 590          | 594          | 661          | 443                  | 356          | 363               | 4417               | :50               | 1-10-       |
| Temperature | 5<br>579        | .s. 0               | 570          | -5<br>573    | 6<br>693     | -6. 5<br>571         | -6<br>584    | 598               | -9, 5<br>557       | 10, 5<br>472      | 11.<br>451  |
| ov. 14      | 6663            | 548                 | 568          | 576          | 700          | 575                  | 608          | 604               | 416                | 540               | 479         |
| Temperature | -10.5           | - 10, 5<br>600      | -10<br>633   | -10<br>740   | -11<br>782   | -10.5<br>990         | -10.5<br>818 | 610               | -13<br>460         | ←14<br>(1040 ± ′) | 14.<br>663  |
| (ov. 15     | 388<br>322      |                     |              |              |              | **********           |              |                   |                    |                   |             |
| Temperature | -10.5<br>539    | -10<br>418          | -7. 5<br>476 | -9, 5<br>491 | -7<br>526    | -7. 5<br>526         | -3, 5<br>476 | 525               | 610                | 9<br>501          | 695         |
| ov. 16      |                 | 550                 | 466          | 503          | 548          | 553                  | 551          | 528               | 582                | 561               | 658         |
| Temperature | 0. 5<br>571     | $\frac{-2}{473}$    | -3, 5<br>593 | 521          | -4.5<br>555  | <del></del> 5<br>498 | -6<br>476    | <del>-7</del> 567 | →8, 5<br>564       | 9<br>550          | 9.<br>541   |
| ov. 17      | 530             | 507                 | 600          | 566          | 550          | 546                  | 576          | 528               | 541                | 540               | 476         |
| Temperature | -7.5<br>(-40-1) | -6. 5<br>358        | -5, 5<br>98  | -4.5<br>104  | 148          | (-40-2)              | 348          | 401               | $\frac{-5}{562}$ 5 | 6<br>269          | 6<br>( 10   |
| ov. 18      | (-40- !)        | 226                 | 114          | 82           | 192          | 156                  | 415          | 250               | 264                | 1 73              | (-40-       |
| Temperature | 382             | 795                 | 0, 5<br>563  | 683          | 1<br>589     | 523                  | 1.5          | 0.5               | 342                | -0.5              | -1<br>4.0   |
| ov. 19      | 183             | 538                 | 584          | 749          | 574          | 397                  | (-40-1)      | 493<br>515        | 369                | 15<br>247         | 314         |
| Temperature | 1.5<br>420      | 1, 5<br>268         | (-40-2)      | 1.5          | 1. 5<br>280  | 1. 5<br>300          | (-40-2)      | 0.5               | -0.5<br>(10')      | 1                 | -2<br>(-10- |
| ov. 20      | 426             | 367                 | (-40-1)      | (-40-?)      | 289          | 322                  | (-40-2)      | (- 40!)           | \$4)               | (-4°-5)           | (           |
| Temperature | 0               | 0.5                 | 0. 5         | 0.5          | 1            | 1                    | 2.5          | 2 :               | 0, 5               | 0                 | -1          |
| ov. 21      | 344<br>384      | 488<br>495          | 523<br>540   | 548<br>469   | 539<br>515   | 449<br>459           | 455<br>456   | 405<br>421        | 544<br>526         | 434               | 462<br>442  |
| Temperature | 5, 5            | 6                   | 6, 5         | 6, 5         | 7.5          | 6                    |              | 4.5               | 2. 5               | 2.5               | 1.          |
| ov 22       | 442<br>478      | 472<br>510          | 437<br>470   | 554<br>450   | 473<br>477   | 448<br>449           | 463<br>480   | 373<br>345        | 344                | 315               | 2149        |
| Temperature | 6, 5            | 6.5                 | 7            | 7            | 7            | 7                    | P            | 7.54              | 7                  | 7                 | 4           |
| ov. 23      | 417             | 463<br>519          | 457<br>443   | 461<br>470   | 465<br>470   | 410<br>403           | 449<br>451   | 348<br>423        | 466                | 250               | 172         |
| Temperature | 11.5            | 11                  | 10           | 10           | 11           | 11                   | 10           | 9                 | 8 1                | 312<br>7, 5       | 7           |
| ov. 24      | 462             | 463<br>467          | 496<br>503   | 435<br>436   | 463<br>468   | 506<br>519           | 503<br>539   | 482<br>518        | 513<br>492         | 446<br>458        | 3.4         |
| Temperature | 3, 5            | 4                   | 4            | 3            | 3            | 1.5                  | 1            | 0                 | 0, 5               | -1                | - 1         |
| iv. 25      | 503<br>498      | 483<br>488          | 592<br>663   | 536<br>478   | 541<br>569   | 569<br>588           | 576<br>583   | 524<br>478        | 484 479            | 538<br>538        | 575<br>515  |
| Temperature | -3.5            | 4                   | -4.5         | 5            | 5            |                      | -1.5         | 1                 | -1                 | • = 1.5<br>541    |             |
| rv. 26      | 568<br>563      | 558                 | 555          | 541          | 621<br>580   | 535<br>503           | 531          | 493<br>506        | 599                | 541<br>488        | 485<br>476  |
| Temperature | :1              | 573<br>2. 5         | 710          | 525<br>- 3   | -3           | <del>-3</del>        | 540<br>-2.5  | -3.5              | 485                | -6                | 7           |
| ov. 27 [    | 561             | 532                 | 483          | 577          | 579          | 573                  | 498          | 549               | 458                | 595               | 372         |
| Temperature | 621<br>—6, 5    | 550<br>5, 5         | 485<br>—5    | 567<br>—5    | 546<br>4.5   | 581                  | 491<br>—4    | 526<br>-5         | 451<br>5           | 561               | 473         |
| v. 28       | 503             | 535                 | 537          | 508          | 522          | 508                  | 544          | 526               | 468                | 100               | 551         |
| Temperature | 500<br>-2, 5    | 528<br>1, 5         | 540          | 510<br>—1    | 525          | 503                  | 535          | 536<br>-2, 5      | 477<br>—3, 5       | 135<br>4, 5       | 488         |
| ov. 29      | 493             | 482                 | 485          | 498          | 535          | 572                  | 537          | 517               | 456                | 53.)              | 470         |
| Temperature | 493<br>—1. 5    | 486                 | 480          | 503          | 536<br>0, 5  | 561                  | 528          | 537<br>-0, 5      | 487<br>—1. 5       | 528<br>2.5        | 483         |
|             | 494             | 493                 | 1<br>480     | 489          | 496          | 501                  | 523          | 521               | 499                | 461               | 477         |
| ov. 30      | 488             | 489                 | 476          | 481          | 495          | 499                  | 533          | 529               | 573                | 4.80              | 473         |
| Temperature | -1.5            | -0.5                | 0            | 0, 5         | 1.5          | 1. 5                 | 2            | 1                 | 0                  | -0.5              | D,          |
|             | 3.8             |                     |              |              |              |                      |              |                   |                    |                   | 1.          |

ometer at Uglaamie, Alaska, November, 1882.

biflar magnet

ber ' after this date

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101

.000749; average for month .0000743 part of the horizontal force.]

| \$11 <sup>k</sup>  | Noon.          | 134             | 141            | 154           | 165           | 175                | 184                | 104                | 204                | 315          | 225              | 33r           | Date       |
|--------------------|----------------|-----------------|----------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------|------------------|---------------|------------|
| 479                | 440            | 405             | 411            | 10            | 120           | 392                | 376                | 202                | 320                | 406          | (0)×             | 309           | <u>} 1</u> |
| 29. 5<br>350       | 29, 3<br>95    | 29<br>363       | 28<br>400      | 26<br>375     | 25. 5<br>368  | 39<br>345          | 28.5 .<br>388 .    | 29<br>403          | 27. 5  <br>352     | 26<br>365    | 25<br>399        | 23. 5<br>400  | ,          |
| 328<br>9.5         | 110            | 360             | 10. 3          | 373           | 366           | 373<br>11. 5       | 369                | 399<br>11. 5       | 390                | 8.5          | 355              | 305           | 3 2        |
| 398<br>366         | 405<br>395     | 390<br>355      | 360            | 180<br>185    | 307<br>415    | 386                | 390                | 335<br>365         | 390<br>425         | 382<br>401   | 360<br>392       | 400<br>385    | 1 a        |
| 3                  | 3. 5           | 3, 5            | 3.5            | 3. 5          | 3, 5<br>365   | 3. 5               | 31. 5              | 3, 5               | 3 388              | 2.5          | 380              | 7             | ,          |
| 25<br>82           | 389            | 343             | 378            | 368           | 384           | 360<br>367         | 382                | 395                | 390                | 384          | 131113           | 387           | 5 4        |
| 132                | 418            | 351             | 380            | 369           | 388           | 386                | 399                | 4, 5<br>394        | 362                | 244          | 4. 5<br>250      | 4, 5<br>356   | 1 3        |
| 2, 5               | 415            | 404             | 389            | 369           | 379           | 387                | 397<br>2. 5 p      | 309                | 354<br>3, 5        | 223<br>4. 5  | 272<br>4, 5      | 373<br>4, 5   | 3          |
| 415<br>382         | 390<br>394     | 410<br>375      | 400<br>394     | 416<br>370    | 398           | 340<br>349         | 315<br>293         | 290<br>255<br>2, 5 | 402<br>400         | 382<br>400   | 410<br>395       |               | 6          |
| 305                | 506            | 1.5<br>544      | 1, 5<br>501    | 208           | 423           | (-40-!)            | 130                | 315                | 462                | 1.5<br>514   | 1.5 °<br>522     | 430           | ! 7        |
| 347                | 509<br>4. 8    | 554<br>4. 5     | 498            | 249           | 399           | 185                | 358                | 370                | 520<br>4           | 440<br>3, 5  | 465              | 470<br>0.5    | , ,        |
| 853<br><b>3</b> 82 | 415 1<br>416 - | 441             | 75<br>123      | 369           | 447<br>450    | 413                | 371                | 382<br>378         | 445                | 405<br>412   | 470              | 500<br>503    | 1 8        |
| 0, 5<br>400        | 1.5            | 425             | 2, 5           | 3.5           | 323           | 4. 5 1<br>250      | (-40-!)            | 6.5                | 6, 5               | 6, 5<br>273  | 6. 5<br>500      | 7. 5<br>510   | , .        |
| 395<br>5.5         | 372            | 408<br>6, 5     | 278            | 241           | 320<br>8, 5   | 237                | 50 (<br>10, 5      | -40-2) ·           | 110 :              | 305<br>15, 5 | 188              | 515<br>17, 5  | } 0        |
| 432<br>439         | 474<br>473     | 470<br>465      | 396<br>392     | 489<br>481    | 432<br>420    | 452<br>454         | 440                | 470<br>450         | 477<br>475         | 474<br>473   | 467<br>472       | 410           | 10         |
| 24. 5              | 25. 5<br>539   | 26<br>550       | 26<br>558      | 26, 5<br>561  | 26. 5<br>481  | 26. 5<br>519       | 445<br>27<br>425   | 27<br>508          | 26.5 ,<br>512      | 26<br>521    | 25, 5<br>353     | 24. 5<br>554  |            |
| 574                | 530            | 556             | 567<br>14      | 550<br>13, 5  | 475<br>13     | 512<br>12, 5       | 405                | 499<br>11, 5       | 530                | 508          | 382<br>10, 5     | 359<br>10     | ξ11.       |
| 305                | 563            | 501             | 314            | 404           | 340           | 65                 | 35                 | 544                | 11. 5<br>360       | 11<br>620    | 669              | 673           | 1 12       |
| 302<br>1           | 528<br>2       | 635             | 376            | 395           | 505           | -6                 | 231<br>-5          | 623                | 402<br>6           | 639          | 703<br>-5, 5     | 646<br>5      |            |
| 850<br>495         | 326<br>355     | 212<br>217      | 105<br>156     | 258<br>110    | 250<br>120    | 155<br>440         | (-40-1)<br>(-40-1) | 40<br>120          | 280<br>232         | 502<br>520   | 280<br>110       | 130           | 3 13       |
| -12<br>74          | 12<br>418      | 12, 5<br>465    | -12<br>479     | 11, 5<br>240  | 12. 5<br>160  | -12.5 $382$        | -11<br>300         | $\frac{-12}{178}$  | $-\frac{12}{30}$   | -12<br>92    | +11<br>310       | -11<br>430    | 114        |
| 40 ')<br>16 ,      | 345<br>—15     | 413<br>15, 5    | 478<br>16      | -115 $-16, 5$ | 175<br>16, 5  | 405<br>16, 5       | 208<br>16          | 199<br>—16         | (40′)<br>15. 5     | -15          | 235<br>- 42, 5   | -500<br>11. ô | ,          |
| 476                | 490<br>        | 321             | 453            | 426           | 182           | 443                | 270                | 296                | 421                | 473          | 483              | 510           | (45        |
| 485                | 568            | 622             | -6<br>418      | 5, 5<br>409   | -5<br>507     | 415                | -3.5<br>482        | -2.5<br>472        | 463                | 1<br>480     | 0.5<br>479       | 530           | 16         |
| 537<br>-11         | 590<br>10, 5   | 626<br>9, 5     | 435<br>9       | 40×<br>—9     | 503           | 461<br>—9          | 463                | 487<br>—9          | 492<br>—9          | 495<br>—9    | 452<br>—≃, 5     | 552<br>-7, 5  | 3          |
| 488<br>275         | 225            | 310<br>283      | 229<br>492     |               | (-40-')       | 100<br>120         | (-40-!)<br>(-40-!) | 74<br>288          | 10                 | (40-!)<br>3  | 682<br>119       | 459<br>493    | 17         |
| 6, 5<br>55         | 4. 5<br>(40')  | 350             | 390            | 3, 5<br>353   | 398           | 438                | -2<br>283          | -3<br>29           | -2.5<br>63         | -1. 5<br>522 | $\frac{-1}{365}$ | -0, 5<br>139  | 118        |
| -1                 | (-40-1)        | 0 1             | 399            | 190<br>—1     | 340           | 518                | 200                | 1 1                | 03                 | 468          | 192              | 135<br>e. 5   | 110        |
| 315<br>276         | 390<br>425     | 15<br>03        | (40')<br>(40') | 170<br>240    | 394<br>220    | 571<br>293         | 422                | 360                | 444<br>410         | 525<br>489   |                  | 275           | 3 19       |
| 2 1<br>40 ?)       | (-40-2)        | (10-!)          | -2<br>35       | 508           | 225           | 7:10               | ( <del>10</del> !) | 192                | 0. 5<br>120        | 152          | 5                | 0, 5          | 1 20       |
| 402                | 65<br>— 1      | (-40-!)         | (40')          | 538           | 281           | 704                | 0.5                | 210                | 202                | 110          | 412              | 356           | 3 20       |
| 465                | 450 ÷ 452      | 351<br>379      | 343<br>232     | 424<br>416    | 248<br>241    | (-40-1)<br>(-40-1) | (-40-1)<br>(-40-1) | 40<br>120          | (-40-1)<br>(-40-1) | 372<br>388 . | 532<br>519       | 956<br>580    | 21         |
| 491                | 1.5<br>442     | 1 412           | 1.5            | 1. 5<br>393   | 355           | 2. 5<br>956        | 308                | 366                | 432                | 5, 5         | 6<br>129         | 6<br>470      | ,          |
| 408<br>9           | 447<br>10, 5   | 411             | 418<br>11.5 -  | 392<br>11, 5  | 573<br>12     | 379<br>12          | 407<br>12.5        | 397<br>12          | 438<br>12          | 3::9<br>12   | 417              | 437<br>11. 5  | (22        |
| 40—1)<br>40—1)     | 295<br>352     | 174<br>253      | 98<br>218      | (-40?)        | 253<br>283 -  | 268<br>284         | 220<br>222         | 202<br>220         | 425<br>447         | 312<br>320   | 442<br>444       | 470<br>450    | 123        |
| 6<br>508           | 6, 5<br>#63    | 6, 5            | 6, 5<br>230    | 354           | 6             | 5. 5<br>241        | 5. 5<br>321        | 5. 5<br>402        | 5.5<br>386         | 5. 5<br>445  | 5<br>426         | 4. 5<br>487   |            |
| 502                | 488<br>0. 5    | 368             | 152            | 378           | 359<br>0, 5 1 | 259                | 324                | 415<br>—1          | 375<br>—1. 5       | 419          | 359<br>-1.5      | 450<br>←3     | 32E        |
| 570                | 414            | 6.5             | 350            | 314           | (-40')        | 253                | 80                 | 342                | 234                | 300          | 482              | 492<br>513    | (25        |
| 556 1              | 422<br>—3      | (-40-1)<br>-3.5 | 288<br>-1      | 318           | 110           | 432<br>—4          | 30                 | 373                | 250<br>4           | 265<br>3. 5  | 532              | -3.5          | ,          |
| 431<br>410         | 539<br>520     | 470<br>504      | 458<br>394     | 502<br>484    | 272<br>307    | 291<br>329         | 393                | 472<br>440         | 412<br>408         | 359<br>409   | 382<br>342       | 590<br>612    | \$ 20      |
| 214 1              | 7, 5<br>567    | -8<br>428       | <del>-8</del>  | -8<br>467     | -8<br>304     | 264                | _8<br>339          | -8.5<br>311        | -8<br>512          | 410          | $\frac{-7}{515}$ | -6.5<br>505   | ₹ 27       |
| 405                | 612<br>—5      | 429             | 464            | 480<br>3, 5   | 301<br>—4     | 268<br>-4. 5       | 350<br>-3, 5       | 282                | 516<br>4           | 416<br>—3 5  | 535<br>—3        | 449<br>—3     | ,          |
| 485<br>459         | 357<br>398     | 408<br>396      | 390<br>384     | 459<br>438    | 490<br>490    | 422<br>420         | 460                | 429<br>434         | 458<br>470         | 492<br>501   | 499              | 490<br>490    | \$ 28      |
| - 5<br>505         | -5<br>485      | - 5<br>446      | -4. 5<br>490   | 457           | -4.5<br>481   | -4. 5<br>501       | -3.5<br>490        | 3<br>496           | -2.5<br>498        | 484          | 480              | 474           | 29         |
| 520                | 510<br>-3, 5   | 451             | 482            | 465           | 481<br>3.5    | 502<br>—3, 5       | 499<br>—2, 5       | 493<br>2. 5        | 492<br>-2. 5       | 486          | 482              | 477<br>       | 5 20       |
| 562<br>545         | 502<br>497     | 452<br>459      | 438<br>436     | 470<br>456    | 450<br>458    | 545<br>553         | 445<br>433         | 462<br>439         | 465<br>412         | 470<br>488   | 440              | 435<br>380    | \$ 30      |
| -0, 5              | -0, 5          | -0.5            | -0.5           | 0.5           | 0             | 0                  | - 1                | 1                  | 1.5                | 3            | 2. 5             | 1)            |            |
| 1 3                | 1.6            | 1.5             | 1.5            | 1.5           | 1.5           | 1.7                | 2. 3               | 2.3                | 2.3                | 2.5          | 2.6              | 2. 9          |            |

Monthly means: Temperature, 29.7; readings, 408 1

H. Ex. 44---62

Hourly readings of the Brooke bifilar magnet

[One division of scale = .0000749 a. 90 160 521 486 471 Temperature ..... 458 464 465 454 500 46H 455 418 Dec 2..... 14 182 484 Temperature ...... 519 518 1.: 518 508 2 545 502 --0 488 508 --4 500 501 --0 470 468 \$25.6 \$25.6 Dec 3...... Temperature ..... 584 587 523 537 -4 524 519 -5 490 493  $\begin{array}{c} 2.5 \\ 537 \\ 524 \\ 523 \\ 519 \\ 516 \\ 546 \\ 502 \\ 557 \\ 546 \\ 502 \\ 558 \\ 5410 \\ 500 \\ 559 \\ 558 \\ 5610 \\ 561$  $\begin{array}{c} 448\\ 510\\ -4\\ 528\\ 530\\ 6\\ 6\\ 4483\\ -7.5\\ 6403\\ 480\\ 483\\ -7.5\\ 540\\ -11.5\\ 520\\ -77\\ -11.5\\ 520\\ -77\\ -480\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\ -280\\ -12.5\\$ Dec. 4..... Temperature ..... Dec. 8..... Temperature ...... Dec. 6...... Temperature ...... 191 1 5 520 493 520 511 Temperature ...... 199 547 517 518 524 562 558 -12 100 125 542 -12 539 542 -12 539 521 521 Temperature ...... -5 504 500 -5 573 640 -20, 5 532 -8, 5 767 600 -7 532 -13 193 494 507 Temperature ...... Dec. 10...... Temperature ...... Dec. 11 ...... 79.5 79.5 746 7526 7507 712.5 496 487 487 487 503 7503 79.5 Temperature ...... Dec 12 ...... Temperature ..... Dec. 13 ...... Temperature ..... Temperature ...... 420 Dec 15 ....... 635 660 -7.5 518 547 -7.5 3, 5 474 500 -10 518 594 -9 5 485 499 -11 452 528 -15, 5 Temperature .....  $\begin{array}{c} 650 \\ 758 \\ -2.5 \\ 526 \\ -3.5$ 333 374 -10 482 500 -10 485 499 -12 394 458 709 721 --5 530 524 --7 533 542 Dec. 16 ..... 3 5 475 198 --9.5 492 494 Temperature ..... Temperature ...... 496 491 Dec. 18 ...... 9,5 486 496 -14 591 -15,5 +33 490 -15 531 -334 -11 520 500 -14,5 Temperature ......  $\begin{array}{c} -7.5\\ 496\\ 492\\ -14.\\ 553\\ 409\\ -14.\\ 553\\ 409\\ -16.\\ 538\\ -11.\\ 553\\ -13.\\ 553\\ -13.\\ 552\\ 486\\ -21.\\ 552\\ 486\\ -21.\\ 552\\ 486\\ -21.\\ 552\\ -15.\\ 562\\ -15.\\ 5$ Temperature ...... -16 504 500 -17 358 358 -12 175 -15, 5
445
-40--2)
-16, 5
-40--2)
-30--2)
-12
135
-165
-15, 5 Dec 20...... Temperature ..... ..... Commerature ..... Dec 22 ..... 255 -16 559 572 -15 277 345 -19 448 353 -22 423 423 Temperature ...... Dec 23 ...... Temperature ...... Dec 24 ....... Temperature ...... Temper date ...... Dec 26 ...... Temperature ...... --9 460 482 Dec 27. ...... Temperature ...... -5.5 500 504 -11.5 4\*8 483 0 -5.5 596 529 --9, 0 530  $\frac{-7}{510}$ -8, 525 485 -10 256 360 5 565 477 490 -12 --9 508 485 --10.1 498 483 5 Dec.28 ...... } 498 -11 5 457 448 Temperature ...... -9.5 549 Dec. 29..... Temperature ...... Dec 30..... Temperature ...... 708 491 --12 Temperature ...... Mean temperature ... Mean readings .... 6, 1 525, 1 502 0 502 0 -6, 6 520, 9-7.9 504.8 $\frac{-8.5}{177.7}$ -8 9 159 1

ifilar magnet

of scale = .0000749

-8.9 459.1

ometer at Uglaumie, Alaska, December, 1882.

| 119                          | Noon.                     | \$150                | 145                    | 15h                  | 165                  | 17h                  | 145                  | 195                  | 300                      | 211                  | 225                   | 231                  | Dite            |
|------------------------------|---------------------------|----------------------|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|----------------------|-----------------------|----------------------|-----------------|
| 452                          | 418                       | 260                  | 310                    | 386                  | 270                  | 465                  | 455                  | 339                  | 364                      | 100                  | 364                   | 356                  | 11              |
| 10.5<br>5.5<br>471           | 11<br>470<br>500          | 10<br>473<br>494     | 11.5<br>447<br>456     | 12 5<br>457<br>482   | 13. 5<br>417         | 307                  | 14 5<br>510<br>453   | 14<br>404<br>445     | 14<br>467<br>450         | 19<br>479<br>485     | 15, 5<br>492<br>500   | 14 5<br>483<br>480   | 1 2             |
| 1                            | 0, 5<br>428 (             | 467                  | 470                    | 474                  | 450<br>1<br>435      | 323<br>1.5<br>425    | 0. 5<br>342          | 0<br>350             | ±0.5<br>410              | 450 D                | 579                   | 49.5                 | ! a             |
| .51                          | 437<br>2<br>328           | 465                  | 482<br>1<br>418        | 343<br>0, 5<br>340   | 428<br>0, 5          | 440<br>0<br>418      | 312<br>0<br>C4       | 330<br>0<br>503      | 501<br>-0.5<br>210       | 40H<br>-0.5<br>252   | 555<br>0.5            | #92<br>1<br>600      | ,               |
|                              | 274                       | 415                  | 459                    | 2000<br>             | 114                  | 415<br>              | _5                   | 509<br>-5.5          | 265<br>5, 5              | 282                  | 350                   | 550                  | 3.4             |
| 15                           | 496                       | 458<br>490           | 517<br>528<br>6.5      | 504 ,<br>505<br>0, 5 | 503<br>525           | 498<br>512<br>       | 504<br>506<br>5, 5   | 500<br>502<br>6. 5   | 492<br>488<br>6, 5       | 512<br>504           | 507<br>515<br>0       | 505<br>510<br>= 5.5  | 10              |
| 65   1<br>30<br>-7 5         | 509<br>509                | 492<br>495           | 509<br>504<br>—6.5     | 475<br>479<br>-6, 5  | 497<br>-5, 5         | 600<br>498<br>—4, 5  | 451<br>467           | 469<br>475           | 403                      | 508<br>476           | 515<br>519            | 503<br>502<br>- 0, 5 | 13 6            |
| 4                            | 494                       | 521                  | 478<br>470             | 451<br>413           | 4730<br>434          | 380<br>389           | 217                  | 320<br>372           | 499                      | 450<br>458           | 480<br>492            | 496<br>521           | 3 7             |
| 0 A                          | 521<br>517                | -0.5<br>472<br>470   | 0, 5<br>485<br>464     | -1<br>516<br>516     | -1.5<br>511<br>512   | 1. 5<br>523<br>522   | -1<br>520<br>520     | -1.5<br>5.98<br>512  | 511<br>510               | +2.5<br>512<br>512   | 511<br>510            | -3.5<br>594<br>450   | 1 8             |
| 5.5                          | -~10<br>532               | -10<br>472<br>487    | -9. 5<br>502           | -0.5                 | - 8.5<br>455         | _8.5<br>362          | -7<br>430            | -7<br>110            | -6.5                     | 440                  | 410                   | ~5.5<br>5.83         | 1 0             |
| 1 1<br>15                    | 538<br>534<br>534         | 487<br>9<br>540      | 496<br>9<br>510        | 469<br>9, 5<br>492   | 454<br>9 5<br>525    | 325<br>- 9<br>512    | 438<br>-7<br>520     | 345<br>8, 5<br>519   | 479<br>8 5<br>512        | 500<br>8, 5<br>521   | 450<br>9<br>595       | 563<br>9<br>508      | 1,3             |
| 1                            | 5 (9)                     | 532                  | 531<br>12              | 486<br>              | 527<br>—11           | 527<br>              | 518<br>-10<br>225    | 519<br>10            | 518<br>10                | 520<br>10            | 523<br>—10            | 528<br>0. 5<br>524   | \$ 10           |
| i<br>i<br>i.5                | 12<br>539<br>521<br>8     | 335<br>382<br>G      | 516<br>515<br>5        | 512<br>520           | 491<br>481<br>—3, 5  | 430<br>432<br>—4     | 165                  | 555<br>454<br>—3     | 282                      | 250<br>420<br>-3.5   | 400<br>429            | 552                  | - (11           |
| n n                          | 464<br>367<br>12          | 40°<br>418<br>12.5   | 510<br>514<br>12, 5    | 517<br>504<br>—12, 5 | 455<br>453<br>—12, 5 | 243<br>310<br>—12.5  | 175<br>200<br>—12    | 492<br>494<br>12, 5  | 521<br>529               | 502<br>519<br>—12, 5 | 473<br>517<br>—12.5 [ | 505<br>509<br>12, 5  | 3 12            |
| 12<br>15<br>12               | 4.53<br>5.37              | 5394<br>\$50         | 412<br>395             | 388<br>411           | 473<br>482           | 491                  | 419<br>422           | 467<br>465           | - 12.5<br>472<br>477     | 400                  | 494                   | 500<br>497           | ₹13             |
| -17<br>155<br>578            | 11.5<br>4.63<br>47.2      | =110.5<br>428<br>333 | 10<br>480<br>400       | 10<br>307<br>279     |                      | 521<br>526           | -7<br>507<br>508     | -7. 5<br>488<br>490  | 489<br>499               | 501<br>503           | 482<br>479            | 6, 5<br>491<br>494   | 114             |
| 10 1                         | 499                       | = 10<br>4 i0         | -10<br>468             | -10, 5 ·             | -10.5<br>473         | -10.5<br>441         | -9.5<br>412          | -10<br>360           | -10<br>344               | -9.5<br>30 <b>6</b>  | 9.5<br>190            | 9, 5<br>398          | t <sub>45</sub> |
| 3 5                          | 4<br>289                  | 4.5<br>388           | 5<br>55 <b>4</b>       | 490                  | 5<br>500             | 4. 5<br>503          | 376                  | 4.5<br>500           | 4.5<br>462               | 4<br>209             | 458                   | 544                  | . (45<br>H      |
|                              | 262<br>-11<br>485         | 410<br>11<br>505     | 567<br>                | 502<br>              | 481<br>              | 520<br>11<br>491     | 373<br>0<br>480      | 508<br>9, 5<br>482   | 342<br>0<br>488          | 915<br>-9 5<br>499   | 109<br>9.5            | 463<br>9, 5<br>486   | )               |
| 5                            | 4°9<br>—10.5              | 496<br>10 5          | 430<br>10, 5           | 490                  | 477<br>—10           | 490                  | 480                  | 493                  | 494                      | 494                  | 490<br>—9. 5          | 507                  | <b>17</b>       |
| .5                           | 521<br>520<br>12          | 476<br>498<br>- 12.5 | 502<br>514<br>—12, 5   | 502<br>520<br>12, 5  | 517<br>511<br>—12, 5 | 529<br>512<br>12, 5  | 499<br>496<br>—11, 5 | 510<br>512           | 522<br>493<br>—12        | 500<br>501<br>12, 5  | 466<br>482<br>—13     | 458<br>450<br>—12-5  | 18              |
|                              | 479<br>476<br>—16.5       | 452                  | 501<br>516             | 505<br>497<br>-15.5  | 479<br>481           | 495<br>511           | 511                  | 460<br>482           | 503<br>479               | 400<br>496           | 496<br>480            | 522<br>490           | \$ 19           |
| 3                            | 16 5<br>508<br>506        | 16<br>207<br>293     | -16<br>(402)<br>(402)  | (-40-')<br>(-10-')   | 291<br>362           | -15<br>20<br>(-46-1) | -12<br>570<br>575    | -13<br>322<br>350    | -13.5 (<br>10<br>(-40-?) | 14<br>552<br>495     | -14<br>550<br>592     | 15. 5<br>400<br>350  | \$20            |
| 6                            | -16, 5<br>293<br>209      | 16<br>488<br>-02     | 16<br>250<br>317       | -16<br>145<br>160    | 16<br>514<br>504     | 16<br>481<br>479     | -14.5<br>390<br>412  | 14.5<br>210<br>190   | -14.5<br>372<br>50       | 14. 5<br>22<br>340   | -14. 5<br>180         | 15<br>495<br>546     | 21              |
| 3<br>2 3<br>17               | -12.5<br>445              | -13<br>369           | -13<br>372             | 13, 5<br>450         | -13<br>459           | -13<br>413           | -11<br>362           | -11<br>379           | -11<br>422               | -11.5<br>403         | 522<br>               | 484                  | 1/23            |
| 58<br>16.5<br>15             | $^{+37}_{-16}$            | -10.5<br>562         | 391<br>16<br>454       | 497<br>16, 5<br>45 0 | 470<br>16.5<br>457   | 450<br>16<br>205     | 340<br>15<br>394     | 409<br>15<br>400     | 508<br>-15<br>532        | 509<br>14, 5<br>     | 462<br>-14. 5<br>550  | 503<br>-14.5<br>500  | ,               |
| 12<br>16                     | 414<br>16                 | 379<br>16            | 462<br>16, 5           | 473<br>—16           | 473<br>15, 5         | 206<br>15, 5         | 387<br>—15           | 412<br>15            | 509 t<br>- 15, 5         | 472<br>—16           | 544<br>17             | 520<br>16. :         |                 |
| e4<br>175<br>20 - 1          | 095<br>3.63<br>+20<br>528 | 476<br>454<br>       | 350<br>334<br>20, 5    | 123<br>110<br>20, 5  | (-40-2)<br>10<br>-21 | 350<br>359<br>—20. 5 | 430<br>447<br>—20    | 403<br>420<br>20     | 482<br>492<br>—20        | 412<br>450<br>20     | 480<br>449<br>—20, 5  | 482<br>484<br>20, 5  | 324             |
| (50 i i<br>(57<br>-21, 5 i i | 528<br>452<br>20, 5       | 25 1<br>37<br>—19.5  | 432<br>438<br>—19      | 478<br>480<br>—18    | 409<br>400<br>—16, 5 | 348<br>357<br>15, 5  | 410<br>415<br>—13, 5 | 412<br>421<br>—12. 5 | 440<br>437<br>—12. 5     | 434<br>435<br>—12, 5 | 452<br>453<br>—12     | 470<br>468<br>- 12   | 325             |
| 178<br>194                   | 447                       | 423<br>428           | 358<br>371             | 200<br>190           | 278<br>268           | 258<br>272           | 435<br>439           | 429<br>408           | 430<br>399               | 409<br>388           | 433<br>422            | 433                  | 326             |
| —9<br>450<br>476             | -8, 5<br>165<br>448       | 464<br>453           | 8.5<br>431<br>446      | -8.5<br>420<br>426   | 8<br>436<br>451      | -7<br>445<br>454     | 5<br>457<br>461      | 5, 5<br>445<br>443   | 6<br>459<br>480          | 6<br>465<br>449      | -6.5<br>468<br>470    | -6<br>451<br>434     | 1 27            |
| -9.5<br>400 j                | -9, 5<br>390              | (-40-')              | -10, 5<br>349          | 11<br>410            | -12<br>425           | -12<br>432           | -11.5<br>480         | -13<br>431           | -13.5<br>465             | $\frac{-14}{452}$    | -14<br>453            | -13.3<br>452         | 7.19            |
| 401<br>=10, 5<br>319         | 11                        | (-40-1)<br>-11.5     | 365<br>-12<br>(-40-')  | 441<br>13<br>215     | 439<br>13, 5<br>200  | 446<br>14<br>140     | 467<br>13<br>220     | 447<br>14<br>45      | 462<br>14<br>192         | 446<br>11<br>300     | 446<br>14<br>510      | 449<br>11.           | 5               |
| 116    <br>  6<br>  105      | 245<br>432                | 320                  | 7-40-1)<br>3, 5<br>240 | 112<br>2<br>140      | 250<br>0<br>491      | 88<br>-1<br>400      | 228<br>1, 5<br>291   | 110<br>-3, 5         | 172<br>5<br>50           | 339<br>6, 5          | 474<br>7<br>508       | 385<br>              | . } 29          |
| 17                           | 440<br>-17, 5             | 475<br>431<br>18     | 18.5                   | 220<br>18            | 469                  | 401<br>—17           | 289<br>16            | 299<br>—16           | 110                      | 234<br>255<br>—15, 5 | 488<br>15.5           | 1 487<br>15.         |                 |
| 431 (<br>450<br>-13 (        | 420<br>414<br>—11, 5      | 85<br>42<br>         | 289<br>342<br>-11      | 381<br>371<br>—13    | 393<br>414<br>—10    | 446<br>437<br>9, 5   | 375<br>362<br>—8     | 180<br>210<br>—7     | 266<br>280<br>—7, 5      | 339<br>322<br>—7, 5  | 340<br>-7, 5,         | 1156                 | 331             |
|                              |                           |                      | -9.0                   | 9.0                  | -8,8                 | -8.7<br>402.7        | -7.5                 | <del>-7.9</del>      | -8.0                     |                      | -8.1                  | _ N.                 |                 |

## Hourly readings of the Brooke hiftlar magnet

| Temperature  |                  |       |            |         |              |            |            |                |             | One divisi | on of scale | ,00007 M |
|--|------------------|-------|------------|---------|--------------|------------|------------|----------------|-------------|------------|-------------|----------|
| Temperature  | Pate.            | 0.    | Į įn į     | 91      | 81           | 44         | 5h         | Q <sub>p</sub> | Th          | Nh         | 91          | 101      |
| Temperature  | *                |       |            |         |              |            |            | ~              |             |            |             |          |
| Temperature — 40   | Jan. 1           | 360   |            | 461     | 403<br>491   | 476        | 503<br>491 | 4/93           |             |            |             |          |
| Temperature   273   366   360   360   360   375   375  | Temperature      | - W   | 7          | - 6.5   |              |            | 8          | 5              | 8           | -3         | ti. b       | -7       |
| Jun. 2   | Jan. 2           | 435   |            |         | 448          |            |            |                | 410         |            |             | 441      |
| Temperature (  |                  | 1480  |            |         | 349          | 386        |            |                | 375         | 327        |             | 7.51     |
| Jun. 4   |                  |       | 356        | 306     | 3469         | 382        | 384        | 361            | 374         | 23.818     | 20634       | 13/66    |
| Temperature ( )  |                  | 396   | 386        | SHA     | 3:6          | 369        | 387        | 389            | 346         | 360        | 1188        | 373      |
| Jan. 5   |                  | 409   |            |         | 379          |            |            | 384            | 3AN         | 388        |             | 377      |
| Temperature  |                  | 384   | 395        | 394     |              | 408        | 420        |                |             |            | 4134        | 357      |
| Jan. 1.   416   300   623   621   460   428   422   460   415   462   344    Jan. 7   417   418   434   441   428   443   471   500   505   506   514   475    Jan. 7   418   434   441   428   443   471   500   505   506   514   475    Jan. 7   418   434   441   428   443   471   500   505   506   514   475    Jan. 8   401   402   403   403   403   403   403   403    Jan. 8   402   403   403   403   403   403   403   403    Jan. 9   404   403   403   403   403   403   403   403    Jan. 1   404   403   403   403   403   403   403   403    Jan. 1   405   407   403   403   403   403   403   403   403    Jan. 1   407   408   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403   403   403    Jan. 1   407   403   403   403   403   403   403   403   403   403   403   403   403    Jan. 1   408   404   40 |                  | ā     |            | 8.5     | 5. 8         | 8          | 4. 5       | 4. 5           | - 0         |            |             | 434      |
| Temperature   1.0   1.5   2.5   3   3.5    |                  |       |            | 423     | 621          | 464        |            | 422            |             |            |             |          |
| Trimpriative — 460 460 470 470 470 470 470 470 470 470 470 47  |                  | 1.0   | 1. 3       | 12. 6 1 | 3            | 3, 5       | 3.3 1      | 38             | 2, 5 1      | 1          | 0.5         | 41       |
| Temperature  | Jan. 7           |       |            |         |              |            | 463        |                | 503<br>438  | 506        | 514         |          |
| Temperature  |                  |       | 4          | -4      | -3           |            | 3.5        | 3. 5           | 3           | - 1 5      | 5           | - 6      |
| Jan. B. 440 408 108 128 417 420 433 400 444 476 408 400 100 100 100 100 100 100 100 100 100  | Jun. #           | 480   | 403        | 4394    | 450          | 464        | 473        |                | 430         |            |             |          |
| Temperature  |                  |       |            | 428     | 417          | 439        | 450        | 400            | -2.5        |            |             |          |
| Jan. 10  |                  | 426   | 432        | 427     | 428          | 450        | 454        | 496            | 471         | 478        | 477         | 11961    |
| Temperature  |                  | 428   |            | 442     |              |            | 460        |                | 437         |            | 494         |          |
| Jan. 11.   |                  |       | 414        |         | 454          |            |            |                |             | 444        | 462         | 432      |
| Truppetature   | Jan 11 5         | 432   | 449        | 500     | 491          | 496        | 501        | 452            | 421         | 446        |             | 455      |
| Jan. 12  | Tempetature      | 4:17  | 456        | 473     | 485          |            | 482        | 456<br>6.5     | 422         |            | 457         |          |
| Temperature  |                  | 445   | 449        | 457     | 453          |            |            | 468            | 463         | 472        | 433         | 463      |
| Jun 13   |                  | -10   | 11         | -11     | -11.5        | 10. 5      | 10. 5      | -11            | 13          | - 13.5     | 462<br>-14  |          |
| Trimpetature   | Jan. 13 }        |       |            |         |              |            |            |                |             |            |             |          |
| Properature  |                  | -15   | 15 5       | -15.5   | -15.5        | -15        | -15        | - 15, 5        | 15. 5       | -17        | -14         | -16.5    |
| Temperature  | Jan. 14          | 465   |            |         | 478          | 484        |            | 474            | 460         | 476        |             |          |
| Trempe@ure   | l'emperature     | 16.5  | 10         |         | 15           |            |            |                | -15         | -16, 5 .   | -17.5       | 17. 5    |
| Jan. 16. \$ 441 447 448 448 450 449 450 449 450 448 400 450 450 459 459 459 459 459 459 459 459 459 459  |                  | 465   |            |         | 184          |            | 1804       |                |             |            | 4100        | 401      |
| Temperature  |                  |       |            |         | 448          |            | 449        |                | 450         |            |             | 485      |
| Jan. 17  |                  |       | 423        | 488     | 468          | 452        | 452        | 431            | 452         | 488        | 41911       | 465      |
| Temperature  | temperature      | 449   | 447        | 439     | 439          | 463        | 448        | 488            | 508         | 520        |             |          |
| Jan. 18  | Temperature      | 448   | 440        |         |              | 446        | 452        |                | 508         | 522        | 440         | 254      |
| Temperature  |                  | 404   |            | 395     | 404          | 419        | 481        | 465            | 402         |            | 345         |          |
| Jan. 19.   488   448   450   448   426   432   437   438   455   423   439     Temperature   |                  | 6     |            |         |              | 414        |            |                |             |            |             |          |
| Temperature  |                  | 488   |            |         |              |            | 432        |                | 438         | 455        | 423         | 420      |
| Jan. 20.   442   440   443   446   452   456   446   447   460   532   55   55   55   55   55   55   5   |                  | -2.5  | -2.5       | -1.5    | -2           | -2.5       | -2. 5      | 3              | -2.5        | -4.5       | -5 5        | 61       |
| Temperature  | Jan. 20 {        |       | 440        | 448     | 446          |            | 456        | 446            | 447         | 400        | 330         | 5.5      |
| Temperature   425   425   450   592   490   593   431   510   503   399   33   | Temperature      | 9. 5  | -9.5       | -9.5    | -10          | 10         | -10        | -10            | 10          | -11        | 12          | 12.5     |
| Temperature  | Jan. 21          | 425   |            |         |              |            |            |                |             |            |             |          |
| Temper ure   442   449   436   446   442   438   437   420   422   423   425   | Temperature      | 10    | -9         |         |              |            |            | -6, 5          |             |            |             | 9.5      |
| Jan. 23.   | Jan. 22 }        | 442   |            | 436     | 446          | 442        | 434        | 427            | 420         | 422        | 423         |          |
| Tempe ture 2.5 3 3 2.5 4 4.5 5 5.5 4 4.5 425 428 429 429 421 425 428 429 421 425 428 429 421 425 425 428 429 421 427 420 422 427 420 421 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 420 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 427 420 422 427 420 422 427 420 422 427 420 422 427 420 422 427 427 427 427 427 427 427 427 427   |                  | 494   | 418        | 400     |              | 413        | 420        |                |             |            | -3.5        |          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |                  | 401   | 407        | 399     | 414          | 417        | 429        | 430            | 425         |            |             | 41.8     |
| Temperature   8   10   10   11.5   12.5   13.5   14.5   16   13.5   14   13.5  | Tempe ture       |       |            |         |              |            | 428        |                |             | 438        | 428         |          |
| fam. 25         443         400         490         496         439         400         428         430         433         450         42         434         448         455         427         438         468         475         420         434         448         455         427         438         468         446         439         469         457         489         457         453         460         480         455         520         513         448         466         448         466         480         475         520         541         488         468         445         476         374           Temperature         -6         -6         -6         -6         -6         -6         -6         56         -6         56         -6         56         8         -0         -0         56         48         497         497         441         448         571         470         446         449         477         443         470         428         412         470         295         461         490         470         478         412         470         295         443         482         480         480         480   | Tommorature      |       |            |         |              |            |            |                |             |            |             |          |
| Temperature 3 2.5 2 2 -0.5 0 2 40.5 0.5 -1 22 -2 12 13m. 26 (460 480 475 476 373 14m. 26 (480 475 476 373 14m. 26 (480 475 476 476 476 476 476 476 476 476 476 476   |                  | 403   | 400        | 400     | 405          | 430        | 460        | 428            | 430         | 433        |             | 4 %      |
| Fan. 26.   |                  | 410   | 380        | 420     | 454          | 448        | 455        | 427            |             |            |             | 439      |
| Temperature (  |                  | 460   | 460        | 480     | 475          | 520        | 543        | 468            | 466         | 425        | 476         |          |
| Fan. 27  |                  | 453   | 500 :<br>6 | 479     | 461<br>(i. 5 |            | -6.5       | 476            | 456<br>6, 5 |            | 457         |          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |                  |       |            | 473     | 478          | 518        | 512        | 468            | 467         | 407        | 426         | 211      |
| Temperature  |                  | 10.5  | -10.5      | 10. 5   | -11          | -10.5      | -11        | -11            | -11.5       | 13         | -13.5       |          |
| Temperature  | fan. 28          |       | 453        |         |              | 580        | 525        | 561            | 600         |            | 463         |          |
|  | Temperature      | 15    | -14.5      | -14     | -13, 5       | -13        | 13         | -13, 5         | 13, 5       | 15         | -15.5       | 1G       |
| Temperature -15 -14, 5 -14 -14, 5 -13, 5 -13 -12, 5 -14 -15 -15, 5 -19 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13 -13, 5 -13, | Fan. 29          | 455   |            |         |              | 520<br>534 | 466        | 456<br>458     |             |            | 423         |          |
| 14.8   460   448   464   447   476   462   468   463   461   479   470   |                  | 15    | -14. 5     | 14      | -14.5        | 13, 5      | -13        | -12.5          | -11         | -15        | 15, 5       | -10.5    |
| Temperature15 -14,5 -14,5 -15 -15 -15 -15,5 -15,5 -17 -18 -18,5 an. 31 (5 440 433 460 433 498 496 497 536 302 550 492 for an. 31 (5 440 447 457 410 506 503 497 516 431 499 529 Temperature18,5 -18,5 -19 -18 -17,5 -17 -17 -17 -18 -18,5 -18,5 (5 40 40 40 40 40 40 40 40 40 40 40 40 40  | Jan. 30          | 454   |            |         |              |            |            |                |             | 463        | 420         |          |
| Temperature5.3 -4.8 -4.5 -4.7 -4.5 -1.9 -1.8 -1.5 -1.7 -1.7 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8  |                  | -15   | -14.5      | -14.5   | -15          | -15        | -15        | -15, 5         | -15.5       | -17        | -18         | 18, 5    |
| Mean temperature5.3 -4.8 -4.5 -4.7 -4.5 -4.4 -4.4 -4.4 -5.7 -6.4 -6.9  |                  | 448   | 447        | 457     | 410          | 506        | 503        | 497            | 516         | 431        | 400         | 526      |
| Mean require: -5.3 -4.8 -4.5 -4.7 -4.5 -4.4 -4.4 -5.7 -6.4 -0.9 Mean requirings 438.1 431.5 441.6 455.0 461.1 461.4 454.4 454.6 455.0 449.5 449.4 117.7  | Temperature      | 18-5  | 18         | 18. 5   | 19           | -18        | -17.5      | 17             | 17          | 18         | 18, 5       | -18.5    |
| arean reanings 937.1 431.5 441.6 455.0 461.1 461.4 454.4 454.6 449.5 449.4 117.7   | Mean temperature |       |            |         | -4.7         |            | -4.4       | -4.4           |             |            |             |          |
|  | acean readings   | 438.1 | 431, 5     | 441, 6  | 455.0        | 461. 1     | 461.4      | 454. 4         | 454. 6      | 449. 5     | 449. 4      | 117. 7   |

ometer at Uglaamie, Alaska, January 1883.

| word of t | the second | Lane by. | farten. | Carteson 1 |
|-----------|------------|----------|---------|------------|
|           |            |          |         |            |

ooke bifilar mannet

3904 -494 ---7 ---441

--6 4 449. 4

-6 9 117. 7

| Part   Mount   10   | part of the           | horizontal               | force.)               |                        |                             |                        |   |                              |                           |                          |                            |                               |   |            |
|---|-----------------------|--------------------------|-----------------------|------------------------|-----------------------------|------------------------|---|------------------------------|---------------------------|--------------------------|----------------------------|-------------------------------|---|------------|
| The color   The | m-                    | Noon.                    | \$5h                  | 14%                    | 121                         | 100                    | 175                                       | \$1.0                        | \$1,5                     | \$Ch                     | 37,                        | 925                           | 905                                     | Ditti      |
| A   | - 7 1                 | -0.5                     | 415                   | ( 40 /j<br>350         | -7.3                        | 380                    | 417                                       | 442<br>-4<br>272             | 41.9<br>3, 5              | 3i ( \$                  | 303                        | 4.9                           | 174                                     | ; 1<br>; : |
| 1   | 475<br>352            | 9<br>370<br>3*           | 30 £                  | 213<br>234<br>4<br>366 | 53<br>89<br>4<br>394        | 364<br>365<br>4, 5     | 303<br>377<br>4 5                         | 064<br>062<br>5.5 [          | 373<br>173<br>3<br>384    | 309<br>372<br>5<br>303   | 363<br>570<br>5<br>390     | 37 ×<br>3 + 2<br>5            | 3×9<br>3×9<br>4.5                       | ,          |
| 0.5   | 4'-0                  | 417                      | 3<br>3):8<br>414      | 3 5<br>410<br>421      | 411                         | 3.5<br>402<br>404      | 3 5 ;<br>301<br>304                       | 5<br>385<br>388              | 0<br>402<br>405           | 3<br>39/2<br>49 I        | 5<br>200<br>300            | 6.5<br>5.58<br>5.52           | 4. 5<br>(0) 1<br>+ 9                    | 1 5        |
| 18  | 114                   | 280<br>280<br>398<br>0 5 | 304                   | 78<br>13<br>—1         | (-40- ')                    | 120<br>128<br>-1       | 30.5<br>30.91<br>12.0<br>- 1.5            | 325<br>316<br>1.5            | 334<br>355<br>1, 5        | 200<br>200<br>200<br>2 5 | 325                        | 244<br>305<br>- 4             | 470<br>4×4<br>- 4                       | t 6        |
| 10   10   10   10   10   10   10   10   | 120<br>= 0.7<br>285   | 239<br>- 7, 5<br>232     | 438<br>R<br>84H       | 363<br>7.5<br>165      | 375 )<br>7.5<br>300         | 11 2<br>- 7<br>456     | (-40 = ') :<br>(-40 = ') :<br>6, 5<br>300 | 500<br>- 3, 5                | 315<br>- 5.5<br>290 - ,   | (10- ) (<br>5 5<br>400   | -40 /)<br>5<br>440         | 404<br>= 4.5<br>404           | 812                                     | ,          |
| 4-0   | 403<br>403<br>450     | 6. 5<br>516<br>514       | -6.5<br>475<br>505    | - 4)<br>(049<br>400    | 424<br>416                  | 366 1<br>361           | 33 t  <br>33 t                            | -3 5<br>300<br>319 (         | -3.5<br>7<br>(-40-7)      | - 3. 5<br>368<br>382     | - 3.5<br>452<br>448        | 410<br>411<br>411             | 121                                     | 1 0        |
| 465 450 440 442 438 442 440 433 443 430 440 433 441 470 470 470 470 470 470 470 470 470 470   | 416<br>4.0<br>-9.5    | 403<br>9                 | 436<br>438<br>- 9     | 439<br>410<br>— 8.5    | 423<br>126  <br>-8          | 4 il<br>4 '6<br>- 1, 5 | 374<br>3-3<br>6, 5                        | 415<br>417<br>~~5            | 412<br>410<br>- 5, 5      | 9994<br>4074<br>5, 5     | 402<br>405<br>5.5          | 313<br>375<br>6               | 3 · · · · · · · · · · · · · · · · · · · | }10        |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 468<br>9. 5           | 450<br>                  | 446<br>10<br>495      | 452<br>-10<br>470      | 438<br>10<br>472            | 4.62<br>               | 440<br>9<br>433                           | 493<br>H<br>BH 4             | 443<br>8.5<br>216         | 430<br>=9<br>375         | 443<br>9, 5<br>432         | 10                            | \$46<br>10<br>\$76                      | ,          |
| 616         465         470         404         433         120         431         421         296         299         305         432         100         / 11           509         408         472         5470         603         426         430         411         224         298         301         430         612         450         510         232         66         40         400         305         123         298         301         450         612         7         11         11         125         15         11         515         11         515         11         515         11         515         11         515         11         515         11         515         11         61         430         11         11         13         13         14         10         431         412         11         431         302         203         303         304         305         441         441         444         461         450         445         16           -18         17.5         -18         -15         -15         -19         -11         411         441         444         461         450         445  | 447                   | -14.5<br>473<br>472      | -14. 5<br>470<br>47.7 | 472<br>473             | 14<br>134<br>410            | 1 #<br>300<br>335      | -14<br>290<br>319                         | 12.5<br>485<br>416           | -13<br>458<br>476         | 13, 5<br>479<br>478      | 14<br>450<br>474           | - 14, 5<br>469<br>457         | -15.5 $-466$ $-465$                     | 713        |
| -77   | 516<br>509<br>— 17. 5 | 465<br>468<br>17, 5      | 470<br>472<br>-17, 5  | 464<br>470<br>—17      | 403<br>403<br>17            | 428<br>16, 5           | 431<br>430<br>—16, 5                      | 424<br>414<br>15, 5          | 206<br>274<br>15          | 289<br>260<br>15         | 385<br>302<br>- 14.5       | 412<br>450<br>14, 5           | #69<br>#62<br>= 14                      | ,          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 7<br>481              | _7                       | 6, 5<br>335           | -6                     | -7<br>405                   | -6.5                   | -6, 5                                     | -5, 5<br>459                 | -7<br>450                 | -7<br>410                | -7<br>451                  | 152                           | 7.0                                     | 1          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | -18 5<br>52           | -18<br>454<br>417<br>3   | 302<br>311<br>5       | 268<br>323<br>6, 5     | 260<br>218<br>7             | 258                    | (-40/)  <br>(-40/)  <br>8                 | 12<br>303 1<br>111<br>       | 11.5<br>439<br>423<br>7.5 | 400<br>445<br>7, 5       | 262<br>383<br>6.5          | 1119 8                        | 25 - 5<br>13 - 6<br>- 6                 | 17         |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 245<br>0<br>374       | 379<br>1<br>395          | 380                   | 360<br>358<br>1.5      | 313<br>-2<br>320            | 381                    | 378<br>372<br>-2<br>280                   | 388 1<br>311<br>1.5<br>235 1 | 170<br>165<br>-2<br>421   | 209<br>201<br>2<br>4 9   | 427                        | 420 2, 5                      | 441                                     | )          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 472<br>518            | -7<br>468<br>449         | 492<br>500            | 8<br>351<br>362        | 302<br>8, 5 !<br>953<br>363 | 8.5<br>210<br>214      | -8, 5<br>104<br>(-40-7)                   | 220<br>-8<br>190<br>220      | 432<br>8<br>271<br>280    | 434<br>                  | 408<br>—E. 5<br>391<br>400 | 410<br>- 19<br>- 474<br>- 459 | 45.1                                    | 12)        |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 465<br>480<br>9 5     | 382<br>251<br>9, 5       | 23<br>127<br>9, 5     | 200<br>331             | 215<br>210<br>8, 5          | 200<br>170<br>—8       | 290<br>265<br>-7, 5                       | 314<br>316<br>—7. 5          | 298<br>329<br>—5, 5       | 484<br>477<br>5          | 439<br>44×                 | 443<br>435<br>~-4, 5          | 115                                     | ,          |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 41.7<br>4<br>381      | 344                      | 301<br>3<br>290       | 251<br>-2.5<br>269     | 441<br>2<br>315             | 440<br>-1, 5<br>352    | 404<br>1, 5<br>297                        | 391<br>0<br>390              | 374<br>-1<br>490          | 394<br>-0, 5             | 376<br>0, 5<br>495         | 289<br>0<br>399               | 1 1                                     |            |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | 3.5<br>432<br>380     | 4, 5<br>408<br>402       | 357<br>350            | 3.5<br>381<br>380      | 5, 5<br>409<br>392          | 5, 5<br>330<br>304     | 261<br>261                                | 905<br>213                   | 7. 5<br>180               | 122                      | 352                        | 8<br>242<br>263               | 322<br>335                              |            |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 385<br>410<br>—3      | (-40-?)<br>(-40-?)       | 288<br>320            | 370<br>388<br>—4       | 425<br>400<br>—4, 5         | 108<br>225<br>—5       | 168<br>173<br>4, 5                        | 353<br>3+0<br>5              | 210<br>-5, 5              | (-40-1)<br>(-40-1)<br>-6 | 179                        | 112<br>110<br>6               | 450<br>310<br>                          | 3 25       |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | 112<br>-9.5<br>350    | 352<br>10<br>564         | 364<br>10, 5<br>467   | 390<br>—11<br>471      | -11.5<br>238                | 439<br>-10.5<br>265    | 471<br>                                   | 297<br>9, 5<br>501           | 359<br>9, 5<br>302        | 209<br>9. 5<br>383       | 10<br>403                  | 319<br>10, 5<br>396           | 320<br>10<br>475                        |            |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | -15<br>416<br>477     | 15<br>459<br>464         | -15, 5<br>440<br>439  | -15.5<br>435<br>438    | 16<br>457<br>463            | 15, 5<br>462<br>465    | -15.5<br>461<br>445                       | -15<br>422<br>436            | 15<br>267<br>295          | -15.5<br>259<br>279      | - 15, 5<br>432<br>442      | = 15, 5<br>443<br>450         | -15<br>443<br>453                       | 1.08       |
|   | 428<br>440<br>—16. 5  | 465<br>462<br>—16        | 419<br>430<br>—16     | 450<br>452<br>—15, 5   | 280<br>266<br>—16           | 386<br>370<br>15, 5    | 419<br>413<br>15                          | 416<br>411<br>—11.5          | 418<br>425<br>—14, 5      | 4.1<br>11, 5             | 388<br>392<br>11, 5        | 445<br>449<br>—15             | 478<br>478<br>—15                       |            |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 382<br>18, 5<br>312   | 522<br>-19<br>65         | 481<br>19<br>430      | 467<br>19. 5<br>461    | 443<br>-19<br>443           | 4°0<br>19, 5<br>427    | 498<br>19, 5<br>339                       | 492<br>18, 5<br>345          | 493<br>19, 5<br>380       | $-\frac{474}{318}$       | ,— 19<br>3.0               | 465<br>18, 5<br>419           | $\frac{151}{-18}$ 5                     | ,:0        |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 18. 5                 | -18.5<br>-7.1            | -18 5  <br>-7. 1      | -18.5                  | -18.5<br>-7.0               | 17. 5<br>6. 6          | 16, 5                                     | 15, 5                        | 15.5                      | -15                      | 14                         | - 12.5                        | - 10. 5                                 |            |

Monthly means: Temperature, -50.87 readings, 298.7

Hourly readings of the Brooke bifilar megal

|                                 |              |             |              |              |              |              |               | •             |              | **                |              |
|---------------------------------|--------------|-------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|-------------------|--------------|
|                                 |              |             |              |              |              | [6]          | ne divisie    | m of scale    | .00007494    | February :        | 7 1 100      |
|                                 |              |             |              |              |              |              |               |               |              |                   |              |
| 11 .4 -                         | tr.          | 14          | 25           | 33 h         | 45           | 55           | €h            | 7h            | Sh           | 9+                | 10.          |
|                                 |              |             |              |              |              |              |               |               |              |                   |              |
| Pel. 1                          | 175<br>478   | 477         | 436          | 447          | 473          | 502          | 442           | 408           | 434          | 422               | 41           |
| Vemperature                     | 9.5          | -1          | 1            | 1            | 3, 5         | 3,5          | 3 ;           | 5             | 6.5          | 9                 |              |
| Feb. 2                          | 482          | 500         | 407          | 504<br>515   | 554 · ·      | 479          | 515<br>509    | 197<br>456    | 411<br>452   | 410               | 107          |
| Temperature                     | li           | 1           | \$           | 2.5          | - 3          | 2.5          | 2             | 1             | 0 5          | 1                 | 1            |
| Feb 3                           | 2011         | 4.04        | 475          | 456          | 4.75         | 4/20<br>538  | 508           | 576<br>376    | 10<br>65     | 351               |              |
| Pemperature                     | 0. 5         | 0.5         | 0.5          | 1.9          | -8           | 0 .          | 6.5           | H             | 7            | 6                 |              |
| Feb. (                          | 508          | 528 r       | 410          | \$35 ± 479   | 485 493      | 4114         | 468           | 450<br>478    | 430<br>475   | (-40)             | 4 .          |
| Femperature                     | . 13         | 14          | 14. 5        | 15<br>470    | 15           | 17.5         | 18<br>446     | 19            | 17<br>469    | 15. 5<br>433      | 420          |
| Feb. 5                          | 514          | 432 '       | 479          | 452          | 462          | 408          | 438           | 40.119        | 474          | 413               | 100          |
| Temperature                     | 13           | 13<br>4d4   | 406          | 13<br>306    | 1 \$<br>41Hi | 467          | 16<br>436     | T.F.          | 15.5<br>427  | 15. 5<br>409      | 417          |
| F(1) 6                          | 493          | 416         | 396          | 388 .        | 504          | 473          | 438           | 483           | 438          | 424               | 41-          |
| Temperature                     | 21 283       | .115        | 22.5         | 3.59         | 224          | 26           | 26. 5 · 376   | 352           | 26<br>377    | 25. 5             | 325          |
| Feb. 7                          | 320          | 9-12        | 528          | 22-459       | 357          | isti4        | 389           | 367           | 357          | 351               | 33.7         |
| Pemperature                     | 12.5         | 12          | 350          | 302          | 390          | 10.5         | 10<br>369     | 247           | 321          | 202               | 25           |
| F(b) 8                          |              | 257<br>579  | 0.54         | 361          | 1,555        | 3 - 4        | 374           | 314           | 300          | 530               | 20.0         |
| Competatore                     | 19           | 313         | 378          | 2004         | 19. 5<br>273 | 19.5         | 18, 5         | 469           | 14. 5<br>372 | 12.5              | 372          |
| Feb                             | 10           | 30 h        | 362<br>10 1  | 370<br>10. 5 | 573<br>12    | 878<br>12. 5 | 100           | 403           | 876<br>12    | 376<br>12         | 875<br>1 1 3 |
| The man of a things of a second | 407          | 411         | 404          | 31543        | 397          | 3.8          | 462 1         | 484           | 384          | 399               | 48(15)       |
| Feb 10                          | 107          | 413         | 404          | 90           | 20.5         | 370          | 408 ±         | 471<br>16     | 320<br>13    | 399               | 1771         |
| Feb 41                          | 414          | 420         | 445          | 420          | 423          | 428 1        | 429           | 439           | 431          | 427               | 451          |
| - hijs taliito                  | 439          | 419         | 444          | 430          | 427          | 428          | 429           | 437<br>—2     | 432          | 450               | 47 :         |
| Fet 12                          | 4.33         | 1.0         | 428          | 429          | 432          | 452          | 433           | 436           | 400          | 432               | 445          |
| 101 (201 (100)                  | 4.42         | 428<br>—3.5 | 424          | 431          | 434          | 432          | 433           | 402           | 368          | 412               | 416          |
| Feb 13                          | 413          | 411         | 407          | 404          | 408          | 407          | 404           | 3388          | 358          | 377               | 269          |
| Laro a tre                      | 415          | 400         | 406          | 402<br>8.5   | 407          | 409          | 404 1<br>12.5 | 394           | 387<br>11.5  | 373               | 37.          |
| Feb 14                          | 407          | 197<br>544  | 400          | 100<br>100   | 400          | 410          | 421 × 425     | 4 (2<br>4 (0) | 423<br>423   | 329               | 711          |
| Temperature and find            | 3.5          | . 5         | -4           | - 11         | 7            | 3.5          | 4.5 2         | 1.5           | 3.5          |                   | 10.4         |
| 15 b 15                         | 407<br>400   | 4.16        | 443          | 4.32         | 118          | 419          | 450           | 4117          | 430          | 404               | 4            |
| Lengerature                     | 9            | 4           | 16. 5        | 6.5          | h            | 8.5          | 11            | 1)            | 13           | 1.1.5             | 15 ,         |
| Feb 16                          | 2163.4       | 356<br>368  | 416          | 408<br>338   | 435          | 483          | 459<br>445    | 423           | 453<br>493   | 1111              | 515<br>565   |
| Empetature                      | 9            | 8 .         | 8            | 6            | 6            | 65           | 5             | 4             |              | 0.5               | 1            |
| Feb. 17                         | 495<br>Pref  | 491         | 456          | 468          | 487          | 484<br>187   | 491<br>489    | 495 (         | 517<br>519   | 570               | 5/10<br>5/24 |
| Lemperature                     | -3.5         | -2.5        | -2.5         | - 2.5        | -2           | -1           | 1             | 0             | 1            | 1                 | -1 .         |
| Ti                              | 445          | 454         | 132          | 470<br>476   | 4-5          | 489          | 487           | 474           | 472          | 463               | 1-4          |
| Temperature                     | 2.0          | 461         | 164          | 470          | 31<br>504    | 3            | 549           | 468           | 0.5          | 440               | 453          |
| Feb.17                          | 477          | 460         | 462          | 471          | 506          | 578<br>583   | 534           | 470           | 453<br>453   | 440<br>441        | 427          |
| Tomperature                     | 8<br>153     | 10<br>456   | 4.6          | 11. 5<br>454 | 42.5<br>418  | 456          | 338           | 11.5<br>435   | 11<br>510    | 392               | 210          |
| Fot. 20                         | 457          | 452         | 4.13         | 456          | 418          | 450          | 557           | 423           | 489          | 397               | 120          |
| Temperature                     | 12<br>475    | 13<br>472   | 14.5<br>470  | 471          | 478          | 470          | 15<br>474     | 471           | 508<br>508   | 494               | 483          |
| Feb.21                          | 482          | 480         | 479          | 473          | 479          | 472          | 475           | 472           | 483          | 480               | 500          |
| Peb 22                          | 340          | 410         | 522          | 426          | 543          | 620          | 3, 5<br>574   | 558           | 540          | 467               | 451          |
| Temperature                     | 0.1          | 115         | 0.00         | 462          | 534          | 606<br>3.5 [ | 572<br>3, 5   | 572           | 542<br>1, 5  | 441               | 46.1         |
| Fe') 23                         | 6:15         | 428         | 498          | 540          | 471          | 533          | 594           | 530           | 45           | 0, 5<br>225       | 387          |
| Temperature                     | 592          | 388         | 515          | 512          | 498          | 521          | 610           | 519           | 96           | 148<br>—9, 5      | -11<br>-11   |
| Feb. 24                         | 503          | £1(16)      | 472          | 560          | 562          | 546          | 554           | 501           | 540          | 509               | 488          |
| Temperature                     | 499          | 508         | 480<br>7, 5  | 561<br>6. 5  | 556          | 556<br>—6    | 550           | 514           | 554<br>8     | 490 i<br>- 9. 5 l | 554          |
| Feb 25                          | 570          | 5.10        | 6.08         | 450          | 326          | 480          | 414           | 315 1         | 3.58         | 379               | 1 13         |
| Temperature                     | 594<br>      | 6.1%<br>9.5 | 700<br>-8, 5 | 424          | 367          | 477          | 414           | 363<br>9.5    | 388<br>      | 311<br>-12.5      | -1.1         |
| Feb. 20                         | 528          | 503%        | 530          | 534          | 503          | 5.12         | 565           | 626           | 490          | 522               | 545          |
| Temperature                     | 529<br>—11   | 5.12        | 514<br>9, 5  | 504<br>9     | 541<br>8 5 i | 540<br>8, 5  | 577<br>8, 5   | 611<br>-9.5   | 468<br>11.5  | 572<br>13         | -11          |
| Feb. 27                         | 536<br>549   |             |              |              |              |              |               |               | 455<br>5\ 5  | 457 (             | -1:-<br>-10- |
| Temperature                     | 549<br>1J, 5 |             |              |              |              |              |               |               | 13           | 1                 | . 1          |
| Tests 28                        |              |             |              |              | 582          | 660          | 700           | 432           | ( -40 - ')   | 330               | 3 .          |
| Temperature                     |              |             |              |              | 585<br>3, 5  | 624          | 721           | 417 · 0.5     | (-40')       | 54.4              | - "          |
| Mean temperature                | 3.7          | 5.1         | 5. 5         | 5. 4         | 5. 9         | 6.1          | 6.1           | 6.0           | 1.5          | 3. 7              | 111          |
| Mean rendings                   | 411.0        | 443. 6      | 434.5        | 445.2        | 459. 0       | 473.0        | 475.3         | 446.0         | 397. 4       | 399. 3            | 377          |
|                                 |              |             |              |              |              |              |               |               |              |                   |              |

ometer at Uglaamie, Alaska, February, 1883.

ooke bifilar magaa.

57.4 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5 | 1. | 75.5

| remainder of the month .00007da         | met of the horizontal dassa 1   |  |
|---|---------------------------------|--|
| thing leader of the Property connector. | Burr or the Hogizodial Folde, I |  |

| ti Noon.                              | 155          | 135       | E.    | 10                                      | 17:   | 156    | 1.5    | -  |  | 2.4   |  | 1 10 |
|---------------------------------------|--------------|-----------|-------|---|---|--------|--------|--|--|---|--|------|
| 319 411                               | 312 ,        | 195       | 111   | 0.7                                     | 57.1  | 233    | 10 -1) | 352  | 45 ( )   | 40.50   | 1                                      | , 1  |
| 10   10   10   10   10   10   10   10 | 8.5  1       | 201 — 2 1 | 11    | 200 000 000 000 000 000 000 000 000 000 | 7 099 141 141 129 1428 141 141 129 1428 141 141 142 145 145 145 145 145 145 145 145 145 145 | 10     | 10 -   | 7 210 21 22 22 23 24 24 24 24 24 24 24 24 24 24 24 24 24 | 27) 221) 211 202 435 203 455 467 210 255 467 210 256 467 210 266 268 410 410 410 410 410 410 410 410 410 410 | 77 40 11 40 | 23   1   1   1   1   1   1   1   1   1 |      |
| 2.5 =3                                | 2.5<br>5 2.3 | -2<br>2.2 | 2.0   | 2.2                                     | 2.2   | 3.0    | 2.6    | 2.5  | 2.8  | 2.5   | 4.0                                    |      |
| 45.9 Ball                             | 2 337 0      | 318.9     | 349 3 | 299, 3                                  | 305. 4  | 289, 8 | 312.7  | 344-1  | 330 6  | 367.6   | 101.9                                  |      |

Monthly means: Temperature, 32.7; readings, 383.

Hourly readings of the Brooke bifilar magnet.

|                         |               |                |                     |                          |                    |                |                |                | One divis        | ion of se       | der amor     |
|-------------------------|---------------|----------------|---------------------|--------------------------|--------------------|----------------|----------------|----------------|------------------|-----------------|--------------|
| Date.                   | 0,            | P              | 2 h                 | ;;h                      | 4h                 | 5h             | 6h             | - h            | ζ,               | \$3 h           | ti           |
| attention of the second |               |                |                     |                          | ,                  | k              |                | ,              |                  |                 |              |
| Mar. 1                  | 573<br>583    | 48)            | 515                 | 626                      | 619                | 616            | 598            | 486            | 4 -9             | 36.0            | 195          |
| Temperature             | 5. 5<br>642   | 5<br>528       | 648                 | 12<br>540                | 14                 | 468            | 10             | - G<br>- 4C9   | 7                | 9.5             | 4.           |
| Mar. 2                  |               | 540            | 750                 | 694                      | 767<br>652<br>2, 5 | 543            | 510<br>571     | 361            | 170              | 465<br>50a      | 411          |
| Temperature             | 483           | 518            | 2. 5<br>558         | 2. 5<br>578              | 2. 5               | 1.5            | 352            | 1, 5<br>625    | 331              | 221             | 1 %          |
| Mar. 3                  | 557<br>—8. 5  | 583            | 554<br>8            | 585<br>-7. 5             | 554                | 638            | 174<br>-6 5    | 622<br>0. 5    | 0.79             | 245             | 27           |
| Mar. 4                  | 5-8           | 600            | 601                 | 542                      | 470                | -6<br>578      | 590            | 599            | 1.27             | 4.10            | 29.1         |
| Temperature             | 543<br>6.5    | - 5            | 559<br>4            | 558<br>-3, 5<br>572      | 472                | 584<br>1       | 612<br>- 1. 5  | 624            | 502<br>1         | 447<br>2        | 20-1         |
| Mar. 5                  | 514<br>516    | 493<br>476     | 525<br>506          | 501                      | 568<br>582         | 624<br>614     | 616<br>622     | 458<br>536     | 468              | 57 )<br>66 )    | 150          |
| Temperature             | 470           | 493            | 483                 | $\frac{-2}{474}$ 5       | 414                | -1<br>489      | 485            | 1.5            | <del>-1</del> .  | -4 5<br>518     | 1 13         |
| Mar. 6                  | 470           | 513            | 504                 | 492                      | 560                | 501            | 485            | 454            | 441              | 520             | 132          |
| Mar. 7                  | 437           | 453            | 489                 | 528                      | 450                | 508            | 497            | 575            | \$10.8           | 458             | 4.4          |
| Temperature             | 424<br>5 5    | 450<br>-4      | 520<br>3            | 528<br>3                 | 462<br>—2          | 484            | 497<br>3 5     | 517            | 449              | 40s             |              |
| Mar. 8 }                | 485           | 500<br>498     | 485<br>473          | 534<br>522               | 474                | 566<br>538     | 470<br>5.4     | 594            | 419              | 206             | 351          |
| Temperature             | 7. 5<br>380   | -6<br>452      | -5, 5<br>543        | 760                      | 618                | -3, 5<br>431   | = 4. 5<br>609  | a<br>558       | 448              | 498             | - 3          |
| Mar. 9                  | 423           | 462            | 562                 | 848                      | 63.2               | 4_9            | 678            | 563            | 442              | 464             | 1-1<br>425   |
| Mar. 10                 | 468           | 475            | -11.5 $-468$        | $\frac{-11.5}{478}$      | →10.5<br>504       | -10, 5<br>517  | -11<br>506     | -11.5<br>474   | 5<br>(50 )       | 488             | 150          |
| Temperature             | 468           | 473<br>-13.5   | 469                 | 488                      | 512                | 516<br>—11     | 508            | 474<br>12, 5   | 457              | - 515<br>+ 15.5 | - 17         |
| Mar. 11                 | 490           | 465<br>472     | 475<br>473          | 477                      | 454<br>450         | 463            | 461<br>468     | 454            | 155              | 491             | 47.1         |
| Temperature             | -18.5         | - 15.5         | -12.5               | -11                      | -8.5               | 458<br>—9      | -10            | -12            | 11               | -487 $-15$      | 45.2         |
| Mar. 12                 | 455<br>457    | 450 .<br>457   | 445<br>446          | 446                      | 472<br>468         | 461<br>467     | 464<br>464     | 166<br>404     | 467              | 47a<br>465      | 11.5         |
| Temperature             | 13            | -10.5          | -9.5<br>435         | 458                      | - 6, 5<br>499      | -7<br>526      | 440            | 355            | 515              | 387             |              |
| Mar. 13                 | 462           | 452            | 445                 | 448                      | 481                | 541            | 442            | 306            | 200              | 37.2            | 50.          |
| Mar. 14                 | 473           | 465            | 436                 | 433                      | 400                | 407            | 505            | 493            | 515              | 3-5             | 544          |
| Temperature             | 475           | 463<br>—3 5    | 433<br>—2. 5        | 435<br>2, 5 <sup>1</sup> | 478                | 441            | 504            | 471            | 4.51             | 304             | 4.0          |
| Mar. 15                 | 47.2<br>457   | 485            | 451                 | 450                      | 461                | 453            | 450            | 484            | 450              | 501             | 1-1          |
| Temperature             | 5, 5          | -1             | 1                   | 3                        | . 8                |                | 3              | 2              |                  | 1.5             | 1            |
| Mar. 16                 | 495           | 422            | 430<br>431          | 430                      | 456<br>430         | 451<br>437     | 467<br>454     | 520<br>536     | 525<br>365       | 618             | 4. 4         |
| Temperature             | 433           | 429            | -0.5<br>427         | -1.5<br>442              | 460                | 456            | -1<br>446      | 1. 5<br>524    | 482              | 461             | —5<br>20.    |
| Mar. 17                 | 435           | 429            | 424<br>0, 5         | 448                      | 472                | 458            | 455            | 563            | 437              | 4×1<br>-1.5     | 110          |
| Mar. 18                 | 408           | 429            | 425                 | 460                      | 422                | 472            | 460            | 451            | 459              | 432             | 1.1%         |
| Temperature             | 432<br>0.5    | 432            | 431                 | 450                      | 430                | 474 (          | 458<br>2.5     | 451<br>1. 5    | 478              | 460             | 1425         |
| Mar. 19                 | 439<br>446    | 449<br>445     | 435                 | 427                      | 436                | 439            | 454<br>456     | 459            | 437<br>433       | 466<br>457      | 446<br>150   |
| Temperature             | 453           | 440            | 437<br>2<br>437     | 427<br>2, 5<br>438       | 477                | 5<br>415       | 461            | 462            | 1 439            | -1<br>402       | 9.5          |
| Mar. 20                 | 417           | 440            | 437                 | 440                      | 471                | 446            | 469            | 473            | 431              | 490             | 11.1<br>11.5 |
| Temperature             | -1.5<br>438   | 445            | 451                 | 453                      | 458                | 2.5<br>478     | -0, 5<br>527   | ←0.5<br>427    | 429              | 252             | 1.0          |
| Mar. 21                 | 443           | 445            | 445                 | 461                      | 476<br>2, 5        | 490            | 553            | 437            | 45:              | 24)             | 144          |
| Mar. 22                 | 440           | 442            | 588                 | 596                      | 667                | 551            | 412            | 40.0           | 391              | 254             | 1.           |
| Temperature             | 440<br>0. 5   | + 440          | 508                 | 602                      | 651                | 623            | 402            | 467            | 370              | 207             | 413          |
| Mar. 23                 | 500<br>488    | 456<br>446     | 444<br>445          | 490<br>480               | 523<br>523         | 504<br>538     | 565<br>541     | 413<br>500     | 461              | 550             | 213          |
| Temperature             | 521           | 6<br>492       | 493                 | 7. 5<br>564              | 520<br>520         | 9. 5<br>616    | 63.5           | 9<br>570 .     | 324              | 640             | - 1          |
| Mar. 24                 | 509           | 496            | 486                 | 554                      | 521                | 592            | 643            | 577            | 313              | 618             | 504          |
| Mar. 25                 | 6. 5<br>500   | 7. 5<br>511    | 564                 | 8. 5<br>613              | 640                | 649            | 647            | 494            | 182              | 491             | 44           |
| Temperature             | 503<br>15     | 523<br>15. 5   | 568<br>16, 5        | 10.5                     | 651<br>18, 5       | 653<br>19. 5   | 671<br>19      | 555<br>18, 5 ± | 15.5             | 50.1            | 111          |
| Mar. 26                 | 325<br>327    | 336<br>334     | 361                 | 376<br>374               | 396<br>386         | 448            | 415            | 534<br>516     | 15               | 295             |              |
| Temperature             | 26. 5 [       | 27             | 26.5                | 28                       | 27. 5              | 442<br>25      | 24.5           | 2372           | 20               | 1.8             | 1            |
| Mar. 27                 | 250<br>214    | 354            | 442<br>445          | 503<br>449               | 556<br>433         | 587<br>559     | 447            | 401            | 486              | 335             | 1 1          |
| Temperature             | 23<br>450     | 398            | 22, 5               | 24<br>488                | 24<br>590          | 25. 5<br>528   | 25<br>389      | 25<br>373      | 25 268           | 25<br>464       | + 11         |
| Map. 28                 | 510<br>27, 5  | 4.48<br>26. 5  | 526<br>26. <b>5</b> | 558<br>25                | 548<br>24, 5       | 570<br>23      | 323<br>21      | 385            | 16               | 594<br>17       | 15           |
| Mar. 29                 | 502           | 465            | 142                 | 592                      | 581                | 430            | 543            | 468            | 523              | 414             |              |
| Temperature             | 494           | 462<br>18      | 460                 | 614<br>18.5              | 569<br>18, 5       | 361<br>20      | 537<br>20      | 466<br>20      | 542 1<br>20, 5 1 | 404             | 20 -1        |
| Mar. 30                 | 415           | 403            | 522<br>494          | 491<br>519               | 489<br>495         | 426<br>430     | 324<br>367     | 392            | 432              | 440             | 7960<br>1904 |
| Temperature             | 28<br>418     | 29. 5<br>425   | 29. 5<br>426        | 29. 5                    | 29                 | 29             | 396            | 28<br>443      | 26<br>414        | 24. 5<br>471    | 1.1          |
| Mar. 31                 | 409           | 432            | 426                 | 403                      | 446<br>472         | 454<br>465     | 380            | 445            | 416              | 471             | 115          |
| Temperature             | 23, 5         | 25             | 25                  | 25, 5                    | 24.5               | 24             | 22, 5          | 21.57          | 20, 5            | 20.5            | _ 21         |
| Mean temperature        | 2 6<br>462. 5 | 3. 5<br>458. 3 | 4.2                 | 4.6                      | 5. 9<br>512. 1     | 5. 4<br>510. 3 | 4. 7<br>489. 7 | 3.9<br>4 1.9   | 2.8<br>419.1     | 2 0<br>409 T    | 10.2         |
| areas reactings         | 40£. J        | 9-20s a        | 481.8               | 510. 7                   | 312. 1             | 010. 4         | 400.1          | 9 1. 0         | 410.1            | 400-4           |              |

ometer at Uglaamie, Alaska, March, 1883.

part of the horizontal force.]

oke bifilar magnet.

 $\begin{array}{c} 1.8 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -4.6 \\ -2.4 \\ -2.$ 

| iih                       | Noon.         | 135           | 141              | 15-              | 16h           | 17h           | 181          | 195            | 20h                | 214          | 225          | 231         | Dat              |
|---------------------------|---------------|---------------|------------------|------------------|---------------|---------------|--------------|----------------|--------------------|--------------|--------------|-------------|------------------|
| 440                       | 441           | 332           | 80               | 422              | 104           | 40            | 500          | 116            | (-40-1)<br>(-40-1) | 120          | 516          | 574         | } 1              |
| 0.5                       | 10            | 10            | 8, 5             | 8.5              | 7.5           | 7             | 6            | 5              | 4.5                | 4            | 3, 5         | 4           |                  |
| 230                       | (-40-7)       | 318<br>291    | (-40!)<br>(-40!) | 250<br>245       | 276           | (-40-?)       | 377          | 333<br>310     | 367<br>520         | 290<br>503   | 409          | 356<br>465  | { 2              |
| 5 5                       | -6.5          | 8             | -9.5             | -10.5            | -10.5         | (-40-l)       | -10.5        | -11            | -10.5              | - 10. 5      | -10.5        | -9.5        | )                |
| 57                        | 520           | 475           | 480              | 337              | 399           | 318           | 110          | 336            | 412                | 389 .        | 506          | 525         | 13               |
| 25                        | 509           | 482<br>10     | 593              | 346              | 418           | 367           | 70           | 186            | 417                | 360          | 520          | 447         | 8 .              |
| 10                        | 384           | 423           | -10 5<br>385     | -10<br>415       | -10<br>420    | -10<br>240    | -9<br>325    | -9. 5<br>319   | - 10<br>352        | -10<br>410   | 469          | -7.5<br>457 | ,                |
| 52                        | 437           | 515           | 378              | 396              | 388           | 260           | 343          | 337            | 350                | 429          | 482          | 503         | 5 4              |
| -2                        | -2 5          | -3.5          | -4.5             | -5               | 5             | 5             | -5           | -6             | -6.5               | -7           | -6.5         | -3. 5       |                  |
| 12.0<br>194               | 352<br>563    | 438<br>405    | 458<br>456       | 409<br>426       | 324<br>355    | 441           | 413          | 489<br>492     | 538<br>530         | 487<br>492   | 490<br>463   | 478         | } 5              |
| -5.5                      | -5.5          | -5.5          | 6                | -6               | 6             | 447<br>5      | 445<br>—3. 5 | 402            | -1.5               | 0 1          | 103          | 1.5         | ,                |
| 18                        | 474           | 410           | 463              | 385              | 259           | 297           | 395          | 359            | 223                | 160          | 461          | 491         | } 6              |
| 176                       | 479           | 344           | 409              | 390              | 389           | 270           | 418          | 419            | 260<br>—8, 5       | 132          | 475          | 493         | 5                |
| -3<br>(5.)                | 503           | 1.5 .<br>5.4  | -5<br>368        | -6<br>234        | -6. 5         | 347           | _6 5 l       | -7. 5<br>90    | -8.5 °             | -8 5<br>517  | 183          | 510         | ) .              |
| 02 1                      | 524           | 490           | 394              | 195              | 341           | 388           | (-40-())     | 170            | 523                | 533          | 485          | 512<br>507  | 5 7              |
| -9.5                      | -9, 5         | -10           | 10               | -11              | 11            | 11            | -10.5        | -11            | -11                | 11           | 10           | -0.5        |                  |
| 235                       | 434           | 258           | 479              | (-40-?)          | 205           | 275           | 455          | 442            | 357                | 85           | 120          | 370         | ! 8              |
| 10                        | 444<br>10     | 207<br>10     | 500<br>—10, 5    | (-40-1)<br>-10.5 | 160<br>10.5   | 290<br>—10. 5 | 469<br>—10   | 446<br>10. 5   | 300                | 152<br>—11   | 143<br>11    | 410         | )                |
| 50                        | 472           | 410           | 455              | 520              | 474           | 342           | 25           | (-40-!)        | 290                | 482          | 501          | 441         | } 9              |
| 396                       | 470           | 400           | 510              | 609              | 486           | 366           | 12           | (-40-1)        | 300                | 473          | 5.0          | 478         | 5                |
| 16. 5<br>62               | 17<br>485     | -17. 5        | -18<br>370       | -18<br>241       | -18<br>378    | 351           | -17          | - 17. 5<br>202 | -17. 5<br>262      | 17. 5<br>410 | 17. 5<br>412 | -16.5       | ,                |
| 35                        | 540           | 503           | 398              | 244              | 392           | 339           | 350<br>350   | 173            | 267                | 406          | 450          | 485         | {10              |
| 18                        | -18.5         | -19           | -19              | 19               | -18.5         | -19           | -18          | - 18. 5        | -18.5              | 18. 5        | 18, 5        | - le. 5     |                  |
| 0.3                       | 452           | 200           | 82               | 378              | 336           | 328           | 434          | 462            | 479                | 482          | 475          | 465         | 311              |
| 42<br>17                  | 465<br>17, 5  | 224<br>—17. 5 | 156              | 377<br>—18. 5    | 331<br>—18    | 329<br>- 18   | 445<br>17. 5 | 464<br>17. 5   | 480<br>-17.5       | 4×4<br>17    | 480          | 463<br>19   | ,                |
| 64                        | 465           | 468           | 459              | 290              | 220           | 418           | 470          | 350            | 490                | 400          | 408          | 523         | 12               |
| 15                        | 469           | 471           | 468              | 264              | 196           | 509           | 441          | 280            | 478<br>- 7. 5      | 362          | 429          | 514         | 3                |
| - 9<br>25                 | -9. 5<br>265  | 10<br>417     | -10<br>(-40-!)   | -10<br>420       | - 9. 5<br>434 | 315           | 433          | 8<br>472       | 485                | 480          | 477          | 470         | ) .              |
| 243                       | 302           | 442           | (-40-1)          | 455              | 492           | 309           | 438          | 455            | 471                | 483          | 484          | 476         | 13               |
| -7.5                      | 7. 5          | -7.5          | -8               | -8.5°            | -9            | -8 5 l        | -8           | -8.5           | 8.5                | 8            | -7.5         | ti          |                  |
| 57                        | (-40-!)       | 10            | 270<br>264       | 383              | 454           | 414           | 361          | 349            | 483                | 463          |              | 494         | }14              |
| 79<br>-9. 5               | -10           | 42<br>10      | 264<br>←10 I     | 400<br>10, 5     | 460<br>—11    | 449           | 382<br>10, 5 | 369<br>—11     | 514<br>—10. 5      | 490<br>—10   | 510<br>—9, 5 | 481<br>6, 5 | )                |
| 49                        | 368           | 412           | 434              | 455              | 377           | 381           | 427          | 412            | 430                | 453          | 451          | 438         | 15               |
| -0.5                      | -1            | 2             | -2.5             | -3               | -3            | -4            | -3.5         | -3             | -3                 |              | -1.5         |             | 1 10             |
| 51                        | 466           | 457           | 462              | 465              | 338           | 333           | 227          | 382            | 484                | 464          | 435          | 4:18        | )                |
| 38                        | 465           | 459           | 470              | 440              | 332           | 332           | 193          | 415            | 450                | 460          | 462          | 428<br>427  | <b>}</b> 16      |
| -5. 5                     | -6<br>429     |               | -6.5             | -6               | -6            | -5. 5<br>422  | 5            | -5<br>408      | 4.5<br>453         | -3. 5<br>426 | 386          | 0. 5<br>453 | ,                |
| 68<br>25                  | 430           | 400<br>435    | 417<br>418       | 440<br>388       | 455 ·<br>462  | 418           | 379          | 402            | 467                | 4338         | 412          | 449         | £17              |
| -3.5                      | 4             | -4            | -4               | -4.5             | -4            |               | 372<br>—2. 5 | -3             | 2.5                | 438<br>-2.5  | 1            | U           | _                |
| 190                       | 442           | 475           | 135              | 305              | 438           | 439           | 496          | 441            | 432                | 399          | 459          | 450         | 318              |
| 39 1                      | 470<br>- 4. 5 | 479<br>-4.5   | 54<br>- 5, 5     | 328              | 454           | 437<br>—6. 5  | 457          | 442<br>0       | 437                | 403          | 453          | 449         | ,                |
| 000                       | 336           | 430           | 357              | 461              | 450           | 469           | 370          | 410            | 450                | 470          | 472          | 419         | È 10             |
| 65                        | 339           | 455           | 368              | 451              | 454           | 468           | 352          | 414            | 448                | 468          | 475          | 450         | { 19             |
| -3. 5<br>73               | 475           | 5<br>455      | -5, 5<br>462     | 6<br>467         | -6<br>471     | -6. 5<br>456  | 6<br>478     | 474            | 5, 5<br>460        | 5<br>467     | 459          | -2 5<br>453 | ,                |
| 55                        | 471           | 469           | 466              | 470              | 476           | 466           | 470          | 471            | 462                | 469          | 467          | 456         | 20               |
| -6                        | -6.5          | 7             | -7               | -7               | -7            | -7.5          | -7           | 7              | , -6.5             | -5           | -4           | -:          |                  |
| 60                        | 458<br>456    | 379           | 459              | 323<br>232       | 270<br>256    | 248<br>187    | 455<br>455   | 322<br>340     | , -20              | (            | 264<br>240   | 314         | $\frac{3}{2}$ 21 |
| -4                        | -4.5          | 387           | 462              | -4.5             | -4            | 101           | -2.5         | -2.5           | -2.5               | 0            | -0.5         | 1           | ,                |
| 62                        | 356           | 320           | 375              | 400              | 384           | 267           | 2.16         | 200            | 104                | 263          | 452<br>457   | 538         | 202              |
| 18                        | 375           | 339           | 403              | 373              | 360           | 253           | 378          | 227            | 203                | 294          | 457          | 540<br>5. 5 | 5                |
| 1.5                       | 1. 5<br>515   | 1, 5<br>343   | (-40-1)          | 239              | 240           | 2. 5<br>240   | 3. 5<br>240  | 243            | 3 338              | 30.5<br>472  | 4. 5<br>470  | 502         | £ 112            |
| 11                        | 514           | 343           | ((1)(1)          | 230              | 240           | 240           | 240          | 256            | 974                | 438          | 452          | 4:6         | 1                |
| 7                         | 6, 5          | 6<br>502      | 5. 5             | 5. 5             | 400           | 424           | 4.5<br>416   | 462            | 5. 5               | 5<br>507     | 5<br>499     | 5. 5<br>482 | )                |
| 10<br>52                  | 502           | 501           | 519              | 511              | 406           | 373           | 406          | 460            | 523                | 511          | 495          | 481         | \$ 24            |
| 6                         | 6             | 6             | 6                | 6                | 5. 5          | 6             | 6. 5         | 8              | 10                 | 11           | 13           | 14. 5       |                  |
| 34                        | 422           | 428           | 349              | 405              | 448           | 449           | 451          | 452            | F 202              | 198          | 292          | 319         | \$25             |
| 10.5                      | 410<br>20     | 435           | 361              | 430<br>21. 5     | 446<br>22     | 449<br>22     | 451<br>21    | 452<br>21      | 196                | 182<br>24    | 299<br>24. 5 | 319<br>27   | 3 -0             |
| 19. 5                     | 376           | 20<br>412     | 21<br>451        | 445              | 413           | 393           | 311          | 374            | 195                | 152          | ( (()')      | 140         | ¿                |
| 15                        | 337           | 385           | 436              | 270              | 403           | 395           | 288          | 398            | 210                | 161          | (10-!)       | 120         | $\frac{1}{5}26$  |
| 15                        | 14.5          | 14.5          | 14. 5            | 14. 5<br>254     | 14<br>148     | 14<br>274     | 15<br>265    | (-10-1)        | 17 20              | 18.5<br>52   | 19. 5<br>188 | 21 213      | ,                |
| 0-1)                      | 246<br>254    | 378           | 135<br>206       | 284              | 200           | 263           | 225          | (-10-1)        | (-40-1)            | 15           | 145          | 2.0         | 3 27             |
| ( <del>/-)</del><br>24. 5 | 24. 5<br>71   | 383<br>24     | 23, 5            | 23               | 200<br>23     | 22            | 22. 5        | 23             | 24                 | 25           | 26. 5        | 17          |                  |
| 270                       | 71            | 255           | 268              | 374              | 160           | 395           | 180          | 290            | 105                | 382          | 305          | 504         | 28               |
| 322<br>13. 5              | (-40?)        | 372           | 382<br>9, 5      | 224              | 88            | 327<br>6. 5   | 155<br>7. 5  | 260<br>8       | 92                 | 369<br>10    | 350<br>12. 5 | 402<br>14.5 |                  |
| 13. 5                     | 178           | 10<br>375     | 300              | 12               | 300           | 173           | 105          | 55             | 382                | 470          | 450          | 402         | 29               |
| 264                       | 245           | 147           | 286              | 59               | 328           | 181           | 47           | 95             | 359                | 230          | 552          | 456         | 3 29             |
| 19.5                      | 20            | 20            | 19. 5            | 19               | 19            | 19            | 20           | 21<br>390      | 21<br>461          | 22           | 24           | 26<br>410   | ,                |
| 299                       | 258           | 425           | 221              | 445<br>378       | 376<br>391    | 175<br>236    | 382<br>392   | 390<br>394     | 461                | 374          | 395          | 432         | 330              |
| 21.5                      | 262<br>20. 5  | 434<br>20     | 293<br>19        | 17. 5            | 16.5          | 15            | 15           | 15             | 15. 5              | 17           | 19           | 20.5        |                  |
| 101                       | 216           | 264           | 356              | 334              | 229           | 20            | 180          | 282            | 362                | 422          | 452          | 411         | 31               |
| 21                        | 443           | 293           | 372              | 375              | 190           | 78<br>16      | 200<br>16. 5 | 283<br>16, 5   | 360<br>17. 5       | 400          | 399<br>20, 5 | 402         | )                |
| 15                        | 10.7          | 10            |                  |                  |               |               |              |                |                    |              |              |             |                  |
| 0. 3<br>75. 2             | 19. 5         |               | 0.9              | -1. 2            | -1.4          | -1.5          | -0.9         | -0.9           | -0.6               | 0.0          | 0.9          | 2.1         | 1                |

Monthly means: Temperature, 10.5; readings, 409.5

H. Ex. 44——63

## Hourly readings of the Brooke bifilar magnet

|                 | 1,                |
|-----------------|-------------------|
| One division of | scale =: .0000700 |

| Date.       | , бр               | 1h           | 2h           | 35           | 44           | 54           | Q1                  | Th.          | 84           | 9h           | 16h        |
|-------------|--------------------|--------------|--------------|--------------|--------------|--------------|---------------------|--------------|--------------|--------------|------------|
| Apr. 1      | 422<br>418         | 398          | 428          | 406          | 474          | 482          | 437                 | 518          | 500          | 579          | 447        |
| Temperature | 21.5               | 20           | 20           | 20.5         | 22           | 20.5         | 22                  | 20. 3        | 19.5         | 17           | 16         |
| Apr. 2      | 399                | 396<br>387   | 379<br>377   | 390<br>370   | 423<br>423   | 402<br>309   | 445<br>454          | 501<br>428   | 505<br>529   | 320<br>350   | 580        |
| Temperature | 13.5               | 13.5         | 13. 5        | 12.5         | 13.5         | 13           | 12                  | 11           | . 16         | 6            | 464        |
| Apr. 3      | 400<br>376         | 382<br>391   | 399<br>399   | 375<br>373   | 379<br>378   | 370<br>386   | 475<br>476          | 518<br>553   | 394<br>456   | 330<br>304   | 100<br>155 |
| Temperature | 9                  | 10           | JH. 5        | 11.5         | 9. 5         | 9.5          | 0                   | 7 1          | 5            | 3.5          | 3.1.1      |
| Apr. 4      | (-40 !)<br>(-40 !) | 198<br>211   | 44J<br>423   | 409<br>443   | 400<br>488   | 410<br>481   | 468<br>484          | 416<br>408   | 279<br>349   | 110<br>160   | 411        |
| Temperature | 6.5                | 8            | 9. 5         | 9.5          | 10           | 9            | 7                   | 6            | 4            | 3            | ()         |
| Apr. 5      | 392<br>397         | 432          | 346<br>359   | 402<br>308   | 416<br>460   | 397<br>387   | 393<br>405          | 402<br>388   | 426<br>480   | 381<br>378   | 61         |
| Temperature | 6, 5               | 6.5          | 8            | 0            | 10           | 9            | 8                   | 7            | 5, 5         | 5            | 1          |
| Apr. 6      | 368                | 408<br>421   | 351<br>353   | 464<br>444   | 457<br>465   | 533<br>553   | 462<br>410          | 445<br>436   | 422<br>413   | 418<br>408   | 344        |
| Temperature | 13.5               | 15, 5        | 16.5         | 16           | 16.5         | 15           | 13.5                | 12           | 11           | 10           | 9          |
| Apr. 7      | 358                | 360          | 352<br>348   | 380<br>367   | 352          | 370          | 360<br>376          | 379<br>399   | 314<br>368   | 373<br>407   | 37.4       |
| Temperature | 9. 5               | . 10         | 12           | 12           | 13           | 11.5         | 10                  | 7            | . 5          | 3. 5         |            |
| ipr 8       | 361<br>352         | 359<br>352   | 375<br>373   | 376<br>384   | 379<br>384   | 421<br>421   | 405<br>386          | 420<br>381   | 366<br>379   | 423<br>414   | 314        |
| Temperature | 7                  | 8.5          | 8, 5         | 9            | 9.5          | 9            | 7.5                 | 5            | 3. 5         | 1.51         | - 0        |
| Apr. 0      | 356<br>364         | 356<br>356   | 369<br>360   | 353<br>368   | 35)<br>840   | 356<br>352   | 370<br>374          | 391<br>392   | 384<br>384   | 424<br>420   | 307<br>384 |
| Temperature | 5. 5               | 5. 5         | 5. 5         | 8            | 9.5          | 9.5 (        | 8.5                 | 7            | 5.5          | 4            | 1.         |
| .pr. 10     | 345<br>314         | 346<br>352   | 352<br>345   | 343<br>343   | 392<br>396   | 374<br>372   | 364<br>366          | 371<br>378   | 367<br>367   | 373<br>377   | 375        |
| Temperature | 5. 5               | 6            | 7.5          | 7.5          | 9            | 9            | 8.5                 | 8            | 7.5          | 7            | C          |
| pr. 11      | 344                | 349<br>350   | 395<br>393   | 451<br>454   | 383<br>301   | 391<br>389   | 48°<br>483          | 416<br>417   | 439          | 359<br>361   | 276        |
| Temperature | 9.5                | 11           | 12           | 11.5         | 13           | 12           | 12                  | 11 1         | 9. 5         | μ.           | 7          |
| pr. 12      | 320<br>822         | 315<br>318   | 315<br>313   | 327<br>337   | 359<br>360   | 361<br>361   | 374<br>392          | 448<br>447   | 409<br>388   | 411<br>416   | 364        |
| Temperature | 11                 | 12.5         | 13. 5        | 13.5         | 14.5         | 15           | 13. 5               | 13           | 11.5         | 10           |            |
| .pr. 13     | 376                | 336          | 356<br>355   | 354<br>352   | 367<br>367   | 374<br>372   | 374<br>369          | 399<br>411   | 486<br>461   | 403<br>397   | 355        |
| Temperature | 16                 | 17.5         | 17. 5        | 18           | 18.5         | 18.5         | 17.5                | 16, 5        | 1.5          | 14           | 13         |
| pr. 14 }    | 365                | 373<br>374   | 399<br>389   | 405<br>419   | 393          | 404<br>402   | 381<br>381          | 396<br>398   | 362<br>364   | 370          | 1.9        |
| Temperature | 19                 | 20.5         | 21.5         | 22           | 23. 5        | 22.5         | 21                  | 20           | 17.5         | 15.5         | 11         |
| .pr. 15     | 369                | 356          | 354          | 347          | 354          | 368          | 382                 | 361          | 381          | 415          | 418        |
| Temperature | 18                 | 20           | 22.5         | 21           | 22.5         | 20. 5        | 23                  | 20           | 19.5         | 19.5         | 19.        |
| pr. 16      | 342                | 351<br>348   | 418<br>417   | 452<br>460   | 444<br>426   | 450<br>442   | 407<br>407          | 360<br>372   | 354<br>412   | 412<br>3E9   | 474<br>406 |
| Temperature | 21.5               | 24           | 23           | 21.5         | 21           | 20. 5        | 19. 5               | 18.5         | 16           | 14           | 12         |
| pr. 17 {    | 358<br>349         | 333<br>334   | 346<br>344   | 342<br>348   | 402<br>412   | 429<br>447   | 484<br>499          | 418<br>422   | 452<br>473   | 396          | 373<br>372 |
| Temperature | 8                  | 10           | 8            | 8            | 9. 5         | 9.5          | 8. 5                | 7.5          | 6            | 4            | 2          |
| pr. 18      | 352<br>353         | 351<br>352   | 353<br>352   | 360<br>348   | 356<br>-350  | 361<br>360   | 381<br>383          | 376<br>395   | 358<br>380   | 442<br>443   | 410        |
| Temperature | 9, 5               | 10           | 11. 5        | 11           | 12           | 11.5         | 11.5                | 10           | 7            | 5            | 346        |
| pr. 19      | 365                | 373          | 300          | 510          | 613          | 393          | 362                 | 407          | 483          | 303          | 145        |
| Temperature | 3t.9<br>6.5        | 375          | 4u.i<br>8, 5 | 522<br>8. 5  | 614<br>10, 5 | 397<br>10. 5 | 384<br>10           | 423<br>9. 5  | 450<br>8     | 345<br>7     | 193        |
| pr. 20 {    | 343                | 248          | 353          | 725          | 667          | 321          | 576                 | 576          | 378          | 407          | 110        |
| Temperature | 351<br>11          | 253<br>12, 5 | 363<br>14    | 735<br>14. 5 | 645<br>16, 5 | 375<br>17    | 570<br>16. 5        | 551<br>16    | 385<br>15, 5 | 364<br>15    | 25<br>14   |
| pr. 21      | 354                | 318          | 374          | 361          | 431          | 401          | 428                 | 413          | 394          | 360          | 374        |
| Temperature | 359<br>21. 5       | 321          | 372<br>22, 5 | 379<br>23. 5 | 430          | 393<br>25    | 410<br>26           | 413<br>25, 5 | 404<br>24. 5 | 370<br>24    | 357        |
| pr. 22 {    | 328                | 354          | 342          | 348          | 346          | 373          | 358                 | 369          | 372          | 391          | 368        |
| Temperature | 325                | 353<br>21    | 346          | 344<br>19. 5 | 350<br>19. 5 | 373<br>19    | 361<br>18. 5        | 370<br>18    | 356<br>16. 5 | 432<br>15    | 14         |
| pr. 23      | 346                | 320          | 338          |              | 357          | 356          | 362                 | 349          | 356          | 382          | 356        |
| Temperature | 351<br>21. 5       | 321<br>21    | 340<br>21. 5 | 20. 5        | 353<br>21, 5 | 360<br>21. 5 | 362<br>20. 5        | 345<br>19    | 340<br>17    | 330<br>15    | 379<br>13  |
| pr. 24      | 348                | 335          | 328          | 344          | 350          | 357          | 365                 | 381          | 384          | 4(13)        | 397        |
| Temperature | 347                | 336<br>18    | 330<br>19    | 343<br>18.5  | 351<br>19    | 358<br>18, 5 | 365<br>18. (        | 381          | 381          | 392<br>15. 5 | 41.3       |
| pr. 25      | 370                | 250          | 100          | 829          | 516          | 527          | 421                 | 399          | 331          | 222          | 268        |
| Temperature | 20.5               | 20.5         | 183<br>21.5  | 897<br>22. 5 | 508          | 471          | 411<br>24.5         | 414          | 837          | 258          | 282        |
| pr. 26      | 510                | 423          | 420          | 409          | 452          | 556          | 406                 | 550          | 405          | 100          | 319        |
| Temperature | 476<br>27          | 442<br>28    | 258          | 401          | 570          | 559<br>29    | 208                 | 508<br>27. 5 | 385<br>26    | (-40?)       | 340        |
| or. 27      | 118                | 471          | 500          | 416          | 499          | 528          | 488                 | 514          | 483          | 420          | 24<br>391  |
| Temperature | 1.72               | 416<br>25, 5 | 500<br>28.5  | 478          | 557          | 529          | 524<br>30           | 502<br>28, 5 | 435          | 370          | 369        |
| or. 28      | 382                | 3(3)         | 382          | 389          | 443          | 410          | 466                 | 415          | 429          | 424          | 372        |
|             | 296                | 363          | 353          | 411          | 448<br>32. 5 | 416          | 469                 | 412<br>21.5  | 455<br>29. 5 | 439<br>27    | 418        |
| Temperature | 365                | 362          | 31<br>374    | 31<br>370    | 346          | 32.5         | 32. <b>5</b><br>365 | 378          | 460          | 427          | 4(0)       |
| er. 29      | 364                | 355          | 379          | 390          | 338          | 345          | 365                 | 387          | 456<br>56    | 470          | 442<br>23  |
| Temperature | 374                | 394          | 368          | 28. 5<br>414 | 30, 5<br>404 | 30. 5<br>439 | 30<br>431           | 27. 5<br>477 | 448          | 24.5<br>474  | 425        |
| pr. 30      | 25                 | 396<br>27    | 375          | 336          | 416          | 438          | 420                 | 466          | 462          | 447          | 414        |
| Temperature | 21 .               | 27           | 27           | 26. 5        | 27           | 26           | 24. 5               | 24           | 22. 5        | 21           | 20         |
|             |                    | 16.3         | 17. 2 }      | 17.0         |              |              | 17. 1               |              |              | 12.8         | 11.        |

ometer at Uglaamie, Alaska, April, 1883.

| 116          | Noon.               | 18h                | 144                | 154                | 166             | 174                | 184                | 19h                | 20 <sup>±</sup>   | 214              | 32h                 | 231                | Date       |
|--------------|---------------------|--------------------|--------------------|--------------------|-----------------|--------------------|--------------------|--------------------|-------------------|------------------|---------------------|--------------------|------------|
| 346          | 324                 | 93                 | 328                | 398                | 359             | 330                | 226                | 367                | 429               | 371              | 439                 | 391                | } 1        |
| 15. 5<br>345 | 14.5<br>504         | 14<br>427          | 13<br>261          | 12<br>310          | 11<br>269       | 10<br>224          | 9.5<br>(-40 f)     | 9<br>333           | 9.5<br>890        | 9. 5<br>362      | 11<br>341           | 11<br>354          | } 2        |
| B78          | 402<br>2. 5         | 240                | 200<br>0           | 247<br>—1          | 293<br>1. 5     | 270<br>—2          | (-40 ?)<br>1. 5    | 836                | 899<br>0. 5       | 868<br>3.5       | 339<br>5            | 368                | 3 2        |
| 122          | 320<br>274          | (-40 f)<br>(-40 f) | 273<br>382         | 504<br>482         | 419<br>493      | (-40 !)<br>(-40 !) | 438<br>476         | (-40?)<br>(-40?)   | 350<br>896        | 351<br>340       | 352<br>399          | 313<br>21-6        | } 3        |
| 320          | 361                 | -2<br>237          | -3<br>301          | 260                | -5<br>190       | -5<br>185          | 120                | (-40 ?)            | -1.5<br>180       | 0.0<br>218       | 2. 5<br>369         | 4. 5<br>310        | 3.4        |
| 85.1         | 264<br>2            | 264<br>3           | 289                | 246<br>-4.5        | 210<br>-5.5     | 244<br>5. 5        | 122<br>—5          | (-401)             | 132<br>—3         | 135<br>-1.5      | 362<br>0            | 352                | 5 "        |
| 110          | 350<br>821          | 376<br>379         | 205<br>304         | (-10 ?)<br>(-10 ?) | 242<br>236      | 320<br>319         | 336<br>343         | 356<br>298         | 121<br>108        | 202<br>270       | 263<br>250          | 316<br>310         | } 5        |
| 3<br>198     | 2. 5<br>36          | 2. 5<br>321        | 349                | 132                | 1.5             | 258                | 3<br>266           | 3. 5<br>313        | 5<br>350          | 6. 5<br>334      | 9<br>366            | 10.5<br>347        | <b>{</b> 6 |
| 220          | 375<br>6. 5<br>389  | 375<br>6<br>390    | 332<br>5. 5        | 153<br>5           | 218<br>4.5      | 260<br>4.5         | 280<br>5           | 298<br>5           | 363<br>5          | 334              | 370<br>7. 5         | 349<br>9<br>367    |            |
| 380<br>428   | 312                 | 337                | 354                | 335<br>408         | 363<br>354      | 379<br>382         | 386<br>380         | 381<br>384         | 382<br>381        | 380<br>383       | 372<br>370          | 362                | } 7        |
| -0.5<br>365  | -1<br>342           | -1 5<br>225        | 345                | -2<br>238          | -2.5<br>20      | 160                | 108                | 0<br>202           | 316               | 330              | 3. 5<br>363         | 4.5<br>326         | 3 8        |
| 854<br>-2    | 374                 | 257<br>-4.5        | 336                | 257<br>6           | 60              | <del>-6</del>      | 5                  | 193<br>-3.5        | 302<br>—3         | 327              | 372<br>1            | 328                | 3          |
| 884<br>862   | 298<br>304          | 421<br>377         | (-40 ?)<br>(-10 ?) | 308<br>327         | 373<br>387      | 330<br>327         | 326<br>315         | 329<br>335         | 396<br>387        | 352<br>350       | 331                 | 374<br>374         | 8 0        |
| 1<br>42h     | 0. 5<br>389         | -0, 5<br>145       | -1.5<br>360        | -2.5<br>290        | -2, 5<br>353    | $\frac{-2.5}{426}$ | -1.5<br>350        | 370                | 381               | 3.5<br>354       | 3.2<br>3.2          | 5.5<br>a00         | :<br>: (10 |
| 892<br>5     | • 400<br>5<br>363   | 217<br>5<br>336    | 395<br>4. 5        | 325<br>3. 5        | 332             | 426                | 349                | 366                | 386<br>6          | 300<br>6 5       | 3 14                | 364<br>9.5         | )          |
| 125<br>134   | 352<br>5            | 348                | 338<br>349         | 346<br>354         | 341<br>346      | 356<br>371         | 284<br>296         | 352<br>350         | 281<br>292        | 311<br>324       | 331                 | 324                | \$11       |
| 6<br>317     | 374<br>344          | 4.5<br>95<br>226   | 4. 5<br>232        | 102                | 4. 5<br>357     | 4.5<br>314         | 5<br>290<br>282    | 5. 5<br>182<br>190 | 6. 5<br>316       | 894              | 388                 | 10 5<br>360<br>318 | £12        |
| 438          | 5. 5<br>3 <b>67</b> | 4, 5<br>302        | 244<br>4<br>280    | 217<br>3. 5<br>295 | 347<br>4<br>253 | 333<br>5<br>319    | 6<br>274           | 7                  | 369<br>9 <b>5</b> | 358<br>11<br>388 | 350<br>13 5<br>383  | 15                 | ,          |
| 309          | 330<br>9. 5         | 263<br>8, 5        | 371<br>7.5         | 235                | 253<br>253<br>8 | 320                | 277                | (-40 !)<br>(-40 !) | 262<br>267        | 384<br>12        | (1989)              | 367                | \$ 13      |
| 11.5<br>378  | 402<br>386          | 362<br>392         | 395                | 6. 5<br>388        | 318             | 6, 5<br>359        | 7, 5<br>378        | 376<br>386         | 388<br>385        | 392<br>390       | 14. 5<br>351<br>378 | 364<br>365         | 111        |
| 403<br>12. 5 | 10. 5<br>339        | 10<br>377          | 410<br>8. 5<br>373 | 382<br>8<br>334    | 365<br>8<br>280 | 846<br>8<br>(40 !) | 382<br>8, 5<br>350 | 10<br>377          | 11. 5<br>412      | 13<br>387        | 15 5<br>382         | 17<br>345          | 1          |
| 392          | 18                  | 18                 | 18                 | 17                 | 17              | 17                 | 16.5               | 17.5               | 19                | 21               | 23                  | 23                 | 315        |
| 402          | 89<br>185           | 434<br>447         | 332<br>876         | 297<br>340         | 366<br>272      | 338<br>410         | 389<br>400         | 399<br>415         | 315<br>313        | 321<br>325       | 377<br>373          | 358<br>367         | 16         |
| 9.5<br>9.5   | 9<br>364            | 7<br>227           | 5. 5<br>850        | 331                | 357             | 2. 5<br>336        | 3. 5<br>382        | 4<br>363           | 377               | 5<br>3-0         | 6<br>383            | 6<br>360           |            |
| 357          | 475<br>—1           | 198<br>—2. 5       | 361<br>3. 5        | 3°8<br>-4          | 330             | 368                | 380                | 364<br>—1          | 373               | 3:6              | 375<br>4. 5         | 31.4               | 117        |
| 347<br>278   | 332<br>284          | 428<br>416         | 316<br>382         | 290<br>358         | 347<br>253      | 170<br>150         | 179<br>140         | 210<br>200         | 329<br>332        | 336<br>331       | 318<br>321          | 313                | 118        |
| 1<br>320     | -1.5                | -3<br>206          | 304                | -5<br>371          | -5. 5<br>122    | -5.5<br>243        | -4.5<br>296        | (-40 %)            | -3.5<br>118       | (40?)            | (-40.5)             | 5.5                |            |
| 335<br>4, 5  | 38                  | 272<br>3. 5        | 288<br>2. 5        | 362                | 89              | 263                | 280<br>4.5         | (-40?)<br>4, 5     | 150               | (-40?)           | (-402)              | 195                | 3 19       |
| 250<br>294   | 285<br>272          | 380<br>369         | 67<br>95           | 935<br>242         | 400<br>413      | 259<br>238         | 309<br>380         | (-40?)<br>(-40?)   | 364<br>369        | 305<br>299       | 450<br>435          | 469<br>399         | \$ 20      |
| 14<br>345    | 13<br>138           | 13<br>360          | 12<br>341          | 12<br>321          | 12. 5<br>373    | 13<br>391          | 14<br>372          | 15<br>387          | 17<br>370         | 18               | 20<br>353           | 21.5               | !          |
| 870<br>21    | 260<br>20. 5        | 254<br>20          | 347<br>20          | 328<br>19. 5       | 378<br>19       | 388<br>19          | 366                | 392<br>18. 5       | 366<br>18. 5      | 366<br>18. 5     | 300<br>19           | 351                | 321        |
| 381<br>325   | 327<br>337          | 390<br>398         | 342<br>339         | 384<br>373         | 890<br>388      | 292<br>280         | 235<br>250         | 384                | 416<br>414        | 363<br>368       | 334                 | 35g<br>356         | \$ 22      |
| 12.5<br>430  | 11<br>369           | 11<br>418          | 10                 | 10<br>401          | 10.5<br>268     | 11                 | 12<br>374          | 13. 5<br>394       | 15                | 18.5             | 19 5<br>366         | 21                 | 1          |
| 408          | 394<br>10           | 378<br>9. 5        | 367<br>9           | 332<br>7. 5        | 274<br>7. 5     | 368<br>7.5         | 375<br>9           | 395<br>10. 5       | 391               | 333<br>13.5      | 367                 | 360                | 323        |
| 370<br>389   | 895<br>386          | 441<br>400         | 445<br>410         | 442<br>459         | 479<br>505      | 214                | 466<br>548         | 402<br>359         | (-40')            | -25<br>102       | (-40?)              | -10<br>(-4.17)     | 324        |
| 12           | 19.5<br>19.5        | 11                 | 10<br>120          | 10<br>292          | 10.5            | 11<br>335          | 12. 5<br>270       | 14<br>372          | 16<br>340         | 18<br>457        | 13<br>270           | 20 S<br>261        | 1          |
| 848          | 154<br>17           | 208<br>17          | 13<br>17           | 272<br>17          | 353<br>17       | 327<br>18          | 259<br>19. 5       | 201<br>20          | 369<br>21.5       | 450<br>23        | 370<br>25           | 209                | 325        |
| 358<br>370   | 378<br>329          | 295<br>312         | 364<br>341         | 405<br>381         | 355<br>363      | 240<br>239         | (-40°)             | (-40?)<br>150      | (-40 3)           | 292<br>320       | 331<br>416          | 391<br>459         | 8:5        |
| 93<br>876    | (-40 )              | 20.5<br>2:6        | 20<br>124          | 19, 5<br>90        | 19. 5<br>158    | 19<br>297          | 20<br>245          | 20<br>260          | 21<br>340         | 22<br>219        | 23<br>318           | 427                | 1          |
| 264<br>21.5  | 35                  | 223<br>19          | 169<br>18          | 170                | 271<br>17. 5    | 289                | 209                | 252<br>19          | 314               | 332              | 319                 | 417                | \$ 27      |
| 375<br>382   | 2.4                 | 286                | 319<br>258         | 283<br>210         | 278<br>251      | 285<br>286         | 242<br>245         | 269<br>278         | 301               | 386<br>388       | 393<br>395          | 378<br>377         | \$28       |
| 23 5<br>411  | 463                 | 21                 | 20<br>215          | 19. 5<br>270       | 19<br>237       | 19<br>292          | 20. 5<br>279       | 22<br>299          | 23.5<br>144       | 25<br>327        | 26 5<br>392         | 28<br>372          | 1.         |
| 418<br>21.5  | 380<br>20           | 332<br>19          | 257<br>18          | 283<br>17. 5       | 245<br>17. 5    | 308<br>17          | 274<br>18          | 297<br>18          | 159<br>19         | 325              | 395<br>24           | 370<br>25          | 329        |
| 432<br>428   | 390<br>402          | 140<br>45          | 295<br>369         | 205<br>237         | 215<br>247      | 227<br>153         | 117<br>105         | 72<br>12           | (-40°)            | 3<br>66          | 176<br>189          | 375<br>380         | 1 10       |
| 18.5         | 17. 5               | 16                 | 15                 | 15                 | 14. 5           | 11                 | 15                 | 15                 | 15. 6             | 16. 5            | 19                  | 19                 | ĺ          |
| 10.0         | 8.9                 | 8, 2               | 7.3                | 6.8                | 6.6             | 6. 7               | 7.6                | 8.0                | 9. 5              | 11.6             | 12.8                | 11.5               |            |

Monthly mean v: Temperature, 120.1, readings, 311.5

sion of scale = .0000700

ke bifilar maynet

579 

Hourly readings of the Brooke bifilar magnet [One division of scale =1,0000760]

| Date.                             | 0 p             | P                   | 24           | 8r           | 4h           | 5 <sup>b</sup>   | 64          | 7 h          | 8h            | 0y             | 100          |
|-----------------------------------|-----------------|---------------------|--------------|--------------|--------------|------------------|-------------|--------------|---------------|----------------|--------------|
| May 1                             | 394<br>892      | 340                 | 325          | 856          | 433          | 474              | 577         | 488          | 420           | 500            | 437          |
| Temperature                       | 19              | 20                  | 20           | 19. 5        | 20           | 19               | 19. 5       | 18.5         | 17            | 16             | 16           |
| May 2                             | 355             | 446                 | 623<br>594   | 581<br>563   | 554<br>534   | 476<br>480       | 355<br>363  | 452<br>422   | 540           | 289<br>276     | 141          |
| Temperature                       | 25              | 24                  | 24           | 20, 5        | 20           | 20               | 18          | 16           | 438<br>14. 5  | 13             | 168          |
| May 3                             | 383             | 408                 | 428<br>428   | 397<br>393   | 377          | 442<br>433       | 424<br>415  | 453<br>462   | 406           | 419<br>473     | 358          |
| Temperature                       | 16              | 16.5                | 17           | 17           | 17. 5        | 17               | 16 5        | 16           | 15.5          | 14             | 306          |
| May 4                             | 352<br>370      | 348<br>350          | 354<br>353   | 386          | 502<br>510   | 482<br>454       | 401         | 372<br>373   | 335<br>332    | 403            | 43.3         |
| Temperature                       | 22<br>343       | 20. 5               | 20. 5<br>320 | 20           | 20           | 20               | 159         | 18           | 17            | 15. 5          | 102          |
| May 5                             | 343<br>336      | 352<br>353          | 334          | 361<br>363   | 444<br>441   | 404              | 394<br>404  | 438<br>447   | 404<br>412    | 397            | 100.0        |
| Temperature                       | 21<br>378       | 21.5                | 99.5         | 92           | 23. 5        | 22. 5            | 23          | 22           | 21.5          | 21             | 392          |
| May 6                             | 378             | 334<br>340          | 352<br>350   | 412<br>424   | 351          | 439<br>449       | 474<br>469  | 565<br>555   | 552<br>554    | 513<br>529     | 413          |
| Temperature                       | 36              | 37. 5               | 39           | 39           | 38. 5        | 38               | 38, 5       | 37           | 36            | 34.5           | 111          |
| May 7                             | 351<br>364      | 381<br>379          | 367<br>367   | 402          | 465<br>462   | 546<br>547       | 496<br>468  | 472<br>433   | 598<br>5e0    | 483<br>147     | 115          |
| Temperature                       | 31.5            | 30. 5               | 30           | 29           | 30           | 29               | 26.5        | 25           | 24.5          | 23, 5          | H3           |
| May 8                             | 362<br>362      | 362<br>366          | 378<br>374   | 365<br>373   | 391<br>387   | 414<br>420       | 397<br>381  | 438<br>435   | 396<br>391    | 411<br>410     | 450          |
| Temperature                       | 29, 5           | 31                  | 32. 5        | 33. 5        | 33. 5        | 34               | 34          | 33           | 32            | 31             | 4 141        |
| May 9                             | 353<br>386      | 356<br>364          | 377<br>363   | 358<br>374   | 380          | 380              | 41 G<br>400 | 377          | \$4.5<br>4.18 | 466<br>420     | 4.15         |
| Temperature                       | 38              | 39. 5               | 39. 5        | 374<br>38    | 39           | 37               | 34.5        | 34.5         | 33            | 33             | 319          |
| May 10                            | 359<br>352      | 369<br>360          | 357<br>354   | 358<br>356   | 421<br>428   | 362              | 382<br>395  | 423<br>402   | 390<br>386    | 388<br>415     | 296          |
| Temperature                       | 35              | 37. 5               | 39           | 38. 5        | 39. 5        | 37               | 35          | 36           | 34            | 32. 5          | 405          |
| May 11                            | 360<br>355      | 356<br>352          | 400          | 410<br>403   | 340<br>404   | 406<br>397       | 390         | 416<br>401   | 419           | 395            | 451          |
| Temperature                       | 40              | 40.5                | 41.5         | 40           | 39. 5        | 40               | 384<br>37 5 | 35           | 414<br>33 5   | 391<br>33      | 443          |
| May 12                            | 385<br>885      | 398<br>394          | 387<br>383   | 427<br>418   | 467<br>466   | 458              | 479<br>478  | 528<br>536   | 479           | 472<br>462     | 418          |
| Temperature                       | 37              | 37. 5               | 38. 5        | 37. 5        | 36           | 471<br>36        | 36          | 34           | 33            | 462<br>32      | F14          |
| day 13                            | 372<br>372      | 371<br>372          | 382<br>384   | 386          | 372          | 412              | 424         | 414          | 456           | 429            | 494          |
| Temperature                       | 37              | 37                  | 37           | 390          | 387<br>35, 5 | 388<br>36, 5     | 418<br>35   | 408<br>35    | 443<br>33     | 447            | 492          |
| đay 14                            | 364<br>368      | 379                 | 389          | 486          | 580          | 683              | 740         | 617          | 493           | 504            | 445          |
| Temperature                       | 33.5            | 378<br>34           | 390          | 494<br>34    | 592<br>34    | 661<br>33        | 722<br>32   | 601          | 474<br>32     | 474<br>31      | 458          |
| đay 15                            | 377             | 368                 | 364          | 364          | 361          | 400              | 449         | 432          | 407           | 350            | 470          |
| Temperature                       | 375<br>43       | 40 5                | 47. 5        | 42           | 45, 5        | 46.5             | 48          | 47           | 47            | 11             |              |
| fay 16                            | 358             | 380                 | 368          | 384          | 470          | 417              | 443         | 551          | 566           | 368            | 11. 5<br>199 |
|                                   | 42              | 377<br>41. 5        | 370          | 582<br>39    | 474<br>39    | 413<br>39. 5     | 449         | 560          | 565<br>36     | 371            | 520          |
| Temperature                       | 496             | 400                 | 386          | 381          | 369          | 400              | 398         | 400          | 428           | 540            | 4.50         |
| Iny 17                            | 494             | 403<br>43           | 369<br>43. 5 | 381<br>42. 5 | 375<br>42    | 407<br>41. 5     | 390         | 2,03         | 413           | 521            | 4.29         |
| Temperature                       | 413             | 364                 | 556          | 478          | 362          | 510              | 40<br>422   | 478          | 37. 5<br>432  | 36<br>454      | 35<br>419    |
| fay 18                            | 410<br>35.5     | 366                 | 548<br>35    | 446          | 371          | 506              | 415         | 491          | 429           | 443            | \$ \$17      |
| Temperature                       | 384             | 34. 5<br>354<br>354 | 389          | 35           | 35           | 34<br>424        | 628         | 689          | 32<br>529     | 4:15           | 30 5<br>187  |
| Iay 19                            | 385<br>37       | 354                 | 391          | 389          | 400          | 424<br>422<br>36 | 640         | 687          | 474           | 394            | 462          |
| Temperature                       | 400             | 38<br>381           | 38. 5<br>408 | 38           | 38           | 384              | 610         | 34<br>408    | 33<br>434     | 31.5<br>446    | 21.5         |
| lay 20                            | 409             | 408                 | 412          | 391          | 378          | 390              | 598         | 411          | 380           | 411            | \$0.0        |
| Temperature                       | 39<br>389       | 38<br>408           | 37. 5<br>370 | 37<br>564    | 37<br>481    | 36.5             | 37          | 36<br>467    | 34<br>368     | (-40-!)        | 31. 5<br>47a |
| ay 21                             | 376             | 398                 | 362          | 578          | 507          | 150              | 311         | 449          | 212           | 50             | 449          |
| Temperature                       | 42<br>501       | 43. 5<br>463        | 45<br>456    | 44           | 44<br>554    | 46               | 45          | 42           | 41            | 37             | 5.4          |
| ay 22                             | 620             | 468                 | 478          | 462          | 552          | 704              | 420<br>418  | 540<br>575   | 370<br>335    | 457 ± 352      | 3.5<br>4.9   |
| Temperature                       | 42.5<br>500     | 44<br>466           | 45<br>519    | 43, 5<br>418 | 632          | 699              | 39<br>486   | 36. 5<br>610 | 35            | 33             | 32           |
| ay 23                             | 482             | 486                 | 522          | 429          | 634          | 631              | 474         | 590          | 553<br>5~0    | 310            | 245<br>435   |
| Temperature                       | 36              | 37                  | 37           | 36, 5        | 36. 5        | 37               | 36          | 35           | 32            | 32             | 21.5         |
| ay 24                             | 404             | 419<br>420          | 381<br>378   | 393<br>392   | 433<br>421   | 462<br>461       | 470<br>472  | 475<br>486   | 492<br>466    | 590<br>510     | 5.18         |
| Temperature                       | 39              | 40                  | 41           | 41           | 41           | 41               | 39. 5       | 38. 5        | 36            | 31.5           | 43.5         |
| ay 25                             | 382<br>390      | 458<br>486          | 423<br>423   | 438<br>428   | 443<br>446   | 430<br>427       | 447<br>440  | 550<br>525   | 437<br>422    | 419<br>419     | \$59<br>\$50 |
| Temperature                       | 43              | 43                  | 44           | 44.5         | 44           | 43.5             | 42.5        | 41           | 40            | 39             | 34           |
| ay 26                             | 389<br>365      | 332<br>324          | 324<br>320   | 420<br>392   | 488          | 490<br>520       | 453<br>451  | 403          | 563<br>515    | 468<br>500     | 404          |
| Temperature                       | 50              | 5 E                 | 51           | 50           | 48.5         | 49               | 48.5        | 46           | 44            | 43             | 41           |
| ay 27                             | 392             | 382                 | 414          | 420          | 455          | 466              | 610         | 429          | 399           | 440            | (int)        |
| Temperature                       | 403<br>49       | 376<br>50           | 50           | 362<br>49    | 431<br>48    | 470<br>47        | 596<br>46   | 419<br>44    | 437           | 469 ;<br>39. 5 | 200          |
| ay 28                             | 487             | 520                 | 626          | 429          | 440          | 536              | 436         | 430          | 536           | 555            | 502          |
| Temperature                       | 462             | 558<br>49           | 618<br>50    | 465<br>48. 5 | 464<br>45    | 542<br>46        | 434         | 449          | 5×0<br>42     | 521            | 503          |
|                                   | 452             | 384                 | 403          | 446          | 447          | 420              | 458         | 521          | 547           | 536            | 130          |
| ay 29                             | 458<br>53       | 382<br>54           | 400<br>54, 5 | 426<br>53    | 459          | 412<br>50. 5     | 476         | 512<br>46    | 576           | 461            | 163          |
| Temperature                       | 396             | 350                 | 352          | 449          | 496          | 503              | 428         | 384          | 412           | 503            | 521          |
| ay 30                             | 394             | 352                 | 403          | 457          | 510          | 517              | 430         | 384          | 408           | 496            | 465          |
| Temperature                       | 41 405          | 41                  | 40, 5<br>456 | 39. 5<br>412 | 513          | 40<br>557        | 40<br>786   | 39<br>485    | 39<br>460     | 38<br>538      | 477          |
| ay 31                             | 410             | 451                 | 453          | 424          | 530          | 543              | 768         | 474          | 459           | 498            | 146          |
| Temperature                       | 41              | 42                  | 43           | 41.5         | 41           | 40, 5            | 39          | 38, 5        | 37            | 37. 5          | 56.5         |
|                                   |                 |                     |              |              |              |                  |             |              |               |                |              |
| Mean temperature<br>Mean readings | 37. 0<br>396. 8 | 37. 3               | 38.0         | 37. 0        | 37.0         | 36, 6            | 35. 6       | 34.5         | 33.1          | 31.9           | 1.0, 7       |

e bifllar magnet sion of scale - coores

30.7 429.3 ometer at Uglaamie, Alaska, May, 1883.

| 11b   | Noon.  | 15h  | 1 1h   | 15 <sup>b</sup>   | 16h  | 17h   | 1%h  | 195   | 30,   | 214   | 224   | 235 Date   |
|---|--|--|--|---|--|---|--|---|---|---|---|--|
| 162   | 252  | 280  | 332  | 328   | 205  | 283   | (40')  | 83  | 192   | 216   | 237   | 218 1  |
| 15 (21) (21) (21) (21) (21) (21) (21) (21)    | 144 255 263 264 3114 317 317 317 317 317 317 317 317 317 317 | 13 (-40-7) (-4 | 12 (-401) 5.5 (-401) 5.5 (-501) 5.5 (- | 100 200 380 380 381 381 381 381 381 381 381 381 381 381   | 11 30x 5 5 140 5 5 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1                   | 12. 5 300 400 301 302 400 400 400 303 400 400 400 400 400 400   | 14 223 226 318 319 414 414 41 4 4 4 4 4 4 4 4 4 4 4 4 4  | 15. 5 4 15. 5 15. | 18 231 23 5 32 32 32 32 32 32 32 32 32 32 32 32 32  | 200 219 219 210 210 210 210 210 210 210 210 210 210 | 22,5 5 250 250 250 250 250 250 250 250 250            | 21   36   2   36   3   3   3   3   3   3   3   3 |
| 40 26 1492 1492 1492 1492 1492 1492 1492 1492 | 314 5 314 425 425 425 425 425 425 425 425 425 42             | 37. 5   415  | 317 538 362 362 362 363 426 426 426 436 365 377 28 438 4418 4419 4419 4419 4419 4419 4419 441  | 3446 446 446 446 446 436 33 425 3425 347 441 441 28, 5 285 256 458 437 29, 5 310 300 311 301 301 301 303, 5 281 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 281 303 303, 5 303 303 303 303 303 303 303 303 303 30 | 381. 5 402 578 581. 5 402 578 581. 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 1246   2246 | 97<br>94<br>911<br>912<br>912<br>913<br>914<br>916<br>917<br>917<br>917<br>917<br>917<br>917<br>917<br>917 | 37.5 48.6 48.6 48.6 48.6 48.6 48.6 48.6 48.6  | 198   198 | 40 5 40 5 40 5 40 5 40 5 40 5 40 5 40 5             | 42 449 421 425 449 449 449 449 449 449 449 449 449 44 | 40.5   |

Monthly means: Temperature, 32, 8; readings, 377.0

# Hourly readings of the Brooke bifilar magnet

|             | arte er a manne    |              |              |              |               |                |                |                | One divisi   | on of scale  | 0,0000, =    |
|-------------|--------------------|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|--------------|--------------|
| Date.       | 64                 | D.           | 3r ,         | Sip.         | 4h            | āh .           | C1             | 7h             | 8h           | $\{\}h$      | 10           |
| June 1      | 407<br>400         | 376          | 383 -        | 425          | 490           | 431            | 430            | 445            | 249          | 379          | 439          |
| Temperature | 45                 | 44           | 49           | 51           | 51.5 1        | 56.5           | 8.2            | 48             | 45, 5        | 48           | 48           |
| June 2      | 486                | 348<br>348   | 432          | 448          | 500           | 542            | 616            | 135            | 629          | 592          | 278          |
| Temperature | 55                 | 53.5         | 433<br>52    | 456<br>50, 5 | 528 ·<br>48 · | 0 F2<br>48     | 05B<br>47      | 514<br>45      | 676<br>43. 5 | 620<br>42    | 371),a<br>#3 |
| June 3      | 37.2               | 523          | 408          | 461          | 524           | 432            | 461            | 521            | 602          | 428          | 255          |
| Temperature | 368<br>44. 5       | 566<br>47. 5 | 478<br>49    | 458          | 515<br>48     | 416 '<br>47, 5 | 452            | 386<br>44.5    | 557          | 449          | 421          |
| June 4      | 392                | 395          | 411          | 430          | 300           | 474            | 511            | 486            | 5"5          | 570          | 7.12         |
| Temperature | 271                | 403          | 41d<br>43    | 410          | 373<br>40, 5  | 478            | 484            | 514            | 402<br>37, 5 | 544<br>36, 5 | 4,00         |
| June 5      | 373                | 866          | 374          | 356          | 381           | 369 1          | 396            | 397            | 30-6         | 410          | 413          |
|             | 383                | 373          | 378<br>47    | 356          | 395           | 363            | 386            | 371            | 399          | 413          | 419          |
| Temperature | 44, 5<br>386       | 46<br>352    | 349          | 47. 5        | 394           | 47 434         | 46             | 44<br>550      | 506          | 42           | 240          |
| June 6      | 384<br>45, 5       | 343          | 345          | 468          | 446           | 426            | 472            | និម:៖          | 527          | 490          | 31.          |
| Temperature | 40. 0<br>327       | 46<br>362    | 378          | 388          | 48            | 48. 5<br>445   | 462            | 45<br>595      | 610          | 43<br>549    | 11.5         |
| June 7      | 328                | 367          | 378          | 390          | 450           | 4.13           | 470            | 546            | 57.5         | 541          | 411          |
| Temperature | 52, 5<br>360       | 52           | 442          | 502          | 52. 5<br>454  | 408            | 51. 5          | 5/8 !          | 48           | 487          | 471          |
| June 8      | 353                | 363          | 4:5          | 484          | 403           | 470            | 505            | 5e2            | 511          | 431          | 47.          |
| Temperature | 50                 | 49           | 48. 5<br>352 | 47.5         | 46            | 45. 5<br>619   | 44. 5<br>643   | 42.5<br>625    | 633          | 41           | 49           |
| June 9      | 393 .              | 408          | 356          | 410          | 445           | 651            | 632            | 562            | 550          | 343          | 496<br>496   |
| Temperature | 46                 | 46           | 46           | 46. 5        | 44.5          | 44             | 42.5           | 41             | 40.5         | 39, 5        | 314          |
| June 10     | 414<br>417         | 400          | 432<br>418   | 396          | 329<br>375    | 396            | 397<br>409     | 399<br>389     | 416<br>415   | 443 -        | 4161         |
| Temperature | 4.4                | 43.5         | 44           | 44. 5        | 44.5          | 44             | 43             | 42             | 41           | 40           | 39           |
| June 11 {   | 336<br>332         | 201          | 300          | 439<br>443   | 510           | 516<br>520     | 591<br>5-7     | 582<br>558     | 572<br>510   | 518          | 456          |
| Temperature | .53                | 51           | 53.5         | 53. 5 ]      | 53. 5         | 53             | 51.5           | 49             | 46.5         | 44           | 42.5         |
| June 12     | 36 <b>1</b><br>358 | 368          | 386          | 364          | 379           | 388            | 4:0<br>4:1     | 389<br>446     | 412<br>421   | 415<br>456   | 509          |
| Temperature | 49,5               | 49           | 49           | 49.5         | 40            | 48             | 46             | 44             | 43           | 42.5         | 414          |
| June 13     | 403                | 419          | 3-8          | 374          | 373           | 465            | 642            | 671            | 470          | 360          | 40%          |
| Temperature | 405                | 417          | 393          | 375<br>46, 5 | 361<br>46. 5  | 473            | 700<br>44.5    | 639            | 42.5         | 402          | 4/1          |
| June 14     | 332                | 370          | 3.14         | 481          | 474           | 461            | 437            | 564            | 509          | 545          | 341          |
| Temperature | 330<br>48          | 363          | 37.5         | 470<br>46. 5 | 410           | 44.5           | 441            | 561<br>43      | 556<br>42. 5 | 574          | 4-1          |
| June 15     | 366                | 353          | 319          | 335          | 367           | 333            | 332            | 341            | 372          | 334          | 4-16         |
| Temperature | 376<br>45          | 47.5         | 51           | 51.5         | 52. 5         | 52             | 52             | 51             | 51           | 49           |              |
|             | 320                | 334 .        | 347          | 336          | 380           | 384            | 412            | 387            | 401          | 386          | 370          |
| June 16     | 53                 | 338          | 346          | 346          | 368           | 388            | 431            | 401            | 403          | 399          | 409          |
| June 17 {   | 323                | 52<br>361    | 354          | 49, 5<br>440 | 48<br>890     | 47. 5<br>704   | 46<br>688      | 41.5<br>800    | 44.5<br>519  | 43           | 42.5<br>315  |
| ,           | 332                | 363 (        | 360          | 435          | 856           | 740            | 712            | 824            | 449          | 380          | 341          |
| Temperature | 51<br>312          | 51<br>500    | 50<br>313    | 49. 5        | 571           | 48.5           | 47. 5<br>620   | 46<br>613      | 346          | 43<br>375    | 4.3<br>67    |
| June 13     | 3.17               | 553          | 328          | 558          | 531           | 388            | 613            | 510            | 413          | 360          | 230          |
| Temperature | 50                 | 52<br>400    | 32.5<br>496  | 53<br>442    | 53, 5 (       | 52.5           | 52             | 50<br>607      | 48<br>591    | 46. 5<br>515 | 46<br>408    |
| June 19     | 368<br>322         | 4.0          | 402          | 480          | 660           | 445            | 614<br>550     | 511            | 580          | 518          | 500          |
| Temperature | 46.5               | 48 .         | 48           | 47           | 47            | 46. 5<br>531   | 45, 5          | 44             | 42           | 41           | 4+           |
| June 2)     | 402<br>400         | 419<br>421   | 411          | 413          | 400           | 553            | 590<br>578     | 507<br>659     | 580<br>5.6   | 475<br>543   | 440          |
| Temperature | 49                 | 49.5         | 50, 5        | 49. 5        | 49            | 47.5           | 46. 5          | 41             | 44           | 42           | 11           |
| June 21     | 372<br>373         | 324          | 587<br>590   | 460<br>449   | 414<br>412    | 390<br>391     | 573<br>539     | 491            | 449<br>459   | 410<br>391   | 446          |
| Temperature | 50                 | 53           | 53           | 51. à        | 51            | 50             | 48.5           | 46.5           | 45           | 43.5         | 42           |
| June 22     | 350                | 332<br>385   | 371          | 354<br>368   | 371<br>375    | 387<br>379     | 377<br>429     | 389            | 374<br>357   | 458<br>446   | 401          |
| Tenmerature | 48, 5              | 49. 5        | 50. 5        | 50           | 49            | 48.5           | 46.5           | 45             | 42.5         | 41. 5        | 41           |
| June 23     | 411                | 486          | 484          | 696          | 744           | 618            | 601            | 286            | 515          | 489          | 4334         |
| Temperature | 437<br>45          | 480<br>45    | 530<br>46    | 740<br>46    | 702<br>44. 5  | 692<br>43. 5   | 571<br>42. 5   | 210            | 610<br>40    | 470<br>39    | 421          |
| June 24     | 411                | 469          | 503          | 608          | 452           | 518            | 569            | 672            | 514          | 4.6          | 484          |
| Temperature | 400                | 453<br>42. 5 | 506<br>42    | 616<br>42    | 458<br>42     | 509<br>42      | 568<br>42      | 608<br>41      | 507          | 477          | 492<br>40    |
|             | 402                | 392          | 385          | 460          | 403           | 462            | 418            | 404            | 412          | 442          | 440          |
| June 25 {   | 398                | 390          | 400          | 456<br>45.5  | 373<br>45. 5  | 458<br>45. 5   | 459<br>44.5    | 439            | 413<br>42    | 439          | 428<br>49,5  |
|             | 388                | 14.5         | 45.5<br>441  | 45.5         | 408           | 432            | 397            | 43<br>440      | 580          | 41. 5        | 586          |
| June 26     | 378                | 453          | 453          | 439          | 405           | 416            | 3:48           | 441            | 590          | 523          | 532          |
| Temperature | 41. 5<br>395       | 41 418       | 42.5         | 438          | 44            | 430            | 43, 5  <br>600 | 42.5<br>509    | 41. 5<br>620 | 41. 5        | (40')        |
| June 27     | 393                | 412          | 407          | 426          | 419           | 422            | 714            | 504            | 629          | 482          | (401)        |
| Temperature | 42<br>450          | 497          | 42<br>535    | 41.5<br>596  | 41. 5<br>549  | 678            | 41.5<br>543    | 40             | 41           | 41 469       | 422          |
| June 28     | 456                | 472          | 587          | 618          | 561           | 716            | 521            | 410            | 5)8          | 487          | 412          |
| Temperature | 46.5               | 46           | 46.5         | 46           | 46            | 45             | 44             | 43             | 43           | 42           | 41 7         |
| June 23     | 257                | 321          | 362          | 342<br>354   | 389           | 475<br>453     | 413<br>409     | 402<br>403     | 514<br>513   | 563<br>568   | 387          |
| Temperature | 58.5               | 58.5 (       | 58.5         | 58. 5        | 57. 5         | 51             | 56.5           | 55             | 34. 5        | 52           | 59.5         |
| ·           | 328                | 1.45<br>4.48 | 416<br>462   | 470<br>468   | 446           | 433<br>428     | 624            | 724<br>710     | 420          | 519<br>518   | 544<br>108   |
| Fune 39     |                    |              |              |              |               |                | 0.74           | 4 8 1 8        | 42.715       |              |              |
| Temperature | 55. 5 1            | 54.5         | 51           | 54           | 54. 5         | 54             | 53             | 50.5           |              | 49 :         | 4/1          |
| Temperature | 55. 5<br>47. 8     | 48 1         | 51           | 54<br>48. 5  | 54. 5         | 47.6           | 40.6           | 50, 5<br>41, 8 | 43.9         |              | 4H<br>4LH    |

ometer at Uglaamie, Alaska, June, 1883.

part of the horizontal force.]

| 11,                | Noon.          | 185              | 141              | 15h                          | 165               | 17h              | 145             | 194              | 30,              | 314              | 324          | 33,           | Dat        |
|--------------------|----------------|------------------|------------------|------------------------------|-------------------|------------------|-----------------|------------------|------------------|------------------|--------------|---------------|------------|
| 470                | 333            | 387              | 386              | 859                          | 277               | 228              | 145             | 27               | (-40!)           | 89               | 223          | 233           | } 1        |
| 45<br>378          | 45<br>500      | 45<br>482        | 45<br>(-40')     | 417                          | 437               | 46.5<br>171      | 47. 5<br>178    | 50<br>298        | 51               | 53<br>493        | 54<br>158    | 258<br>248    |            |
| 350<br>40          | 440            | 447              | (-40°)           | 396<br>36, 5                 | 308<br>36. 5      | 242              | 234             | 255<br>38        | 5 39             | 482              | 130<br>41.5  | 989<br>43     | § 2        |
| 43a<br>410         | 439<br>892     | 411<br>423       | 432<br>366       | 400<br>423                   | 416               | 274              | 246<br>271      | 428<br>452       | 366              | 387<br>381       | 302          | 500<br>478    | { a        |
| 39<br>890          | 38             | 37               | 36, 5            | 36. 5<br>354                 | 37<br>276         | 88, 5<br>435     | 38. 5<br>402    | 39. 5<br>419     | 40.5             | 41<br>370        | 42<br>391    | 43            |            |
| 404                | 432<br>32, 5   | 261<br>32        | 365              | 855                          | 282<br>32         | 418              | 459<br>34       | 412<br>35. 5     | 311              | 400              | 392<br>41    | 386<br>42.5   | , } 4      |
| 424                | 414            | 402<br>417       | 415<br>400       | 32<br>378<br>374             | 400<br>386        | 32<br>427<br>421 | 409             | 440<br>443       | 439<br>442       | 423<br>426       | 492<br>495   | 408<br>418    | 1 5        |
| 37<br>- 400        | 30, 5          | 36<br>424        | 35. 5<br>895     | 35. 5<br>320                 | 35                | 35. 5<br>210     | 36.5<br>(-40/)  | 39<br>80         | 49<br>25         | 41. 5            | 43<br>327    | 45<br>332     | 1          |
| -10?)<br>39. 5     | 452 1<br>39    | 510              | 416              | 5<br>38. 5                   | 20<br>05<br>40, 7 | 212<br>41 5      | (-40?)          | 42<br>45. 5      | 17<br>46         | 242<br>47. 5     | 320<br>49    | 3' 7          | 3 0        |
| 501<br>416         | 407            | 372<br>359       | 345<br>830       | 178<br>180                   | 268<br>284        | 282<br>287       | 300<br>282      | 340              | 294<br>297       | 358<br>342       | 363          | 358<br>554    | .} 7       |
| 43<br>418          | 42. 5<br>447   | 42<br>175        | 41.5             | 41. 5                        | 41<br>185         | 41               | 41.5            | 42.5<br>132      | 471.5<br>363     | 45<br>326        | 46. 5<br>300 | 51<br>368     |            |
| 4°10<br>39         | 422<br>38, 5   | 79<br>38         | 264<br>37. 5     | 234                          | 157               | 79<br>38. 5      | 205<br>39, 5    | 140              | 203              | 317<br>43        | 390          | 378<br>47     | 1 8        |
| 4%5<br>436         | 437<br>428     | 308<br>409       | (-40!)<br>(-40!) | 296<br>248                   | 300               | 280              | 169<br>145      | 55<br>62         | 132<br>120       | 417              | 430          | 403<br>404    | 3 9        |
| 37. 5<br>450       | 37<br>409      | 36.5<br>422      | 36               | 35. 5<br>288                 | 35. 5<br>270      | 35 5<br>264      | 36<br>204       | 36. 5<br>249     | 37               | 39<br>328        | 40. 5<br>309 | 42 5<br>262   |            |
| 452<br>38          | 398<br>37, 5   | 414<br>37. 5     | 386<br>37, 5     | 318                          | 261<br>38. 5      | 258<br>39, 5     | 251<br>40, 5    | 253<br>42        | 389<br>44        | 332              | 317<br>48    | 264<br>51     | 310        |
| 354<br>375         | 462<br>460     | 414              | 895<br>414       | 477<br>479                   | 457<br>460        | 379<br>362       | 358<br>369      | 452<br>451       | 463<br>460       | 438<br>439       | 402<br>396   | 400<br>398    | }11        |
| 42<br>401          | 41             | 40               | 39 5<br>165      | 39. 5<br>270                 | 39. 5<br>303      | 40. 5<br>362     | 42.5<br>494     | 43 5<br>473      | 41.5             | 45<br>412        | 46.5         | 48<br>412     | 1          |
| 452                | 445            | 482<br>30, 5     | 80               | 305                          | 319<br>39. 5      | 365<br>39, 5     | 484             | 468<br>41        | 426<br>41. 5     | 410              | 390<br>43    | 4 6           | 1 15       |
| 364                | 370<br>340     | 372<br>371       | 455 1<br>480     | 427<br>416                   | 371               | 436<br>441       | 295<br>318      | 452<br>448       | 420<br>427       | 349<br>343       | 410<br>406   | 413           | 13         |
| 41<br>461          | 40, 5          | 417              | 40               | 40<br>371                    | 40                | 40. 5<br>275     | 41.5            | 43<br>279        | 44<br>335        | 45<br>375        | 46           | 48            |            |
| 458                | 465            | 362<br>40        | 394              | 361                          | 286               | 276<br>39, 5     | 885<br>39. 5    | 326<br>40, 5     | 361<br>40, 5     | 378<br>42        | 382<br>43.5  | 35-8<br>4-4   | 311        |
| 412                | 389            | 398              | 401              | 380                          | 370               | 410              | 395             | 337              | 238              | 366              | 353          | 327           | \$ 15      |
| 398                | 46. 5<br>451   | 46, 5<br>415     | 46.5<br>403      | 46                           | 46.5              | 46<br>418        | 46. 5<br>368    | 47.5<br>193      | 48<br>200        | 49 5<br>388      | 51<br>352    | 52.5<br>370   | 1          |
| 394<br>41.5        | 428            | 412              | 409              | 409 5                        | 398<br>40. 5      | 416              | 356<br>41       | 203<br>42, 5     | 211<br>43. 5     | 383<br>45, 5     | 340<br>48    | 3_0<br>50     | } 1G       |
| 470 L<br>459       | 175<br>(- 40?) | 250              | 398<br>372       | 487<br>479                   | 469               | 60<br>38         | 10<br>70        | 305<br>312       | 357<br>410       | 330<br>362       | 242<br>253   | 388<br>407    | 1 17       |
| 265                | 39, 5          | 421              | 38<br>270        | 38                           | 38<br>36:         | 39<br>170        | 39.5<br>(-40?)  | 210              | 48<br>357        | 45<br>352        | 46<br>494    | 47. 5<br>342  |            |
| 331<br>43. 5       | 316<br>42.5    | 375<br>42        | 247<br>41        | 393<br>40. 5                 | 348<br>40         | 181              | (-40!)<br>41    | 262<br>41.5      | 403<br>43        | 363<br>44        | 476<br>45    | 325<br>46     | 18         |
| (= 10°)<br>(= 10°) | 418<br>375     | 301              | 454<br>425       | 219<br>253                   | 364<br>366        | (-4°)<br>(-40°)  | 38<br>35        | 862<br>384       | 417<br>450       | 419<br>415       | 352<br>357   | 378<br>366    | § 19       |
| 39 5<br>418        | 39<br>576      | 38.5<br>421      | 38               | 37. 5<br>394                 | 37. 5<br>350      | 37. 5<br>265     | 38<br>(-40?)    | 39<br>323        | 41<br>220        | 43<br>282        | 45. 5<br>236 | 47. 5<br>351  | 1 2        |
| 401                | 525<br>39      | 442<br>38        | 4:31<br>38       | 410<br>37.5                  | 347<br>38 5       | 260<br>39. 0     | (-40?)<br>40. 5 | 350<br>41.5      | 242<br>43        | 307<br>44        | 211<br>47.5  | 317           | \$ 20      |
| 465                | 462            | 405<br>452       | 450<br>453       | 392<br>425                   | 407<br>390        | 350<br>350 .     | 368<br>367      | 334<br>328       | 364<br>362       | 352<br>357       | 398          | 382<br>385    | 321        |
| 467                | 463            | 39. 5<br>418     | 39<br>392        | 38. 5<br>333                 | 38                | 38<br>140        | 38. 5<br>136    | -20              | 41<br>399        | 42. 5<br>502     | 44. 5<br>342 | 47. 5<br>37.2 | 1 22       |
| 481                | 478<br>39      | 402              | 410<br>38        | 345<br>37.5                  | 340<br>37. 5      | 145<br>37, 5     | 157<br>38, 5    | 67<br>39. 5      | 382<br>41<br>299 | 494<br>42.5      | 210<br>44. 5 | 404<br>45     |            |
| 95                 | 234            | 333<br>137       | 312<br>334       | 350<br>340                   | 232<br>240        | 316<br>310       | 419<br>439      | 344<br>322<br>39 | 324              | 202<br>230       | 398<br>392   | 438<br>477    | \$23       |
| 451                | 462            | 38. 5<br>450     | 39               | 38.5<br>346                  | 38<br>318         | 38<br>317        | 38. 5<br>280    | 402              | 39<br>298        | 4.1<br>452       | 40<br>412    | 41 429        | <b>{24</b> |
| 451                | 512<br>39      | 441<br>38. 5     | 404<br>38        | 376<br>38                    | 308<br>37. 5      | 326<br>37. 5     | 251<br>38       | 412<br>39        | 319<br>40        | 455<br>42        | 396<br>42.5  | 409<br>42.5   |            |
| 461                | 444<br>458     | 426<br>417       | 402<br>394       | 380<br>403                   | 379<br>391        | 276<br>258       | 332<br>334      | 102<br>96        | 174<br>162       | 433<br>411       | 412<br>401   | 448<br>446    | 23         |
| 40.5<br>43.1       | 40<br>488      | 39, 5<br>361     | 39<br>390        | 39<br>390                    | 38 5<br>393       | 38<br>93         | 38. 5<br>75     | 39<br>420        | 40<br>422        | 40. 5<br>355     | 404          | 397           | 1 20       |
| 41                 | 498<br>40      | 302<br>40<br>397 | 403<br>40        | 371<br>39. 5                 | 370<br>39         | (-40?)           | 40<br>39. 5     | 428<br>39. 5     | 393<br>40 5      | 342<br>41        | 387<br>41    | 401           |            |
| 265<br>812         | 316<br>410     | 407              | (-40°)<br>(-40°) | 293<br>309                   | 243<br>195        | 465<br>497       | 357<br>358      | 388<br>405       | -22<br>-22       | (-40!)<br>(-40!) | 298<br>319   | 481<br>439    | \$ 27      |
| 4 1<br>402<br>417  | 40. 5<br>256   | 41<br>240        | 409              | 41<br>345                    | 41<br>272         | 41.5<br>186      | 42. 5<br>203    | 42. 5<br>321     | 43<br>290        | 43.5<br>282      | 44.5<br>209  | 45<br>273     | £ 28       |
| 41.5               | 245<br>41, 5   | 269<br>42        | 418<br>42        | 344<br>42.5                  | 257<br>43         | 184<br>44        | 209<br>47. 5    | 324              | 287<br>51. 5     | 332<br>53 5      | 291          | 280<br>57     |            |
| 498                | 455<br>449     | 424<br>431       | 364<br>378       | 397<br>398                   | 333<br>291        | 124<br>170       | 300<br>301      | 392<br>392       | 252<br>259       | 335<br>350       | 352<br>357   | 368<br>372    | 1 29       |
| 49 5<br>385        | 49.5<br>464    | 49<br>286        | 48<br>330        | ( <del>-48</del> )           | 47. 5<br>333      | 47<br>158        | 46. 5<br>520    | 324              | 48<br>442        | 49. 5<br>352     | 51<br>319    | 53, f<br>332  | 30         |
| 361<br>47          | 403<br>46. 5   | 278<br>46        | 283<br>45        | (-40 <sup>7</sup> )<br>45, 5 | 836<br>45         | 188<br>45        | 500<br>44. 5    | 350<br>44        | 482<br>45        | 396<br>45        | 412          | 330<br>48 :   | 3          |
|                    |                | 39. 8            | 39. 6            | 39 4                         | 39. 1             | 39. 8            | 40. 6           | 41.6             | 42.7             | 44 0             | 45 1         | 47.0          | -          |

Monthly means: Temperature, 432.7; readings, 487.1

e biftlar magnet

# Hourly readings of the Brooke biftlar magnet.

|                     |                   |               |                |                  |                |              |                  | (3)                   | ac divisio     | n of scale    | .00c0*ra)                                |
|---------------------|-------------------|---------------|----------------|------------------|----------------|--------------|------------------|-----------------------|----------------|---------------|--|
| Date:               | ( 6)1·            | 411           | 25             | 31               | 41             | 5h           | 6511             | 71 .                  | 40 1           | g) h          | 101                                      |
| \$7(11V)            |                   | •             |                |                  | •              |              | **               | •                     |                |               | ***                                      |
| Jaly 1              | 476               | 4.62          | 6100           | 6.49             | 453            | eisref       | 621              | 440                   | 611.           | -84317        | Ita i                                    |
| Temperature         | 487<br>50         |               | 57             | 'h               | 57.5           | 57           | 57.5             | 11 147 1              | 56             | 54.5          |  |
| July 2              | 307               | 497           | 347.4          | 4.29             | 410            | 494<br>549   | 50 k<br>150      | 507                   | 240            | 165           | 95                                       |
| Temperature         | .U 58, 5  <br>116 | 35, 5<br>1: 0 | 30 A           | 50               | 48 1           | 47           | 48<br>540        | 45<br>497             | 45             | 45<br>516     | 41                                       |
| July 3              | 81.28             | 3 -7          | \$41.5         | 11.7             | 407            | 16.0         | 516              | 570                   | 151            | 544           | 110                                      |
| Temperature         | 43<br>321         | 44            | 40.5<br>460    | 45<br>571        | 41.5 t<br>502  | 44, 5        | 4 1. 3<br>578    | 48<br>519             | 40. 5 (<br>695 | 413<br>550    | 303                                      |
| July 4              | 317<br>51.5       | 377           | 442            | 585<br>55        | 512            | 419<br>53    | 5-2              | 51.9                  | 5>H<br>48      | 516<br>48     | 401                                      |
| July 5              | 3109              | 3755<br>342   | 874<br>368     | 630<br>507       | 474            | 3100         | 564              | 6 H                   | 504            | 453<br>527    | 1.10                                     |
| Temperature         | 359<br>50         | 52            | 53             | 51.5             | 50             | 49           | 48               | 40.5                  | 40             | 45            | 44                                       |
| July 6              | 358               | 340           | 433            | 7.24<br>696      | 376<br>593     | 500          | 589 ±<br>621     | 6124-\$<br>6511-2     | 538<br>561     | 500<br>554    | 479 [                                    |
| Temperature         | 49.5              | 49            | 450<br>450     | 436<br>381983    | 334            | 46, 5        | 45 ;             | 48.5                  | 4% 5<br>260    | 43            | 4  |
| July 7              | 419               | 419           | 415            | 397              | 320<br>58, 5   | 40%          | 302<br>50        | 473                   | 529            | 412<br>47. 5  | 411                                      |
| July 8 {            | 46<br>311         | 47.5<br>388   | \$6.5 L        | 376              | 381            | 51  <br>383  | 014              | 49<br>657             | 450            | 474           | 46 · · · · · · · · · · · · · · · · · · · |
| Temperature         | 413               | 394           | 40%            | 372<br>53        | 379            | 39-0         | 504              | 6533                  | 4.0            | 450<br>53     | 191                                      |
| July 9              | 431<br>419        | 414           | 191            | 409              | 305<br>303     | 374          | 412              | 391                   | 1.1            | 440           | 10.7                                     |
| Temperature         | 48                | 46.5          | 48.5           | 47               | 411. 5         | 46, 5        | 46.5             | 45                    | 45             | 4.4           | 4  |
| July 10             | 356               | 355           | 3198<br>35.1   | \$10x<br>\$10    | 576<br>516     | (6.1.)       | 472<br>514       | 513                   | 4.04           | 200           |  |
| Tem grature         | 51, 5             | 51. 5<br>37 l | 51<br>401      | 49.5             | 47.5 (         | 46.5<br>412  | 45               | 43                    | 42.5           | 41.5          | 439                                      |
| July 11             | 349               | 365           | 368            | 608              | 453            | 415          | 373 .            | 364                   | 480            | 493           | 117                                      |
| July 12             | 45<br>214         | 408 [         | 47, 5<br>522   | 46.5             | 710            | 478          | 137              | 45.5<br>561           | 474            | 473           | 11                                       |
| Temperature         | 201<br>50         | 500<br>51, 5  | 518            | 407<br>50, 5     | 50, 5          | 483          | 427              | 4704                  | 260            | 473<br>45     | 5.6                                      |
| July 13             | 376               | 372<br>373    | 361            | 369              | 337            | 363          | 370              | 431<br>446            | 556<br>511     | 419 -         | 4(-)                                     |
| Temperature         | 873<br>45, 5      | 4.5           | 15             | 45.5             | \$5.5          | 841          | 45.5             | 8.8                   | 4.4            | 4.1           | 11 1                                     |
| July 14             | 395               | 427<br>436    | 382 1          | 424<br>380       | 399            | 350<br>352   | 465 F            | 445                   | 478            | 511<br>400    | 501 .                                    |
| Temperature         | 46<br>359         | 47<br>352     | 50<br>325      | 50, 5<br>343     | 50.5           | 50.5         | 49, 5            | 48                    | 47. 5          | 40            | 45                                       |
| July 15             | 353               |               | 55             |                  | 44.0           | 392          |                  | 415                   | 4440           | 440           | 394                                      |
| Temperature         | 53                | 51            | 150            | 54, 5<br>198     | 4-4            | 54<br>851    | 30.3             | 54 5<br>599           | 5.0            | 53.5<br>19*   | 54 F                                     |
| July 16 Yemperature | 57.5              | 412<br>56     | 469<br>53      | 5 5              | 5,19<br>51     | 50<br>50     | 459              | 549                   | 40.5           | 507<br>45. 5  | 715<br>45                                |
| July 17             | 403               | 455           | 4508           | au.              | 573            | 513          | 574              | 504                   | 5.00           | 5.22          | 475                                      |
| Temperature         | 417               | 454           | 47. 5          | 496              | 576<br>47. 5   | 51.1         | 503 1<br>46, 5   | 509                   | 545<br>44.5    | 5 13<br>48, 5 | 12                                       |
| July 18             | 385               | 381           | 410<br>408 1   | 405<br>405       | 414            | 510<br>551 : | 50.3             | 30m<br>407            | 517            | 508           | 125                                      |
| Temperature         | 51.5              | 51.5          | 51.5           | 51               | 50, 5 j        | 50           | 49               | 48                    | 46.5           | 45. 5         | 45 .                                     |
| July 19             | 446<br>427        | 450<br>433    | 403            | 346              | 594            | 437<br>485   | 512<br>402       | 417                   | 458            | 445           | 4 9                                      |
| Temperature         | 57<br>496         | 558           | 544            | 59<br>508        | 642            | 60<br>539    | 59, 5<br>522     | 491                   | 404            | 54.5          | 39-                                      |
| July 20             | 508               | 564           | 55.5           | 590              | 631<br>48, 5   | 530          | 5.8 1            | 475                   | 4411           | 403           | 4.0                                      |
| July 21             | 51<br>428         | 50<br>415     | 52             | 49, 5 (<br>453   | 410            | 47. 5        | 476              | 46, 5 1<br>432<br>427 | 407            | 115           | ,  |
| Temperature t       | 430               | 456           | 455            | 418              | 401            | 43.5         | 42.5             | 427                   | 517<br>41.5 [  | 552<br>41.5   | 41                                       |
| July 22             | 380<br>381        | 392<br>400    | 403<br>403     | 421<br>127       | 449            | 431<br>434   | 401              | 472<br>460            | 446            | 413           | 11-                                      |
| l'emperature        | 44.5              | -4-4          | 44             | 43, 5            | 43             | 42           | 41. 5            | 41                    | 40.5           | 39. 5         | 39                                       |
| - July 23           | 389               | 392<br>395    | 432            | 449              | 433            | 454          | 435<br>456       | 533                   | 50d            | 53.6          | 318<br>5 5                               |
| Temperature         | 44<br>244         | 44.5<br>356   | 386            | 45<br>429        | 44. 5<br>510   | 632          | 13<br>671        | 42<br>697             | 42<br>595      | 41.5          | f 1                                      |
| July 24             | 341               | 3.57          | 587<br>51      | 427              | 532            | 630          | 4 -11            | 680                   | 545            | ti'i:         | 11                                       |
| July 25             | 359               | 51<br>493     | 441            | 51. 5<br>565 - 1 | 49, 5<br>643   | 61.9         | 18, 5<br>523 - j | 46<br>578 ;           | 43<br>532      | 41            | 116                                      |
| Temperature         | 374<br>50         | 4r6<br>51     | 131<br>51, 5   | 586              | 706<br>51      | 608<br>51    | 521              | 581                   | 519            | 458<br>47.5   | 7.1                                      |
| July 26             | 387               | 378           | 393 ,          | 458              | 397            | 420          | 421 .            | 517                   | 515            | 4.7           | 1  |
| Temperature         | 386 53. 5         | 383<br>54     | 378<br>56 i    | 462<br>54        | 3(80)<br>54    | 446<br>53, 5 | 415 ± 5<br>52.5  | 570<br>50. 5          | 44             | 40            | 15                                       |
| July 27             | 307               | \$90          | 409<br>427     | 411              | 446            | 637          | 651              | 583<br>597            | 620            | 50-3          | 1: -                                     |
| Temperature         | 52                | 51            | 52, 5<br>419 1 | 51               | 50.5           | 51           | 59.5 (<br>439    | 46                    | 17. 5          | 1G<br>418     | 179                                      |
| July 28             | 417<br>421        | 420           | 419            | 421              | 427<br>427     | 420<br>422   | 439              | 444<br>459            | 4.58           | 465           | 176                                      |
| Temperature         | 391               | 40            | 401            | 48, 5 (          | 48, 5          | 113          | 47. 5<br>518     | 46 .<br>511           | 4.4<br>5565    | 4.3           |  |
| July 29             | 384               | 400 (         | 397            | 492              | 406<br>47. 5   | 452<br>46.5  | 500              | 500                   | 5-1            | 615           | 1.5                                      |
| July 30             | 426               | 4.55          | 458            | 692              | 583            | 570          | 804              | 535                   | \$0.5          | 510           | 111                                      |
| Temperature         | 428               | 460           | 443 T<br>42, 5 | 632<br>41.5      | 41.5           | 521<br>41, 5 | 817<br>41        | 553<br>40             | 425            | 4.79          |  |
| July 31             | 528<br>465        | 718           | 801            | 451              | 567            | 461          | 6:5              | 418                   | 10.5           | 410<br>393    | 10                                       |
| Temperature         | 40.5              | 6×3<br>44     | 873<br>46      | 446<br>46. 5     | 579 i<br>46, 5 | 478<br>45, 5 | 44               | 431<br>43.5           | 4.1            | 393<br>11, 5  | 1 .                                      |
| Mean temperature    | 49.1              | 49. 5         | 50, 0          | 49. 6            | 40, 4          | 48.8         | 48.1             | 46.5                  | 40.0           | 45.1          | 41.1                                     |
| Mean readings       | 3+8.3             | 415.7         | 417.0          | 473. 3           | 478.9          | 505. 7       | 511. 8           | 505, 8                | 4-5, 7         | 482.6         | 445.1                                    |

ometer at Uglanaile, Alaska, July, 1883.

bifilar magnet.

| 112   | Noon.  | 131  | 115  | 12+   | 145 h  | 175   | 186   | 110"   | 20*  | 216  | 225  | 23  | Dat                                      |
|---|--|--|--|---|--|---|---|--|--|--|--|---|--|
| .76<br>   | 35   | 279  | \$673  | 389   | (40)   | 140   |   | (-40 - ')  | ( 10 = ')  | 41   | 241  | 201   | ž 1                                      |
| 53   46   1   4   4   4   4   4   4   4   4   4   |  | 51   512   512   513   514   515   514   515   514   515   5 | 50, 5 400, 5 400, 6 403, 403, 403, 403, 403, 403, 403, 403,  | 50<br>190<br>190<br>42,5<br>50<br>102<br>42,5<br>60<br>42,5<br>44,5<br>44,5<br>44,5<br>44,5<br>44,5<br>44,5<br>44,5 |  | 52 416 5 16 5 16 5 16 5 16 5 16 5 16 5 16                               |   | 555 209 400 219 219 219 455 465 261 445 425 425 427 47 47 47 47 47 47 47 47 47 47 47 47 47   | 500 100 100 100 100 100 100 100 100 100                              | 57, 5<br>4111<br>454, 5<br>50<br>202<br>202<br>202<br>203<br>204<br>47, 5<br>202<br>271<br>47, 5<br>204<br>47, 5<br>204<br>40, 5<br>40, | 54, 5<br>477, 478, 478, 478, 478, 478, 478, 478, | 50 100 100 100 100 100 100 100 100 100 1          | 1 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3  |
| 2012年   444   445   444   445   445   445   455 | 53 172 140 5 140 140 140 140 140 140 140 140 140 140 | 22.5 420 448 448 442 445 445 449 445 449 449 45 46 46 46 47 47 47 47 47 47 47 47 47 47 47 47 47  | 52 406 425 426 5 108 5 108 6 4 6 7 6 8 6 7 6 7 | 22 443 446 446 446 446 446 446 446 446 446  | 52 300 5 300 6 201 300 6 201 300 6 201 300 6 201 300 6 201 300 6 3 | 52 53 54 55 54 55 56 54 55 56 54 55 56 56 56 56 56 56 56 56 56 56 56 56 | 41.5<br>398<br>364<br>41<br>289<br>279<br>50<br>413 | 53 (140 - 15) (140 - 1 | 20,5 (+10+2) (42,5 (44) (44,5 (44) (44) (44) (44) (44) (44) (44) (44 | 54, 5<br>401, 5<br>402, 5<br>402, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403, 5<br>403   | 500 400 452 452 452 452 452 452 452 452 452 452  | 56 5 40 60 44 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | 10 11 11 11 11 11 11 11 11 11 11 11 11 1 |

Monthly means: Temperature, 45°.8; readings, 408.8

H. Ex. 44---64

## Hourly readings of the Brooke bifilar magnet

[To reduce 1 ad 928 approximately to a uniform series subtract 187.9 divisions from all readings after August 7, 23 hours, this correction. One division of scale (6.007).9

| Date             | <b>O</b> <sup>a</sup> ( | P F          | 9.           | 3"                | 45 .          | $\delta^{h}$  | Gh I          | 7%             | 45.             | fight 3      | 104           |
|------------------|-------------------------|--------------|--------------|-------------------|---------------|---------------|---------------|----------------|-----------------|--------------|---------------|
| -                |                         | 11.00        | 1            | 4-3-4             | 440           | ,             | 44.00.0       | 411.2          | nna I           |              |               |
| Ang 1            | 18712<br>(4×4)          | 350          | 823          | 420               | 446           | 601           | 064           | 405            | 386             | 573          | 347           |
| Temperature      | 45<br>8 8 H             | 48           | 465          | 49<br>511         | 51<br>759     | 50<br>776     | 612           | 50             | 50.5            | 49           | 4st 5         |
| Aug 2            | 31.5                    | 419          | 402          | 546               | 760           | 47            | 16.5          | 293            | 632 (           | 597<br>43    | 411           |
| Aug 3            | 100                     | 413          | 442          | 541 .             | EHID          | 4×0           | 471           | 1.15           | 510             | 544          | 155           |
| Temperature      | 52 (                    | 407          | 409<br>54    | 545               | 530<br>53     | 495           | 61            | 49.5           | 4H7<br>4H       | 46           | 476           |
| Ang 1            | 161                     | 493          | 495          | 501               | 590<br>600    | 499           | 494<br>503    | 542            | 504             | 511          | 519           |
| Temperature      | 17                      | 17. 5        | 47 5 1       | 47. 5             | 414           | 48<br>470     | 47<br>510     | 45.5           | 44              | 43           | 11            |
| Aug. 5           | 465                     | 476          | 475<br>477   | 483               | 474<br>475    | 4 < 1         | 515           | 509            | 502             | 570          | 59.5          |
| Temperature      | 45.5<br>838             | 510          | 561          | 637               | 716           | 15<br>641     | 692           | 625            | 5-6             | 662          | - R<br>- 20   |
| Aug. 6}          | 520<br>43               | 5-010<br>4/3 | 560          | 621               | 7094          | 4 1, 5        | 43.5          | 640            | 50H [<br>40 5 ] | 675          | 617           |
| Aug 7            | 534                     | 570          | 5 7          | 495               | 521           | 505           | 60.7          | 616            | 6.11            | 587          | 560           |
| Temperature      | 57.4<br>32.5            | 528 ×        | 520          | 517               | 534           | 547           | 43            | 43. 1          | 604<br>42       | 612<br>41    | 5 st<br>41    |
| Δug 8            | 486<br>511              | 492<br>500   | 618<br>584   | 840<br>910        | 727           | 562           | 619           | 701            | 634             | 710<br>692   | 6 (2          |
| Temperature      | 35                      | 45. 5<br>560 | 4A<br>554    | 49, 5<br>6: 0     | 50.5 (<br>619 | 52<br>617     | 5.2           | 691            | 6.0             | 49           | 4.1           |
| Aug. 9           | 544                     | 560          | 550          | 6.20              | D4403         | Both .        | 6.1           | 6=6            | 6" 4            | 652          | 657           |
| Temperatin       | 644                     | 63.5         | 604          | 656               | 62. 5<br>614  | 63, 5<br>618  | 63            | 710            | 600             | 754<br>1067  | 611           |
| Aug 10           | 660                     | 64           | 61.5         | 63.5              | 640           | 611           | 652           | 6.8            | 56.5            | 650          | 621           |
| Aug. 11          | 660                     | 642          | 640          | 749               | 7.17<br>720   | 870           | 892           | 811            | 557             | 794          | 716           |
| Temperature      | 659<br>56               | 650<br>54-5  | 611          | 7.15              | 503           | 876<br>52. 5  | H70           | 50             | 50 1            | 49           | 701           |
| Aug. 12          | 720<br>718              | 700<br>607   | 6.65         | 697               | 715           | 731           | 646           | () ()<br>() () | 682             | 717          | 707           |
| Temperature      | 35<br>685               | 55           | 56 I<br>682  | 55, 5<br>695      | 54<br>6eti :  | 53.5 1<br>683 | 53<br>(80     | 54<br>70h      | 53<br>700       | 718          | 727           |
| Aug. 13          | . 690 [                 | 754          | 670          | 703               | 700           | BHB           | 686           | 6.5            | 6.38            | 712          | 710           |
| Temperature      | 57, 5<br>053            | 57<br>700    | 55, 5<br>693 | 54. 5<br>680      | 50<br>700     | 52 5<br>780   | 52<br>701     | 722            | 6.18            | 50<br>720    | 517           |
| Aug. 14          | 695<br>49, 5            | 715          | 709          | 619<br>53         | 702           | 776<br>51     | 50. 5         | 770<br>48.5    | 731             | 739<br>45    | £95<br>11.5   |
| Aug. 15          | 714                     | 746          | 770          | 741               | 701           | 770           | 700           | 080            | 723             | 717          | 715           |
| Temperature      | 708 .                   | 52           | 64.5         | 53                | 56.5          | 52.5          | 55. 5         | 55.5           | 51              | 52           | 51            |
| Aug 16           | 698                     | 703<br>700   | 705          | 701               | 702<br>702    | 700           | 707           | 703            | 725             | 724<br>693   | 742           |
| Temperature      | 62.5                    | 61.5         | 60           | 60.5              | 59. 5         | 59.5          | 57. 5         | 58<br>700      | 56.5            | 54.5         | 54            |
| Aug. 17          | 720<br>716              | 712          | 700<br>701   | 715               | 694<br>705    | 709           | 707           | 714            | 720             | 718          | 7.00          |
| Temperature      | 710                     | 703          | 48. 5<br>697 | 685               | 728           | 47. 5<br>751  | 727           | 724            | 45<br>BC4       | 015          | 70            |
| Aug. 18          | 712                     | 703          | 700<br>51.5  | 69 <b>5</b><br>52 | 736<br>52     | 748<br>51. 5  | 7 i9<br>50, 5 | 736<br>49.5    | 802<br>48.5     | 610          | 70%           |
| Aug 19           | 811                     | 763          | 794          | 862               | 800           | Dil1 ;        | 742           | 715            | 752             | 775          | 46 i<br>745   |
| Temperature      | 43                      | 758          | 780<br>43    | 886<br>42.5 :     | 796<br>41.5   | 1971          | 716<br>41     | 713            | 756             | Sept.        | 728           |
| Aug. 20          | 690                     | 704<br>689   | 713          | 748<br>750        | 766<br>748    | 635<br>730    | 710           | 757            | 787<br>790      | 789<br>789   | 794           |
| Temperature      | 43                      | 44.5         | 46           | 46                | 47. 5         | 47.5          | 46.5          | 45, 5          | 44              | 42           | 41            |
| Aug. 21          | 726                     | 733<br>735   | 678<br>675   | 729<br>728        | 742           | 769<br>766    | 758<br>758    | 747            | 766<br>760      | 778          | 680           |
| Temperature      | 36<br>719               | 730          | 36, 5<br>768 | 36. 5<br>718      | 709           | 36. 5<br>736  | 733           | 36. 5<br>735   | 36. 5<br>702    | 36.5         | 36<br>755     |
| Aug. 22          | 720                     | 730          | 760          | 717<br>37. 5      | 713           | 724<br>40     | 736<br>40     | 731            | 7.15            | 805          | 751           |
| Aug. Viller      | 723<br>752              | 743          | 828          | 790               | 784           | 742           | 850           | 849            | 8.12            | 760          | 747           |
| Temperature      | 752                     | 740<br>40.5  | 836<br>40, 5 | 799               | 768<br>42     | 741           | 853<br>41     | 40.5           | 823             | 761<br>40    | 791<br>33.5 L |
| Aug. 24          | 763                     | 748<br>749   | 737<br>737   | 780               | 803           | 816<br>826    | 817<br>821    | 782<br>786     | 780<br>782      | 783<br>785   | 6.9           |
| Temperature      | 41                      | 45           | 46           | 46                | 46            | 45            | 45            | 44             | 44              | 44           | 43            |
| Aug. 25          | 754<br>756              | 735<br>740   | 768<br>761   | 743<br>739        | 745<br>741    | 770<br>771    | 787<br>782    | 823<br>800     | 823<br>816      | 759<br>745   | 805<br>812    |
| Temperature      | 731                     | 40<br>731    | 40<br>734    | 40.5              | 735           | 40. 5<br>730  | 40. 5<br>749  | 743            | 39. 5<br>752    | 39<br>774    | 782           |
| Aug. 26          | 736                     | 728          | 734          | 735               | 733           | 729           | 744           | 740            | 759             | 771          | 7×9           |
| Aug 27           | 39, 5 1<br>762          | 41<br>760    | 41<br>755    | 41<br>759         | 42<br>745     | 43<br>764     | 43<br>778     | 43<br>756      | 43<br>759       | 44. 5<br>754 | 45<br>800     |
| Temperature      | 761 1<br>44 5           | 757          | 752          | 761<br>43. 5      | 764           | 764<br>43     | 779<br>43     | 755<br>41      | 761<br>40       | 758<br>39. 5 | 806           |
| Mean temperature | 47.7                    | 48.3         | 48. 6        | 48.4              | 48.5          | 48.4          | 48, 0         | 47.2           | 46.3            | 45. 1        | 44 8          |
| Mean readings    | 498. 5                  | 590, 2       | 508.2        | 540 5 -           | 550. 2        | 560. B        | 557. 1        | 528.1          | 541.9           | 553. 1       | 524 3         |

### ometer at Uglaamie, Alaska, August, 1883.

was found as follows. Mean of 7 days, August 1 to 7 inclusive, 455 9, mean, August ≥ to 14, inclusive, 651 9, difference, 127 9.]
part of the borizontal force.]

Monthly means: Temperature, 459.5; readings, 501.2

ke bifilar magnet

347 - 466 - 147 - 156 - 147 - 15

The monthly means of the bifilar readings appear quite irregular, produced by large disturbances and by change in adjustment. The latter became necessary in consequence of the effect of temperature and moisture on the suspension. During the winter the observatory became thickly coated with ice on its sides and roof, which during thawing weather kept the interior atmosphere in a state of extreme moisture. The observed variations in the length of the suspension fibers and in the torsion of the two declination instruments may be thus accounted for, and the greater or less stiffness of the fibers was probably occasioned by moisture deposited upon it freezing and thawing alternately. The effects on the readings of changes of temperature and gradual loss of magnetism\* of the magnet or of such secular change are small compared with the above irregularities from other causes. It would seem desirable to use metallic suspension in the place of silk.

The September mean (619.5) was corrected to 519.1 by application of a rough correction of —318 divisions to the readings of the first six days, found by comparison with the mean of the succeeding six days.

In August, 1883, the mean reading was higher (639.7) than at any other time, and it was evident that the adjustment of the instrument had from some unknown cause been disturbed. One of the observers (Mr. Maxfield) states that when he took down the instrument on the 27th he found that the adjusting screw which holds the thread and determines the distance between the threads worked rather loosely in its bearings, whereas it was very fight when the instrument was first set up. It is difficult to fix upon a particular time when the rapid increase in the readings commenced, but it was most probably between August 7 and 8, and lasted for two or three days before the instrument settled again to a fixed condition. A slow, progressive motion is apparent from the last two days of July. For our present purpose the matter is of little importance, since we shall deal strictly in a differential way, only aiming at roughly comparable absolute readings. In order to reduce the monthly readings during August roughly to a uniform scale a correction of —187.0 divisions was applied.

Preapitulation of monthly mean values (inclusive of disturbances and uncorrected for changes of temperature and variations in scale values) of the hourly readings of the Brooke bifilar magnetometer at Ugacomic, Alaska, 1882–83.

| Gottingen civil time                  | <b>G</b> 1: | 14         | 2h             | 31:      | 41         | 2 :-             | 61        | 7.5       |          | \$3.11         | 10 -                | 11       |
|---------------------------------------|-------------|------------|----------------|----------|------------|------------------|-----------|-----------|----------|----------------|---------------------|----------|
| Uglaamie civil time Noo               | . i 53™.6   | 135 53m. G | 145 53m,6      | 15+58+.6 | 16h 53m, 6 | 17550m, C        | 181,50%,0 | 19 50%6   | 20-59-6  | 21: - 6        | <u>99 - 50 - 74</u> | P. S. P. |
| 1882.                                 |             |            |                |          |            |                  |           |           |          |                | **                  |          |
| September 12 to 30                    | 1.1         | 532, 0     | 5.36, 1        | 542.0    | 563, 5     | *                | 543, 0    | 535 9     | 515.5    | 529.5          | 501, 5              |          |
| October                               | 9 1         | 494.0      | 190.0          | 198.5    | 504.0      | -                | 4-10      | 11- 1     | 465 6    | 424.6          | 30 € 9              | 2.7      |
| Seveniber                             | 450.        | 451.5      | 477. 0         | 4~0.1    | 508-0      | 1-1.             | 11.7. 8   | 455.5     | 4 2 0    | 418.3          | 402.2               |          |
| December                              | 4=7.9       | 7 90, 7    | 513.3          | 514.8    | 525, 1     | 0.27.2           | 320.9     | 5 b = 0   | (00)     | 477.7          | 459. 1              |          |
| 1880.                                 |             |            |                |          |            |                  |           |           |          |                |                     |          |
| dimens                                | 405 I       | 431.5      | 441.6          | 455, 0   | 4°1. 1     | 461.4            | 454.4     | 454.6     | 449, 5   | 149.1          | 117.7               | ,1"      |
| Pebruary                              | 441.0       | 443, 6 1   | 4.11. 1        | 445.2    | 450 0      | 47.7.0           | 475.0     | 446.0     | 3307.4   | 399.3          | 1.75                |          |
| March                                 | 462 %       | 458, 3     | 4-1.8          | 510.7    | 512 1      | 510.3 .          | 4 49 7    | 451.9     | 419.1    | 43.4 1         | 4 0, 2              | -        |
| 200                                   | 357         | 354.0      | 364.9          | 418.7    | 4.22.5     | 410.4 [          | 416.9     | 4,00,60   | 411. 1   | 374 6          | 311 :               |          |
| M /                                   | 35 1 8      | 391.3      | 400.0          | 416.4    | 148 3      | 457 4 1          | 469, 0    | 47.2.9    | 472.8    | 429.1          | 419 0               | 15       |
| d. 100                                | 27 . 1      | 397. 2     | 405.8          | 444.3    | 417.3      | 470, 6 3         |           | 500 T     | 4163, 4  | 465.7          | 170.0               |          |
| de Virginia in a receptor in the      | 1 3         | 420.7      | 447 0          | 473.3    | 478.9      | 5.5.7            | 541.8     | 505 8     | 455 7    | 482.6          | 445.4               | 1.       |
| A (20st I to 27, includive            | 1 .1        | 200.5      | 5.8 2          | 540, 5   | 550, 2     | 560 8            | 557. 1    | 525 1     | 511. 3   | 558, 1         | 524. 3              | 7        |
| Cottingencia I time Soon.             | ;           | 141        | 151            | 185      | 172        | 1%1              | 19        | 20 -      | 211      | $22^{i}$       | 23                  | -        |
| Uglaamie civil time — o: 539.6        | , 56        | 2:55.36    | 35.531.6       | ¥1.50%,0 | 51.5319,6  | 6.53%,6          | 71.500.6  | 81.5 79.0 | 91.534.6 | 1055353        | 11 5"               | M- 1     |
| 1882.                                 |             |            |                |          |            |                  |           |           |          |                | 1                   |          |
| September                             |             | 50n, 4     | 487.4          | 498, 9   | 480, 4     | 481.1            | (96, 9    | 513. 6    | 509.5    | 500.9          | 5.9.1               |          |
| Octost 481.1                          | 1 1         |            | 306.1          | 420.3    | 200.4      | 390. 5           |           | 1 577.5   |          | 445            |                     | - 1      |
| November                              | 1.5         | 340.7      | 3.65 9         | 3.45. 5  | 249 4      | 254.6            |           | 342.4     |          | 431. 3         | 130.7               |          |
| December                              |             | 463.5      | 389.5          | 417. 9   | 402. 7     | 398.8            |           | 1006.5    |          | 459. 8         |                     | , .      |
|                                       |             |            |                |          |            |                  | 1-71      |           |          |                |                     |          |
| 1882.                                 | 400         | and A      | 4. 1. 4        | i        | 11.14      | 1150 0           | 1         | 11.1.12   |          |                |                     |          |
| Jone 1v 580 5                         | 370.8       | 336, 4     | 335 1          |          | 339.8      | 356.9            |           | 319.0     |          | 400, 1         |                     |          |
| February 568 2<br>Marca 572 4         | 350.2       |            | 349 S<br>346 9 | 239.3    | 305 4      | 28 F 8<br>320, 2 |           | 344 i     | Lac. 6   | 36 ! 6         | 101 /               |          |
|                                       |             |            | 299 4          | 3.01.0   | 313 5      |                  |           | 250.0     | 337.4    | 4 1.3          | 441.3               |          |
| Mas 11 9                              | 31 - 0      | 254.9      | 317 6          |          | 276.1      | 2.1.6            |           | 332.8     |          | 3_9 4          | 400.3               |          |
| June 116 3                            | 350 6       |            | 317 0          | 338.9    | 25 2       | 20.7.2           |           | - 1.3     |          | 153, 0         |                     |          |
|                                       | 10.7. 1     |            | .08, 1         | 341.7    | 520.3      | 2511             | 274 3     | 3 - 10    |          | 3: 1.0         | 3.13                |          |
| August 38 5                           | 51 9        |            | 472.8          | 473 4    | 461. 2     | 411.0            |           | 44.5      |          | 3: 10<br>400 0 | 1-1.                |          |
| as a part of the second second second | .1,         | F 1 2      | 412.8          | 4 , 3 4  | 401.2      | 4111             | 4.307     | 447.0     | Fr. 11   | 4600 0         | 1,0,                | - 10     |
|                                       |             |            |                |          |            |                  |           |           |          |                |                     |          |

<sup>&</sup>quot;The Brooke magnets are now over thirty years old. They were used at Washington in 1853,

Solar diurnal variation of the horizontal force (inclusive of disturbances), expressed in scale divisions and uncorrected for changes in temperature.

| Göttingen civil time.   |  | 0 b  | <b>1</b> h   | 24   | 3h   | 41   | ű <sup>h</sup>  | #2H  | 7 h  |
|---|--|--|--|--|--|--|---|--|--|
| Uglaamie civil time.  |  | Noon+53**.6  | 13h+53m,6  | 14h+53m.6  | 15h-j-53m.6  | 16°+53°.6  | 17h+53m,6   | 18h- -53m.6  | 19 <sup>5</sup> +53 <sup>m</sup> .6  |
| 1882.   |  |  |  |  |  |  |   |  |  |
| Sentember   |  | +18.0  | $^{+12.9}_{+56.2}$   | +17.0  | + 22.9<br>+ 60.7   | + 44.4<br>+ 66.2   | + 39.7  | + 43.9<br>+ 51.2   | + 19.8   |
| Autohor   |  | +51.0  | +56.2  | + 52. 2  | + 60.7   | + 66.2   | + 48.0  | + 51.2   | + 0.0<br>+ 47.   |
| November  |  | +51.0<br>+27.5   | +73.7<br>+40.3   | -68. 9<br>-52. 9   | + 72.0<br>+ 54.4   | + 99. 9<br>+ 64. 7   | + 77.2<br>+ 61.8  | + 59, 7<br>+ 60, 5   | + 47.4   |
| 1883.   |  | 7 21.0   | 740.0  |  |  |  | 4 01.0  |  | 7 04.  |
| January   |  | +39.4  | +32.8  | +42.9<br>+51.4<br>+72.3  | + 56.3<br>+ 62.1<br>+101.2   | + 62.4   | + 62.7  | + 55.7<br>+ 02.2   | + 55.  |
| January February March April May June   |  | + 57. 9<br>+ 53. 0   | +60.5  | +51.4  | + 62.1   | 75. 9  | +100.8  | + 12.2   | + 62.1<br>72.  |
| March   |  | +14.0  | +48.8  | +23.4  |  | +102.6<br>+ 81.0   | + 64.0  | + 80.2<br>+ 75.4   | 82.  |
| May   |  | + 19. 8  | +14.3  | +31.0  | + 39.4   | -t- 71. 3  | - 80.4  | + 92.0   | -r- 95, f  |
| July  | ******   | -15, 0<br>-90, 5   | -+-10. 1   | +18.7  | + 57.2   | + 80, 2<br>+ 70, 1   | + 83.5<br>+ 96.9  | +131.4   | -1: 95. 9<br>-: 121. 0<br>-: 97. 0   |
| July  |  | - 30. 5<br>- 2. 7  | +16.9<br>- 1.0   | +38.2<br>+ 7.0   | + 39. 4<br>+ 57. 2<br>+ 64. 5<br>+ 39. 3   | + 70. 1<br>+ 49. 0   | + 96. 9<br>+ 59. 6  | + 103, 0<br>+ 55, 9  | - 26.  |
| April to September, inclusive   |  | + 2.3  | +10.8  | +22.6  | + 50.1   | + 66, 0  | + 71.5  | + 83.6   | + 73.1   |
| October to March, inclusive   |  | + 46, 7  | +52.1  |  | + 67. 8  | +78.6  | + 73.4  | + 66, 6  |  |
|   | -  | +24.5  | -+31.4   | +39.7  | + 58.9   | + 72.3   | - 72.5  |  |  |
| Year  |  | +24.0  |  | +39.7  | + 58.9   |  | -, 72.0   | 70.1   |  |
| Göttingen civil time.   |  | 8h   | 94   | 10h  | 116  | Noon.  | 13h   | 144  | 15h  |
| Uglaamie civil time.  |  | 20h+53m.6  | 21b+53m.6  | 22h+53m.6  | 23h+53m.6  | 0h+53m.6   | 1h+52m.6  | 2h +53m.6  | 9h + 53m,6   |
|   |  |  |  |  |  |  |   |  |  |
| 1882.   |  |  |  |  | 1  |  |   |  | 1  |
| September   |  | - 0.3  | +10.4  | -17. 3   | 7. 5   | -14.7  | -10.7   | -18.7  | -31.   |
| October   |  | + 30.8<br>+ 43.9   | $-13.2 \\ +10.2$   | 46. 9<br>5, 9  | 7. 7. 5<br>—32. 9<br>—35. 4  | -36.7<br>-11.8   | + 4.3<br>-39.4  | -31, 9<br>-67, 4   | -31.<br>-72.   |
| November<br>December  |  | + 40.4   | +17.3  | = 1.3  | + 7.2  | -13. 9   | -63. 2  | -56.9  | -70.   |
|   |  |  |  |  |  |  |   |  |  |
|   |  |  | 1  |  |  |  | i   |  |  |
| 1883.   |  | + 50.8   | ±50.7  | +19.0  | -26.6  | -15.4  | -27. 9  | -62.3  | 163  |
| _   |  | + 50.8<br>+ 14.3   | +50.7<br>+16.2   | +19.0<br>- 8.1   | -26.6<br>-17.2   | -15.4<br>+ 5.1   | -27. 9<br>-46. 1  | -62.3<br>-64.2   | -63<br>-33.  |
| _   |  | + 50.8<br>+ 14.3<br>+ 9.6  | +16.2  | - 8. 1<br>- 9. 3   | -17. 2<br>-34. 3   | + 5.1<br>-37.1   | 46, 1<br>26, 3  | -64. 2<br>-82. 8   | —33.<br>—62.   |
| _   |  | + 50.8<br>+ 14.3<br>+ 9.6<br>- 60.6  | +16.2<br>+29.6<br>+33.3  | - 8.1<br>- 9.3   | -17. 2<br>-34. 3<br>- 5. 2   | + 5.1<br>-37.1<br>-30.5  | 46, 1<br>26, 3<br>50, 7   | -64. 2<br>-82. 8<br>-46. 6   | -33.<br>-62.<br>-42.   |
| January February March April May  |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3   | +16.2<br>+29.6<br>+33.3<br>+52.1<br>+78.6  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9  | -17. 2<br>-34. 3<br>- 5. 2<br>+11. 8<br>- 5. 6   | + 5.1<br>-37.1<br>-30.5<br>-35.2<br>+19.2  | -46. 1<br>-26. 3<br>-50. 7<br>-62. 0<br>- 6. 5  | -64, 2<br>-82, 8<br>-46, 6<br>-57, 1<br>-57, 4   | -33.<br>-62.<br>-42.<br>-59.<br>-40.   |
| January February March April May  |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3   | +16.2<br>+29.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8   | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3  | -17. 2<br>-34. 3<br>- 5. 2<br>+11. 8<br>- 5. 6<br>+12. 8   | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1   | -46, 1<br>-26, 3<br>-50, 7<br>-62, 0<br>- 6, 5<br>-21, 8  | -64, 2<br>-82, 8<br>-46, 6<br>-57, 1<br>-57, 4<br>-12, 4   | -33.<br>-62.<br>-42.<br>-59.<br>-40.<br>-10.   |
| January February March April Jane Jane Jane Jane July August  |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7   | +16.2<br>+29.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8<br>+51.9  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3<br>+ 23.1  | $\begin{array}{r} -17.2 \\ -34.3 \\ -5.2 \\ +11.8 \\ -5.6 \\ +12.8 \\ +5.7 \end{array}$  | + 5.1<br>-37.1<br>-30.5<br>-35.2<br>+10.2<br>-13.1<br>+18.3  | -46. 1<br>-26. 3<br>-50. 7<br>-62. 0<br>- 6. 5<br>-21. 8<br>+12. 7  | -61, 2<br>-82, 8<br>-46, 6<br>-57, 1<br>-57, 4<br>-12, 4<br>- 5, 0   | -33.<br>-62.<br>-42.<br>-59.<br>-40.<br>-10.<br>-28.   |
| January February March April May June July August April to September, inclusive   |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7   | +16.2<br>+29.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8<br>+51.9  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3<br>+ 23.1<br>+ 20.0  | -17. 2<br>-34. 3<br>- 5. 2<br>+11. 8<br>- 5. 6<br>+12. 8<br>+ 5. 7<br>+ 4. 5   | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1<br>+18. 3<br>- 9. 3   | -46.1<br>-26.3<br>-50.7<br>-62.0<br>-6.5<br>-21.8<br>+12.7  | -64. 2<br>-82. 8<br>-46. 6<br>-57. 1<br>-57. 4<br>-12. 4<br>- 5. 0   | -33.<br>-62.<br>-42.<br>-59.<br>-40.<br>-10.<br>-28.   |
| January February March April May June July August April to September, inclusive October to March, inclusive   |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6   | +16.2<br>+20.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8<br>+51.9<br>+50.0<br>+18.5  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3<br>+ 23.1<br>+ 20.0<br>- 8.8   | $ \begin{array}{r} -17.2 \\ -34.3 \\ -5.2 \\ +11.8 \\ -5.6 \\ +12.8 \\ +5.7 \end{array} $ $ \begin{array}{r} +4.5 \\ -23.2 \end{array} $   | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1<br>+18. 3<br>- 9. 3<br>-18. 3   | -46.1<br>-26.3<br>-50.7<br>-62.0<br>-6.5<br>-21.8<br>+12.7<br>-23.2   | -64. 2<br>-82. 8<br>-46. 6<br>-57. 1<br>-57. 4<br>-12. 4<br>- 5. 0<br>-32. 9   | -33.<br>-62.<br>-42.<br>-59.<br>-40.<br>-10.<br>-28.<br>-37.<br>-55.   |
| January February March April May June July August April to September, inclusive Qctober to March, inclusive   |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6<br>+ 47.1   | +16.2<br>+29.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8<br>+51.9  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3<br>+ 23.1<br>+ 20.0<br>- 8.8   | $ \begin{array}{r} -17.2 \\ -34.3 \\ -5.2 \\ +11.8 \\ -5.6 \\ +12.8 \\ +5.7 \end{array} $ $ \begin{array}{r} +4.5 \\ -23.2 \end{array} $   | + 5.1<br>-37.1<br>-30.5<br>-35.2<br>+19.2<br>-13.1<br>+18.3<br>-9.3<br>-18.3   | -46.1<br>-26.3<br>-50.7<br>-62.0<br>-6.5<br>-21.8<br>+12.7  | -64. 2<br>-82. 8<br>-46. 6<br>-57. 1<br>-57. 4<br>-12. 4<br>- 5. 0   | -33.<br>-62.<br>-42.<br>-59.<br>-40.<br>-10.<br>-28.<br>-37.<br>-55.   |
| January February March April May June July August April to September, inclusive October to March, inclusive   |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6   | +16.2<br>+20.6<br>+33.3<br>+52.1<br>+78.6<br>+73.8<br>+51.9<br>+50.0<br>+18.5  | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 22.9<br>+ 36.3<br>+ 23.1<br>+ 20.0<br>- 8.8   | $ \begin{array}{r} -17.2 \\ -34.3 \\ -5.2 \\ +11.8 \\ -5.6 \\ +12.8 \\ +5.7 \end{array} $ $ \begin{array}{r} +4.5 \\ -23.2 \end{array} $   | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1<br>+18. 3<br>- 9. 3<br>-18. 3   | -46.1<br>-26.3<br>-50.7<br>-62.0<br>-6.5<br>-21.8<br>+12.7<br>-23.2   | -64. 2<br>-82. 8<br>-46. 6<br>-57. 1<br>-57. 4<br>-12. 4<br>- 5. 0<br>-32. 9   | -33,<br>-62,<br>-42,<br>-59,<br>-40,<br>-10,<br>-28,<br>-37,<br>-55,<br>-46  |
| January February March April May Jano Jano Jain Jain Jain Jain Jain John John April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.   | 162  | + 14.3<br>+ 9.6<br>+ 60.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6<br>+ 47.1   | +16. 2<br>+20. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2   | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 23.3<br>+ 23.1<br>+ 20.0<br>- 8.8<br>+ 5.6  | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-5. 6<br>+12. 8<br>+5. 7<br>+4. 5<br>-23. 2<br>-9. 4  | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1<br>+18. 3<br>-0. 3<br>-18. 3<br>-13. 8  | -46, 1<br>-26, 3<br>-50, 7<br>-82, 0<br>-6, 5<br>-21, 8<br>+12, 7<br>-23, 2<br>-33, 1<br>-28, 1   | -61, 2<br>-82, 8<br>-60, 6<br>-57, 1<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 0<br>-60, 9<br>-46, 9  | -33, -62, -42, -59, -10, -10, -28, -37, -55, -46   |
| January February March April May Jone July Angulat April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  |  | + 14.3<br>+ 9.6<br>+ 69.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6<br>+ 47.1   | +16. 2<br>+20. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2   | - 8.1<br>- 9.3<br>+ 2.8<br>+ 52.3<br>+ 23.3<br>+ 23.1<br>+ 20.0<br>- 8.8<br>+ 5.6  | -17.2<br>-34.3<br>-5.2<br>+11.8<br>-5.6<br>+12.8<br>+5.7<br>-23.2<br>-9.4  | + 5.1<br>-37.1<br>-30.5<br>-35.2<br>+19.2<br>-13.1<br>+18.3<br>-0.3<br>-18.3   | -46.1<br>-26.3<br>-50.7<br>-62.0<br>-6.5<br>-21.8<br>+12.7<br>-23.2<br>-33.1<br>-28.1   | -61, 2<br>-82, 8<br>-10, 6<br>-57, 1<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 0<br>-60, 9  | -33, -62, -42, -49, -49, -49, -49, -49, -49, -49, -49  |
| January February March April May Jone July August April to September, inclusive October to March, inclusive Year  Göttingen civil time.   | 162  | + 14.3<br>+ 9.6<br>+ 60.6<br>+ 75.8<br>+ 109.3<br>+ 79.9<br>+ 40.7<br>+ 62.5<br>+ 31.6<br>+ 47.1   | +16. 2<br>+20. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2   | - 8.1<br>- 9.3<br>- 2.8<br>- 52.3<br>- 22.9<br>- 36.3<br>- 23.1<br>- +20.0<br>- 8.8<br>- 5.6   | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-5. 6<br>+12. 8<br>+5. 7<br>+4. 5<br>-23. 2<br>-9. 4  | + 5. 1<br>-37. 1<br>-30. 5<br>-35. 2<br>+19. 2<br>-13. 1<br>+18. 3<br>-0. 3<br>-18. 3<br>-13. 8  | -46, 1<br>-26, 3<br>-50, 7<br>-82, 0<br>-6, 5<br>-21, 8<br>+12, 7<br>-23, 2<br>-33, 1<br>-28, 1   |  | -33, -62, -42, -59, -10, -10, -28, -37, -55, -46   |
| January February March April May June July Angulat April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglaamie civil time.  | 16 <sup>1</sup><br>4 <sup>3</sup> +53=.6<br>—29.2  | 14.3 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0   | +16. 2<br>+29. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2<br>-18 <sup>h</sup>   | - 8.1  |  | 9 + 5.1 1 - 37.1 1 - 39.5 5 - 35.5 2 + 19.2 2 + 19.3 1 + 18.3 3 - 18.3 - 13.8 24 <sup>h</sup> 9 <sup>h</sup> +53 <sup>m</sup> .6 - 9.6   | -46, 1 -26, 3 -50, 7 -62, 0 -6, 5 -21, 8 +12, 7 -23, 2 -33, 1 -28, 1  22 <sup>h</sup> 10 <sup>h</sup> +53 <sup>m</sup> , 6  |  | -33, -62, -42, -42, -59, -40, -40, -40, -40, -40, -40, -40, -46  Scale value in parts of force, 0.0000   |
| January February March April May June July Angulat April to September, inclusive. October to March, inclusive. Year Güttingen civil time.  Uglaamie civil time.  September October October  | 16 <sup>L</sup><br>4 <sup>h</sup> +53 <sup>a</sup> .6<br>-20, 2<br>-17, 5  | 14.3<br>4.9.6<br>4.60.6<br>4.75.8<br>109.3<br>170.9<br>4.0.7<br>4.62.5<br>4.31.6<br>4.7.1<br>17 <sup>b</sup><br>5 <sup>b</sup> +53 <sup>o</sup> .6   | +16. 2<br>+29. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2<br>-38. 0<br>-47. 3   | - 8.1<br>- 9.3<br>- 2.8<br>- 52.3<br>- 422.9<br>- 36.3<br>- 23.1<br>- 20.0<br>- 8.8<br>- 45.6<br>- 45.6<br>- 22.2<br>- 22.2<br>- 22.2  |  | 9 + 5.1  | -46, 1 -26, 3 -50, 7 -62, 0 -6, 5 -21, 8 +12, 7 -23, 2 -33, 1 -28, 1  22 <sup>h</sup> 10 <sup>h</sup> +53 <sup>m</sup> , 6  | $ \begin{vmatrix} -611.2 \\ -82.8 \\ -40.6 \\ -57.1 \\ -57.4 \\ -12.4 \\ -5.0 \end{vmatrix} $ $ -32.0 $ $ -60.0 $ $ -40.9 $ $ -10.0 $ $ +10.0 $ $ +37.0 $  | -33, -62, -42, -49, -40, -10, -10, -28, -37, -55, -46  Scale value in parts of force, 0,0000   |
| January February March April May June July April to September, Inclusive. October to March, Inclusive. Year  Göttingen civil time.  Uglaamie civil time.  1882 September October October November   | 16 <sup>1</sup> -20, 2  -17, 5  -7, 6  | 14.3 4.9 6.0 6.1 14.3 1.0 14.3 | +18.2 +29.6 +33.3 +52.1 +78.6 +73.8 +731.9 +50.0 +18.5 +34.2 -18.6 +6.5 =6.6 +3.8 +3.1 +3.5 +3.1 +3.1 +3.1 +3.1 +3.1 +3.1 +3.1 +3.1  | - 8.1<br>- 9.3<br>- 2.8<br>- 52.3<br>- 422.9<br>- 36.3<br>- 23.1<br>- 20.0<br>- 8.8<br>- 45.6<br>- 45.6<br>- 22.2<br>- 22.2<br>- 22.2  | -17. 2<br>-34. 3<br>-5. 2<br>+11.8<br>-15. 6<br>+12.8<br>+5. 7<br>-23. 2<br>-9. 4<br>-20 <sup>4</sup><br>-5. 5<br>-60. 2<br>-5. 5<br>-60. 2<br>-5. 5<br>-60. 2<br>-5. 6<br>-60. 2<br>-5. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6<br>-6. 6 | \$\\ \begin{array}{c} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \  | -46.1   | -61. 2<br>-82. 8 -10. 6<br>-57. 1 -57. 4<br>-12. 4 -5. 0<br>-32. 9<br>-60. 9<br>-46. 9<br>-23 <sup>b</sup><br>-11 <sup>b</sup> +53 <sup>a</sup> . 6  | -33, -62, -42, -40, -40, -40, -10, -10, -28, -37, -55, -46  Scale value in parts of force, 0,0000  |
| January February March April May Julio Julio Julio Julio April to September, inclusive. October to March, inclusive. Year  Göttingen civil time.  Uglaamie civil time.  1882. September October Kovember De comber November De comber De comber   | 16 <sup>L</sup><br>4 <sup>h</sup> +53 <sup>a</sup> .6<br>-20, 2<br>-17, 5  | 14.3<br>4.9.6<br>4.60.6<br>4.75.8<br>109.3<br>170.9<br>4.0.7<br>4.62.5<br>4.31.6<br>4.7.1<br>17 <sup>b</sup><br>5 <sup>b</sup> +53 <sup>o</sup> .6   | +16. 2<br>+29. 6<br>+33. 3<br>+52. 1<br>+78. 6<br>+73. 8<br>+51. 9<br>+50. 0<br>+18. 5<br>+34. 2<br>-38. 0<br>-47. 3   | - 8.1  |  | 9 + 5.1  | -46, 1 -26, 3 -50, 7 -62, 0 -6, 5 -21, 8 +12, 7 -23, 2 -33, 1 -28, 1  22 <sup>h</sup> 10 <sup>h</sup> +53 <sup>m</sup> , 6  | $ \begin{vmatrix} -611.2 \\ -82.8 \\ -40.6 \\ -57.1 \\ -57.4 \\ -12.4 \\ -5.0 \end{vmatrix} $ $ -32.0 $ $ -60.0 $ $ -40.9 $ $ -10.0 $ $ +10.0 $ $ +37.0 $  | -33, -62, -42, -49, -40, -10, -10, -28, -37, -55, -46  Scale value in parts of force, 0,0000   |
| January February March April May June July August April to September, inclusive. October to March, inclusive. Year Güttingen civil time.  Uglaamie civil time.  1882 September October November Deember Deember   | 16 <sup>2</sup> 4 <sup>3</sup> +53=.6  -20, 2 -17, 5 -72, 6 -42, 5   | 14.3 4 14.3 4 14.3 1 14.3 1 14.5 1  | 18.2 + 18.2 + 29.6 + 29.6 + 29.6 + 29.6 + 29.1 + 29 | - 8.1<br>- 9.3<br>- 12.8<br>- 12.8<br>- 12.6<br>- 13.1<br>- 12.0<br>- 8.8<br>- 19h<br>- | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-15. 6<br>+12. 8<br>-23. 2<br>-9. 4<br>-23. 2<br>-9. 4<br>-5. 5<br>-60. 7<br>-61. 9   | + 5.1<br>-30.5<br>-30.5<br>-35.2<br>+10.2<br>+10.2<br>-13.1<br>+18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-19.5<br>-1 | -46. 1 -26. 3 -50. 7 -62. 0 -6. 5 -21. 8 -12. 7 -23. 1 -28. 1 -28. 1 -18. 2 -33. 1 -28. 1 -6. 6   | -61, 2<br>-82, 8<br>-40, 6<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 0<br>-60, 9<br>-10, 9<br>-11, 23, 11, 12, 13, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14   | -33622424240401028375546  k Scale value in parts of force, 0.0000  |
| January February March April May June July Angulat April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglaamie civil time.  1882 September October November De ember.   | 16 <sup>1</sup> -20, 2  -17, 5  -72, 6  -42, 5  -58, 9  -83, 8   | 14.3 4 14.3 4 14.3 4 14.3 4 14.5 4  | +18.2 +29.6 +33.3 +92.1 +73.8 +92.1 +73.8 +73.8 +73.8 +73.8 +73.8 +73.4 +23.8 +23.8 +23.8 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3 +23.6 +23.3  | - 8, 1<br>- 9, 3<br>+ 2, 8<br>+ 2, 3<br>+ 2, 3<br>+ 36, 3<br>+ 36, 3<br>+ 36, 3<br>+ 36, 3<br>+ 20, 0<br>- 8, 8<br>+ 5, 6<br>19 <sup>h</sup> 7 <sup>h</sup> +63 <sup>m</sup> ,6  - 22, 2<br>- 83, 4<br>- 33, 4 - 33, 4 - 33, 4   | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-15. 6<br>+12. 8<br>-15. 6<br>+12. 8<br>-23. 2<br>-9. 4<br>-23. 2<br>-9. 4<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-6. 7<br>-7. 7<br>-6. 7<br>-6. 7<br>-7. 7<br>-6. 7<br>-7. 7<br>-6. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7<br>-7. 7           | + 5. 1<br>   | -46. 1 -26. 3 -50. 7 -62. 0 -6. 5 -1. 8 -12. 7 -28. 1 -28. 1 -28. 1 -18. 2 -33. 1 -28. 1 -18. 2 -4. 3. 7 -28. 6 -1. 4. 7 -26. 5 -26. 8  | -61, 2<br>-82, 8<br>-10, 6<br>-57, 1<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 9<br>-60, 9<br>-40, 9<br>-11 <sup>2</sup> +53°, 6<br>+10, 4<br>+10, 4<br>+21, 2<br>+21,      | -33, -62, -62, -62, -63, -63, -63, -63, -63, -63, -63, -63   |
| January February March April May June July Angulat April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglaamie civil time.  1882 September October November De ember.   | 16 <sup>4</sup> 4 <sup>3</sup> +53=.6  -29, 2 -17, 5 -72, 6 -42, 5  -58, 9 -83, 8 -68, 5   | 14.3 4 14.3 4 14.3 1  | 18.2 + 18.2 + 29.6 + 33.3 + 52.1 + 78.6 + 473.8 + 51.9 + 50.0 + 18.5 + 34.2 + 27.3 + 2 | - 8.1  | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-5. 6<br>+12. 8<br>+5. 7<br>+4. 5<br>-23. 2<br>-5. 5<br>-6. 2<br>-6. 2<br>-6. 2<br>-70. 7<br>-30. 0<br>-70. 7<br>-30. 0<br>-30. 2<br>-30. 2   | + 5, 1<br>-97, 1<br>-90, 5<br>-95, 2<br>+19, 2<br>+19, 2<br>-13, 1<br>+18, 3<br>-18, 5<br>-18, 5   | -46. 1<br>-26. 3<br>-50. 7<br>-62. 0<br>-6. 5<br>-21. 8<br>+12. 7<br>-23. 2<br>-33. 1<br>-28. 1<br>22 <sup>k</sup><br>10 <sup>k</sup> +53 <sup>m</sup> .6<br>+1. 7<br>-2. 1<br>-2. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1<br>-4. 1 | -61, 2<br>-82, 8<br>-40, 6<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 0<br>-60, 9<br>-10, 9<br>-112+53**,6<br>-127, 0<br>+31, 6<br>+10, 4<br>+12, 4<br>+12, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 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2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11, 2<br>+11,                  | -3362242424010101028375546  k Scale value in parts of force, 0.0000  |
| January February March April May June July Angulat April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglaamie civil time.  1882 September October November De ember.   | 16 <sup>1</sup> -20, 2 -17, 5 -72, 6 -42, 5 -58, 9 -83, 8 -68, 5 -37, 6  | 14.3 4 14.3 4 14.3 4 14.3 4 14.5 4  | 18.2 + 18.2 + 29.6 + 29.6 + 29.6 + 29.6 + 29.8 + 29.1 + 29.8 + 29.1 + 29.8 + 29.1 + 29.8 + 29.1 + 29 | - 8, 1<br>- 9, 3<br>+ 2, 8<br>+ 22, 9<br>+ 26, 3<br>+ 26, 3<br>+ 26, 3<br>+ 26, 1<br>+ 20, 0<br>- 8, 8<br>+ 5, 6<br>- 22, 2<br>- 85, 4<br>- 33, 4<br>- 33, 4<br>- 20, 9<br>- 20, 9<br>- 30, 3<br>- 3   | -17. 2<br>-34. 3<br>-5. 2<br>+11. 8<br>-5. 6<br>+12. 8<br>+5. 7<br>+4. 5<br>-23. 2<br>-5. 5<br>-6. 2<br>-6. 2<br>-6. 2<br>-70. 7<br>-30. 0<br>-70. 7<br>-30. 0<br>-30. 2<br>-30. 2   | + 5.1<br>97.1<br>90.5<br>35.2<br>+-19.2<br>13.1<br>+-18.3<br>18.3<br>13.8<br>  | -46.1 -26.3 -50.7 -62.0 -6.5 -21.8 -6.5 -12.7 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5   | -61, 2<br>-82, 8<br>-10, 6<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 9<br>-40, 9<br>-40, 9<br>-40, 9<br>-40, 9<br>-41, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 43, 6<br>-410, 4<br>-410, 4   | -3362242424040404040404040   |
| January February March April May Jone July April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglasmic civil time.  September November De cmber De cmber January January January January January January January January January March April  | 16 <sup>4</sup> 4 <sup>3</sup> +53=.6  -29, 2 -17, 5 -72, 6 -42, 6 -42, 6 -42, 6 -43, 8 -68, 5 -37, 6 -68, 1   | 14.3 4 69.6 6  | 18.2 + 20.6 + 20.3 + 20.6 + 20 | - 8.1  | -17. 2 -34. 3 -5. 2 -5. 2 -5. 5 -60. 2 -5. 5   | + 5. 1<br>-97.1<br>-97.2<br>-93.5<br>-95.2<br>+19.2<br>-13.1<br>+18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>-18.3<br>- | -46.1 -26.3 -50.7 -62.0 -6.5 -21.8 -6.5 -12.7 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5   | -61, 2<br>-82, 8<br>-40, 6<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 0<br>-60, 9<br>-10, 9<br>-10, 9<br>-11, 10, 0<br>-37, 0<br>+31, 6<br>+10, 4<br>+18, 2<br>+18, 2<br>+18, 2<br>+16, 6<br>+1, 16<br>+1, 16                  | -336224240401028374546  k Scale value in parts of force, 0.0000  |
| January February March April May Jone July April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglasmic civil time.  September October November De ember De ember January February Harch May May July July July July July July July Jul  | 10 <sup>4</sup><br>4 <sup>3</sup> +53=.6<br>-20, 2<br>-17, 5<br>-72, 6<br>-42, 5<br>-83, 8<br>-84, 6<br>-85, 6<br>-86, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-8 | 14.3 4 9.6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 18.2 + 2.3.3 + 2.3.4 + 2.3.3 + 2.3.4 + 2.3.3 + 2.3.4 + | - 8.1  | -17. 2 -34. 3 -5. 2 -5. 2 -5. 3 -5. 2 -5. 3 -5. 3 -5. 3 -5. 5 -5. 5 -60. 2 -5. 5 -60. 2 -60.  | + 5.1<br>-30.5<br>-30.5<br>-30.5<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+1 | -46.1 -26.3 -50.7 -62.0 -6.5 -12.7 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.3 -6.6 -6.5 -2.2 -8.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2  | -61, 2<br>-82, 8<br>-10, 6<br>-57, 4<br>-17, 4<br>-5, 0<br>-72, 9<br>-60, 9<br>-10, 9<br>-10, 9<br>-11 <sup>2</sup> +53 <sup>2</sup> , 6<br>+10, 0<br>+31, 6<br>+10, 4<br>+10, 4<br>+11, 4<br>+11, 4<br>+11, 2<br>+31, 1<br>+11, 2<br>+31, 2 | -33622424040404040404040   |
| January February March April May Jone July April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglasmic civil time.  September November De cmber De cmber January January January January January January January January January March April  | 16 <sup>2</sup> 4 <sup>3</sup> +53°.6 -20, 2 -17, 5 -72, 6 -42, 5 -58, 9 -68, 5 -37, 6 -68, 1 -61, 2   | 14.3 4 14.3 4 14.3 1 14.3 1 14.3 1 14.5 1  | 18.2 + 18.2 + 29.6 + 29 | - 8, 1<br>- 9, 3<br>+ 2, 8<br>+ 22, 9<br>+ 36, 3<br>+ 25, 1<br>+ 20, 0<br>- 8, 8<br>+ 5, 6<br>- 22, 2<br>- 85, 4<br>- 33, 4<br>- 70, 2<br>- 70, 2<br>- 70, 1<br>- 70, 2<br>- 70, 2<br>- 70, 1<br>- 70, 2<br>- 70, 1<br>- 70, 2<br>- 70, 3<br>- 7   | -17. 2 -34. 3 -5. 2 -5. 2 -5. 5 -60. 2 -5. 5   | + 5. 1<br>-97.1<br>-97.2<br>-95.2<br>-95.2<br>-95.2<br>+19.2<br>-13.1<br>+18.3<br>-18.3<br>-13.8<br>-13.8<br>-13.8<br>-14.8<br>-15.2<br>-16.1<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>-17.2<br>- | -46. 1 -26. 3 -50. 7 -62. 0 -6. 5 -1. 8 -112. 7 -23. 2 -28. 1 -28. 1 -28. 1 -28. 1 -28. 1 -18. 2 -28. 1 -18. 2 -18  | -61, 2<br>-82, 8<br>-10, 6<br>-57, 4<br>-12, 4<br>-5, 0<br>-32, 9<br>-40, 9<br>-40, 9<br>-40, 9<br>-40, 9<br>-41, 4<br>-41, 6<br>-41,              | -33622424240404040405546  Scale value in parts of force, |
| January February March April May Jone July April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglasmic civil time.  September October November De ember De ember January February Harch May May July July July July July July July Jul  | 10 <sup>4</sup><br>4 <sup>3</sup> +53=.6<br>-20, 2<br>-17, 5<br>-72, 6<br>-42, 5<br>-83, 8<br>-84, 6<br>-85, 6<br>-86, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-87, 6<br>-8 | 14.3 4 9.6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 18.2 + 2.3.3 + 2.3.4 + 2.3.3 + 2.3.4 + 2.3.3 + 2.3.4 + | - 8.1  | -17. 2 -34. 3 -5. 2 -5. 2 -5. 3 -5. 2 -5. 3 -5. 3 -5. 3 -5. 5 -5. 5 -60. 2 -5. 5 -60. 2 -60.  | + 5.1<br>-30.5<br>-30.5<br>-30.5<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+10.2<br>+1 | -46.1 -26.3 -50.7 -62.0 -6.5 -12.7 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.1 -28.3 -6.6 -6.5 -2.2 -8.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2  | -61, 2<br>-82, 8<br>-10, 6<br>-57, 4<br>-17, 4<br>-5, 0<br>-32, 9<br>-60, 9<br>-60, 9<br>-10, 9<br>-11 <sup>2</sup> +53°, 6<br>+10, 4<br>+27, 3<br>+31, 6<br>+10, 4<br>+27, 1<br>+31, 9<br>+31,      | -3362.2 -42424040404040404040  |
| January February March April May Jone July April to September, inclusive. October to March, inclusive. Year  Güttingen civil time.  Uglaamie civil time.  September October November Do comber November Do comber September January February March April May January March April May July July July July July July July Jul | 10 <sup>4</sup><br>+ + 53=.6<br>-20, 2<br>-17, 5<br>-72, 6<br>-42, 5<br>-58, 9<br>-88, 8<br>-68, 5<br>-37, 6<br>-68, 1<br>-68, 1<br>-72, 8   | 14.3 4 14.3 4 14.3 1 14.3 1 14.5 1  | 18.2 + 10.2 + 20.6 + 20.3 + 20.1 + 20 | - 8, 1<br>- 9, 3<br>- 2, 8<br>- 2, 6<br>- 3, 6<br>- 3, 6<br>- 3, 6<br>- 3, 6<br>- 4, 6<br>- 4, 6<br>- 4, 6<br>- 5<br>- 6<br>- 8, 6<br>- 6<br>- 8, 6<br>- 6<br>- 7, 6<br>- 7, 6<br>- 7, 6<br>- 7, 7<br>- 7, 7   | -17. 2 -34. 3 -5. 5 -4. 12. 8 -5. 5 -6. 12. 8 -5. 7 -6. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19   | + 5. 1<br>-30. 5<br>-30. 5<br>-30. 5<br>+10. 2<br>+10. 2<br>+10. 1<br>+18. 3<br>-18. 3<br>-18. 3<br>-18. 3<br>-18. 3<br>-19. 8<br>-19. 8<br>-19. 8<br>-37. 8<br>-37. 8<br>-38. 6<br>-48. 3<br>-48. 3   | -46.1 -26.3 -50.7 -62.0 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5 -6.5   | -61, 2<br>-82, 8<br>-10, 6<br>-57, 4<br>-17, 4<br>-5, 0<br>-72, 9<br>-60, 9<br>-10, 9<br>-10, 9<br>-11 <sup>2</sup> +53 <sup>2</sup> , 6<br>+10, 0<br>+31, 6<br>+10, 4<br>+10, 4<br>+11, 2<br>+31, 11, 11, 11, 11, 11, 11, 11, 11, 11,   | -3362242424040404040404040   |

eed by large disa consequence of r the observatory her kept the intethe length of the hus accounted for, we deposited upon temperature and compared with the suspension in the

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ie, and it was evii disturbed. One
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tween the threads
ment was first set
he readings conthree days before
is apparent from
oortance, since we
ute readings. In
le a correction of

for changes of temr magnetometer at

11

| 4 - 4. () | 125111, 13              | 11 1 11 |
|-----------|-------------------------|---------|
| 418.3     | 402.2                   | 20 1 7  |
| 477.7     | 459. 1                  | 467, 6  |
| 149 1     | 117.7                   | 3 1     |
| 399 3     | 5.5.1                   |         |
| 43.6.1    | 117.7<br>5 5 1<br>4 3.2 | - 1     |
| 374. 0    | 344 1                   |         |
| 429.1     | 419.3                   | 30 - 8  |
| 465.7     | 110.0                   |         |
| 482.6     | 445.1                   | 1.1.6   |
| 553.1     | 524.3                   | 5-1.0   |
|           |                         |         |
| 225       | 23                      |         |
|           |                         | M n     |
| 10h 50m.6 | 11'5: -                 |         |
|           |                         |         |
| 1         |                         |         |
| 5(0.9.1   | 529 1                   | > 1     |
| 440.51    | 474.5                   | 1       |
| 431.2 (   | 439.7                   | 10.1    |
| 159, 8 ;  | 470. ~                  | 3 1 1   |
| 4co, 4 1  | 125.7                   |         |
| 362.6     | 101                     | 1       |
| 402.0     | 441. 1                  |         |
| 414.3     |                         |         |
| +3-17 #   | 600, 3                  |         |
| 356, 0    |                         | 1)      |
| 254, 6    | 374.5                   | 1       |
| 351.0     | 4.3                     | 11      |
| \$66.0    | 151.5                   |         |
|           |                         | 11 .    |
|           |                         |         |

n in 1853.

Monthly mean values of the hourly readings of the thermometer attached to the Bifilar magnetometer and expressed in degrees of Fahrenheit's scale.

| Göttingen civil time   | •   | 0,   | ih.  | 21   | 3,   | 4h  | 5h                                      | €µ   | 7%  |
|--|---|--|--|--|--|---|---|--|---|
| Uglaamie eivil time  | No  | on +53m.6.   | 13h 4-53m.6.   | 14h+53m.6.   | 15h+53m.G.   | 16h+53m,6.  | 17h+53m,6.                              | 18h+53m.6.   | 19n ± 53m 6                                   |
| 1872.  | 1   |  |  |  |  |   |   |  |   |
| September October December   |   | 36 4<br>19 6<br>3 8<br>—7. 8                               | 37. 0<br>20. 4<br>3 9<br>7. 5                                      | 37 2<br>20 9<br>4.1<br>7.1                                 | 37 1<br>20.8<br>4.2<br>—7 0                                  | 37. 6<br>21. 0<br>4 6<br>6. 4                                     | 35 4<br>20. 3<br>4. 3<br>—0. 5          | 35. 9<br>20. 0<br>4. 5<br>                                 | 35<br>19<br>3.<br>—6.                         |
| January 18-3. February March 4 April 4 April 4 April 4 April 4 April 4 April 5 April 5 April 6 April 6 April 6 April 7 |   | -5.3<br>3.7<br>2.6<br>15.5<br>37.0<br>47.8<br>49.1<br>47.7 | -4. 8<br>5. 1<br>3. 5<br>16. 3<br>87. 3<br>48. 1<br>49. 5<br>48. 3 | -4.5<br>5.5<br>4.2<br>17.2<br>38.0<br>48.7<br>50 0<br>48.6 | -4.7<br>5 4.4<br>4 6<br>17.0<br>37.0<br>48.5<br>49.6<br>48.4 | -4. 5<br>5. 9<br>5. 9<br>18 0<br>47. 0<br>48. 0<br>49. 4<br>48. 5 | -4.4 6.1 5.4 17.6 36.6 47.6 48.8 48.4   | -4.4<br>6 1<br>4.7<br>17.1<br>35.6<br>46 6<br>48.1<br>48.0 | -4<br>6.<br>3.<br>15<br>34<br>44<br>46<br>47. |
| April to September, inclusive<br>October to March, inclusive<br>Year   |   | 38.9<br>2 8<br>20 8  | 39 4<br>3. 4<br>21. 4  | 40. 0<br>3 8<br>21. 9                                      | 39. 6<br>3. 9<br>21. 8                                       | 39. 8<br>4 4<br>22. 1   | 39 2<br>4. 2<br>21. 7                   | 38. 6<br>4. 0<br>21. 3                                     | 37<br>3<br>20.                                |
| Göttingen civil time   |   | 8h   | 94   | 104  | Th.  | Noon.   | 13,                                     | 144  | 15h   |
| Uglaamio civil time  |   | 20h- -53m.6.   | 21h+53m.6.   | 22h+53m.6.   | 23b+53m.6.   | 0h+53m,6.   | 1h+-53m.6.                              | 2n+53m.6.  | 3h+53m.6,                                     |
| 1882.  |   | 34 7<br>18.3<br>2 5<br>-7.9                                | 34. 5<br>17. 5<br>1, 9<br>—8. 5                                    | 33. 8<br>17. 0<br>1. 5<br>—8 9                             | 35, 8<br>17, 0<br>1 3<br>9, 0                                | 31 1<br>17 2<br>1. 6<br>—8. 9                                     | 34 0<br>17 3<br>1 5<br>-9 0             | 34. 0<br>17. 3<br>1. 5<br>9. 0                             | 33<br>17<br>1<br>-9.                          |
| January  |   | -5 7<br>4.5<br>2.8   | -6. 4<br>3 7<br>2. 0   | -6.9<br>3.1<br>1.0   | -7.3<br>2.5<br>0.3   | -7. 1<br>2. 5<br>-0. 1  | -7.1<br>2.3<br>-0.5                     | -6 9<br>2 2<br>-0 9  | <del>-7</del> .                               |
| January January February March April May May June June July Augtst   |   | 11 2<br>33.1<br>43 9<br>46 0<br>46.3                       | 12. 8<br>31. 9<br>42. 8<br>45. 1<br>45. 4                          | 11. 5<br>30. 7<br>41. 8<br>44. 1<br>41. 8                  | 10. 0<br>29. 5<br>40. 9<br>43. 2<br>44. 3                    | 8. 9<br>28. 8<br>40. 3<br>43. 0<br>44. 0                          | 8 2<br>28 2<br>39 8<br>42 6<br>43 3     | 7. 3<br>27. 6<br>39. 6<br>42. 2<br>43. 1                   | 1<br>6<br>27<br>29<br>42,<br>42               |
| April to September, inclusive<br>October to March, inclusive<br>Year   |   | 36. 4<br>2. 4<br>19. 4                                     | 35. 4<br>1. 7<br>18. 6   | 34. 4<br>1. 1<br>17. 8                                     | 33. 6<br>0. 8<br>17. 2                                       | 33. 2<br>0. 9<br>17. 0  | 32. 7<br>0. 8<br>16. 7                  | 32. 3<br>0. 7<br>16. 5                                     | 32.<br>0<br>16.                               |
| Göttingen ervil time   | 6h  | 175  | 184  | 194  | 204  | 314   | 224                                     | 23h  | 1   |
| Uglaamie civil time 4h+  | 54m 6.  | 5h- -53m.6.  | 6b+53m.6.  | 7h+53m.6.  | 8h+53m.6.  | 9h+53m.6.   | 10h+53m,6                               | 11h+53m.6  | Monthly<br>nicali.                            |
| September  | 33. 9<br>17. 4<br>1. 5<br>8 8                                   | 33. 8<br>17. 5<br>1. 7<br>—8. 7                            | 33. 9<br>17. 6<br>2. 3<br>—7. 5                                    | 17. 5<br>2. 3  | 34. 4<br>17. 4<br>2. 3<br>—8. 0                              | 34. 9<br>17. 5<br>2. 5<br>—8. 1                                   | 17.7                                    | 18.1   | 1 18  |
| January February March April May March May March May May May May May May May May May May   | -6. 6<br>2. 2<br>-1. 4<br>6. 6<br>28 2<br>39 4<br>42 3<br>42. 7 | -6. 4<br>-1. 5<br>6. 7<br>29 0<br>39. 8<br>42 5<br>42. 5   | -5.4<br>3.9<br>-0.9<br>7.6<br>29.8<br>40.6<br>43.3<br>42.8         | 2.6<br>-0.9<br>8.0<br>31.1<br>41.6<br>43.9                 | -5.7<br>2.5<br>-0.6<br>9.5<br>32<br>42.7<br>45.0<br>43.8     | -5.7<br>2.8<br>0.0<br>11.0<br>33.8<br>44.0<br>46.1<br>44.7        | 3, 5<br>0, 9<br>12, 8<br>35, 5<br>45, 4 | 4. 6<br>2. 1<br>14. 5<br>37. 3<br>47. 6<br>48. 4           | + 1.<br>+ 12<br>+ 32<br>+ 43                  |
| April to September, inclusive October to March, inclusive Year   | 32.5<br>0 7<br>16.4   | 32. 4<br>0. 8<br>16. 6                                     | 33. 0<br>1. 5<br>17. 3   | 1.3  | 34. 6<br>1. 3<br>18. 0                                       | 35. 8<br>1. 5<br>18. 6  | 1.8                                     | 2, 3   | + 35<br>+ 2.<br>+ 19                          |

### TEMPERATURE COEFFICIENT.

There were no special observations made to ascertain the effect of changes of temperature on the magnetic moment of the bifilar magnet; the instrument was mechanically compensated as near as could be judged; we have, therefore, to determine the outstanding effect by means of the

| 6,   | 7 h                                   |
|--|---------------------------------------|
| 8h+53m.6.  | 19*+53**.6                            |
| 35. 9<br>20. 0<br>4. 5<br>—6. 6                            | 35 4<br>19 4<br>3 5<br>-6.8           |
| -4.4<br>6.1<br>4.7<br>17.1<br>35.6<br>46.6<br>48.1<br>48.0 | -1 4 6.0 3.9 15 8 34 5 44 8 46 5 47.2 |
| 38. 6<br>4. 0<br>21. 3                                     | 37. 4<br>3. 6<br>20. 5                |
|  |                                       |

|           | **        |
|-----------|-----------|
| 141       | 15h       |
| 2n+53m,6. | 3h+53m.6, |
| 34. 0     | 33 7      |
| 17. 3     | 17. 1     |
| 1. 5      | 1 5       |
| 9. 0      | —9. 0     |
| -6 9      | -7.0      |
| 2 2 9     | 2.0       |
| -0 9      | -1.2      |
| 7. 3      | 68        |
| 27 6      | 27 7      |
| 39. 6     | 29 4      |
| 42. 2     | 42.4      |
| 43. 1     | 42.9      |
| 32. 3     | 32. 2     |
| 0. 7      | 0. 6      |

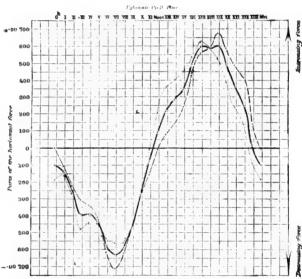
| '.  |   |
|---|---|
| 23h<br>11h+53m.6.   | Monthly nieuu.                                      |
| 35. 8<br>18. 1<br>2. 0<br>—8. 2                                   | +35.°1<br>+18. 4<br>+ 2. 7<br>- 8. 0                |
| 5. 4<br>4. 0<br>2. 1<br>14. 5<br>37. 3<br>47. 0<br>48. 4<br>47. 1 | - 5 8 + 3. 7 + 1. 5 + 12. 1 + 32. 8 + 43. 7 + 45. 5 |
| 38. 4<br>2. 3<br>20. 3  | +35. 8<br>+ 2. 1<br>+19. 0                          |

temperature on censated as near y means of the

### SOLAR-DIURNAL VARIATIONS OF THE MAGNETIC HORIZONTAL FORCE

Observed at Uglaamie, Alaska.

(Disturbances included)



Erdl curre——mean of the year, Sign, 1882, to Aug, 1883, incl.
Broken ———nean of 6 months, san in north declination.
Dated———mean of 6 months, san in south lexinarias.

ordinary hourly readings. During 1882, one lamp was continually burning in the observatory, but early next year three lamps were kept burning, the supply of oil in store being greater than was at first supposed. The annual average temperature in the observatory, as shown by a Fahrenheit thermometer inside the zinc cover of the bifilar, was  $\pm 19^\circ.0$  or  $\pm 7^\circ.22$  C.

In consequence of the irregularities in the state of the instrument as shown by the monthly mean readings, the only available method for deducing the temperature coefficient q appeared to be that of selecting a number of consecutive and undisturbed days at times when the temperature was rapidly changing, and find for each case the apparent change of the daily means in scale divisions corresponding to a change of  $1^\circ$  in temperature. The following values were thus found:

| Date.                             | Change of the daily means. | Corresponding<br>change<br>in temperature. | Change for<br>1º Fahrenheit |
|-----------------------------------|----------------------------|--|-----------------------------|
| 1882.                             | d                          | 3  | d                           |
| October 30, 31<br>November 10, 11 | +55<br>+26                 | +13.4<br>- 8.0                             | +4. 1<br>-3. 3              |
| December 1, 2                     | +27                        | - 7.3                                      | -3.7                        |
| December 14, 15                   | -30                        | +11.0                                      | -3.5                        |
| December 15, 16                   | +44                        | -10.3                                      | -4.3                        |
| February 9. 10                    | +40                        | - 7.4                                      | 5.3                         |
| March 11, 12                      | +16                        | + 6.8                                      | +2.4                        |
| July 19, 20                       | +37                        | — 8.3                                      | <b>-4.</b> 5                |

It is proposed to adopt provisionally the mean value  $-2.2\pm0.8$  which is equivalent to a decrease of 0.000165 part of the horizontal force for an increase of temperature of 1° Fah. or q=0.000165

In the following table the values in columns 3, 4, 5 are uncorrected for changes of temperature, the next three columns show the temperature differences for which corrections were required, and the last three columns give the diurnal variations thus corrected. The values are laid down on the accompanying diagram.

Solar-diurnal variation of the horizontal force, inclusive of distur' ances, and expressed in parts of the force, at Uglaamie, 1882-'83.

| civil   | ## ## ## ## ## ## ## ## ## ## ## ## ##   |   | Temper  | ature di   | ference.   | Solar-diurnal variation.   |  |   |  |   |  |  |
|---|--|---|---|--|--|--|--|---|--|---|--|--|
| Göttingen<br>time.  |  | t−35°.8<br>⊙ N.   | <i>t</i> −2°.1<br>⊙ S.  | t-19°.0<br>year.   | Half year,<br>sun north<br>of equa-<br>tor.  | Half year,<br>sun south<br>of equa-  | Whole<br>year.   |   |  |   |  |  |
| 06<br>1<br>2<br>3<br>4<br>5<br>6<br>6<br>7<br>8<br>9<br>10<br>11<br>Noon,<br>13<br>14<br>15<br>16<br>17<br>18<br>20<br>21<br>22<br>22<br>23 | Noon + 53.6   131   +53.6   131   +53.6   131   +53.6   131   +53.6   156   +53.6   166   +53.6   177   +53.6   118   +53.6   119   +53.6   129   +53.6   121   +53.6   122   +53.6   123   +53.6   14   +53.6   14   +53.6   14   +53.6   15   +53.6   16   +53.6   16   +53.6   17   +53.6   18 | 00:81<br>00170<br>00377<br>00487<br>00538<br>00630<br>00556<br>60471<br>+ 00014<br>+ 00070<br>00175<br>00218<br>00270<br>00354<br>00564<br>00564<br>00587<br>00463<br>00587 | 00389<br>00424<br>00586<br>00586<br>00638<br>00497<br>00369<br>00236<br>00173<br>00136<br>00237<br>00434<br>00445<br>00457<br>00540 | 00236<br>00298<br>00442<br>00544<br>00543<br>00461<br>00353<br>00257<br>00071<br>00103<br>00217<br>00347<br>00347<br>00391<br>00583<br>00468<br>00564<br>00569 | +3.1<br>+3.6<br>+4.2<br>+3.8<br>+4.3.4<br>+2.8<br>+1.6<br>+0.6<br>+0.4<br>-1.1<br>-3.5<br>-3.6<br>-3.6<br>-3.6<br>-3.4<br>-2.2<br>-2.2<br>-1.2<br>-2.2<br>-1.2<br>-1.2<br>-1.2<br>-1.2 | +9.7<br>+1.3<br>+1.7<br>+1.8<br>+2.3<br>+2.1<br>+1.9<br>+1.5<br>+0.3<br>-0.4<br>-1.3<br>-1.2<br>-1.3<br>-1.4<br>-1.5<br>-1.4<br>-1.3<br>-0.6<br>-0.8<br>-0.8<br>-0.8<br>+0.9 | 9 +1.8 +2.4 +2.9 +2.8 +3.1 +2.7 +2.3 +1.5 +0.4 +1.5 -2.0 -2.3 -2.5 -2.6 -2.6 -2.6 -2.6 -2.6 +1.7 -1.5 -1.0 -0.4 +1.3 | + . 00069<br>. 00140<br>. 00239<br>. 00440<br>. 00563<br>. 00564<br>. 00668<br>. 00668<br>. 00668<br>. 00668<br>. 00168<br>. 00 | + .00360<br>.00410<br>.00452<br>.00536<br>.00624<br>.00628<br>.00991<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104<br>.00104 | +.00214<br>.C0277<br>.00346<br>.00486<br>.00515<br>.00601<br>.00486<br>.0025<br>+.00021<br>.00137<br>.00244<br>.0039<br>.0039<br>.0039<br>.0039<br>.0039<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056<br>.0056 |  |  |

At Uglaamie the daily maximum value of the horizontal force occurs between the hours 5 and 7 p. m., and the daily minimum about 7 a. m.; there is also a very slight indication of a secondary disturbance in the regular progression between 3 and 5 a. m. corresponding to a second-

ary maximum about 6 a. m. as exhibited at Toronto, and more strongly at Philadelphia at  $5^\circ_1$  a. m. where it constitutes the principal maximum, the secondary occurring at 4 p. m. The maximum at Toronto takes place between 4 and 5 p. m. and the minimum about 10 a. m.

The diurnal inequality in the whole deflecting force acting in the horizontal plane may be exhibited graphically both in direction and magnitude as in the annexed diagram.

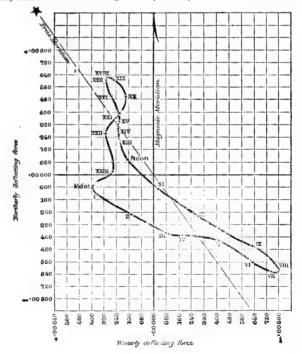
The origin of the co-ordinates represents the normal declination and horizontal force, and any line drawn from it to any part of the curve will represent in direction and magnitude (according to scale of diagram) the deflecting force acting at the time as marked against that point. If for any time the angle  $\psi$  equals the westerly deflection of the horizontal needle the deflecting force producing the same is  $H\sin\psi$ , and when expressed in parts of the horizontal force simply  $\sin\psi$ . A deflec-

tion of  $\psi$  minutes corresponds to  $\frac{\psi}{3437.7}$  or 0.000291  $\psi$ , parts nearly. The table of the solar-diur-

nal variation of the declination contains the values of  $\psi$  for every hour of the day, and the corresponding change in the force at right angles thereto is contained in the preceding table of the variations of the horizontal force; these two components, the westerly and northerly, appear combined in the diagram. It will be seen that the disturbing forces act more energetically in a plane approaching closer to the true than to the magnetic meridian, and that the usual character of the representation is changed by their action, that half of the curve containing the hours 21 (9 p. m.) to  $2\frac{1}{2}$ a.m. being thrown far to the westward, forming a loop, and beyond the branch containing noon; on the other hand, the great extension of the deflecting force between 7 and 8 a.m. is wholly due to the great activity of the easterly disturbances about these hours. This will become clear when the disturbances have been separated from the normal deflecting forces, and a diagram for the latter alone is presented.

DIURNAL VARIATION IN THE WHOLE DEFLECTING FORCE ACTING IN THE HORIZONTAL PLANE.

[The intensity of the total horizontal deflecting force is expressed in parts of H and all its disturbances are included.]



adelphia at 53 a. The maximum

al plane may be

al force, and any itude (according point. If for any ing force production  $\psi$ . A deflection the solar-dim.

r, and the correling table of the crly, appear comically in a plane character of the ours 21 (9 p. m.) containing noon; m. is wholly due come clear when

ZONTAL PLANE.

diagram for the

e included.]

#### THE VERTICAL MAGNETOMETER.

The length of 1 division of the scale is 1<sup>mm</sup>, the radius, mirror to scale, is 1.719<sup>m</sup>, hence angular value of 1 division of scale = 1'. In consequence of the great sensitiveness given to the instrument, which was nearly double what it was intended it should have a few of the largest disturbances were beyond the range of the instrument during November, and thus failed to be recorded.

(1) Adjustment and determination of scale value September 9, 1882, noon. The knife-edge was brought into the magnetic meridian on the leveled agate supports; the magnet was balanced at 11<sup>h</sup> 22<sup>m</sup> p. m., Göttingen time; the fixed and movable mirrors were made to read 500.

Observations for time of one oscillation of magnet and appendages.

| Magnet supported on knife-edge.  | М  | agnet suspe   | nded by                               | thread                                | 8.                           |
|--|--|---|---------------------------------------|---------------------------------------|------------------------------|
| 10 oscillations were performed in $\frac{m}{2}$ 1.8, 0.16 oscillations were performed in $\frac{3}{3}$ 25, 5.16 oscillations were performed in $\frac{3}{3}$ 28, 0.16 oscillations were performed in $\frac{3}{3}$ 28, 0.58 oscillations were performed in $\frac{3}{4}$ 245.0 | 10 oscilla:<br>10 oscilla:<br>28 oscilla | tions were<br>tions were<br>tions were<br>tions were<br>174.664 (ur | perform<br>perform<br>perform         | ed" in<br>ed in<br>ed in<br>ed in     | 2 56.1<br>2 56.1<br>8 14.1   |
| Mence $T$ : 13:,190; and value of one division of the scale in parts of the vertical force (for $\log \psi - \log 1$ )   | Obse<br>Torsion<br>circle.               | rvations for<br>Scale<br>extreme                                    |                                       | of thre<br>Ican.                      | nd.<br>Diff.                 |
| $T_1^2 \left(1 + \frac{t}{t}\right) \cot \theta \psi  0.00008028$ and multiplying by $V = 12.786$ , value of one division of scale $0.001026$ English units.   | 15°<br>285<br>105<br>15                  | 625   | 711 <sup>d</sup><br>323<br>754<br>714 | 600 <sup>4</sup><br>516<br>690<br>597 | 84 <sup>d</sup><br>174<br>93 |
| William V, relact vivoso 211 grad miles  | hence cor                                | f one divis<br>rected time<br>=17*.664/                             |                                       |                                       | 351<br>L=87'.8               |

\* By Chronometer Bond 188

(2) Readjustment November 3,  $10\frac{1}{2}^h$  p. m. (Göttingen time), to November 4,  $4\frac{1}{2}^h$  a. m. (Göttingen time). Instrument releveled, fixed mirror made to read 500; also movable mirror adjusted to division 50,  $5^h$   $20^m$  p. m. (local time).

| scillations scillations or $T_1 = 17$ | s were per<br>s were per<br>7.840 (unco | formed in<br>formed in<br>formed in<br>rected for | 5 56. (<br>5 56. (<br>5 56. ( |
|---------------------------------------|---|---|-------------------------------|
|                                       |   |   |                               |
| sion                                  | Scale<br>extremes.                      | Menn.   | Diff.                         |
|                                       | 5 596<br>5 778                          | 560<br>761  | 204<br>204<br>108             |
|                                       | 54 75                                   | 54 755 773  | 54 755 773 761                |

\* By Chronometer Bond 188.

(3) Balance magnetometer adjusted November 14, 1882 (7 p. m. Göttingen time), so as to oscillate in 9\*,060 and to read 500 at  $10^{\rm h}$  05m p. m. (Göttingen time). This value for T was derived from 20 oscillations; no particulars are recorded. No observations of oscillations with magnet suspended. With  $T_1 = 18*,002$  and T = 9\*,060 we have scale value in parts of the vertical force 0.0001739, which is equal to 0.002223 English unit.

(4) Readjustment of balance magnetometer March 4, 1883. Instrument leveled, with supporting H. Ex. 44——65

edge in magnetic prime vertical (7 a. m. Göttingen time); magnet balanced by means of weights, and both mirrors brought to scale 50 (8 a. m. Göttingen time); magnet brought to oscillate in  $11^{\circ}.850$  by means of adjusting weight on upright stem ( $8\frac{1}{2}$  a. m. Göttingen time).

| 10 oscillations were performed* in.<br>10 oscillations were performed in   | 1    | 58.<br>58.<br>58. |
|--|------|-------------------|
| Hence $T=115.850$ With $T_1=185.002$ and $T=115.850$ we have value of one of scale in parts of the vertical force 0.0001017, which camps 0.001300 English. | divi | sio               |

\* By Chronometer Bond 188.

- (5) March 29, 1883, about 4 a. m. (Göttingen time) magnet removed, cleaned of slight frost that had collected on it, and replaced between 4 and 5 p. m.
- (6) April 15, 1883, magnet raised from support and lowered between  $6^{\rm h}$  55m and  $7^{\rm h}$  00m p. m. (Göttingen time).
- (7) Readjustment of the balance magnetometer April 27, 1883. Instrument leveled. Supporting edge in magnetic meridian for oscillations in horizontal plane 2<sup>h</sup> 12<sup>m</sup> a. m. (Göttingen time). Between 4<sup>h</sup> 10<sup>m</sup> and 5<sup>h</sup> 40<sup>m</sup> a. m. adjusted fixed and movable mirrors to scale division 50.

| No. of oscillations. |     | Fime by<br>lond 188. |     | No. of oscillations. |     | H  | Time by<br>3ond 188. |  |  |
|----------------------|-----|----------------------|-----|----------------------|-----|----|----------------------|--|--|
|                      | h.  | m. s.<br>16 55 0     |     | 0                    | 1   | h. | H. K.                |  |  |
| 0                    | 1 1 | 10 55 0              | - î | 0                    |     | -  | 27 03. 5             |  |  |
| R                    | 1   | 17 42.5              |     | 6                    | 1   |    | 28 52.4              |  |  |
| 13                   |     | 18 37.0              |     | 13                   | i . |    | 30 59, 5             |  |  |
| 19                   | 1   | 19 23.5              |     | 19                   | 1   |    | 32 47.5              |  |  |

Time of one oscillation 7:816 Time of one oscillation 18:105

| No. of<br>escillations. | Time by<br>Bond 188.                                   | Torsion<br>  circle.                  | Scale<br>extremes.  | Mean.                                 | Diff              |
|-------------------------|--|---------------------------------------|---|---------------------------------------|-------------------|
| 0<br>6<br>13<br>19      | h. m. s.<br>6 38 29.0<br>39 15.0<br>40 02.5<br>40 41.5 | Change 90°<br>Change 180<br>Change 90 | 250 <sup>4</sup> and 690 <sup>4</sup><br>15 735<br>460 730<br>235 675 | 470 <sup>d</sup><br>375<br>595<br>455 | 95d<br>220<br>140 |
|                         |  | I                                     |   | 1                                     | 455               |

Time of one oscillation 65.974 - 455 + 4 = 1135.8; hence  $T_1 = 185.295$ 

Hence scale value for the time preceding April 27, using  $T=7^{\circ}.816$ , one division=0.0002413 part of the vertical force, or 0.003086 English unit, and after April 27 using  $T=6^{\circ}.974$ , one division=0.0003031 part of the force, or 0.003876 English unit.

- (8) May 3, 1883, magnet of balance magnetometer raised on support and lowered between 11 and 12 p. m. (Göttingen time). Found time of one oscillation in the vertical plane= $8^{\circ}$ .750; hence with  $T_1 = 18^{\circ}$ .295, one division of the scale=0.0001926 part of the vertical force, or 0.002462 English unit.
- (9) May 21, 1883. At 3 a. m. Göttingen time magnet fell off support; replaced and time of one oscillation determined 84,700; hence one division of scale=0,0001948 part of the vertical force, or 0.002490 English unit.

Increasing scale readings denote increasing vertical force.

of weights, and illate in 115.850

of slight frost

nd 75 00° p. m.

leveled. Sup m. (Göttingen e division 50,

ion=0.0002113 .974, one divis

ed between 11 750; hence with 102462 English

nd time of one ertical force, or HAURLY READINGS OF THE BROOKE BALANCE MAGNETOMETER, TOGETHER WITH THE CORRESPONDING TEMPERATURE (FAH.), FROM SEPTEMBER 12, 1882, TO AUGUST 27, 1883.

| Value of one division of scale   | English<br>units. | Gaussian<br>units. | B. A. units<br>or dynes. |
|--|-------------------|--------------------|--------------------------|
|  | _                 |                    |                          |
| Between September 9, 1882, and November 3, 1882                                  | .00103 .          | , 000473           | . 000047                 |
| Between November 3, 1882, and November 14, 1882                                  | . 003194          | , 000481           | . 000048                 |
| Between November 14, 1882, and March 4, 1883                                     | . 00222           | . 00102            | . 000102                 |
| Between March 4, 1883, and April 15, 1883  | .001.0            | . 00060            |                          |
| Between April 15, 1883, and April 27, 1883                                       | . (40.309)        | . 00142            | . 000142                 |
| Between April 27, 1883, and May 3, 1883  | . 00388           | . 00179            | . 000179                 |
| Between May 3, 1883, and May 21, 1883  | .00:43            | . 00114            | .000111                  |
| Between May 21, 1883, and close of series  | . 06240           | . 00115            | . 000115                 |
|  |                   |                    |                          |
| The average scale reading 523 corresponds approximately<br>to vertical intensity | 12, 702           | 5, 898             | 0.5893                   |

[Tabular values uncorrected for changes of temperature: A parallel sign || indicates that the instrument was readjusted. Extreme scale divisions, 0 and 200; when the magnet passed off the zero end it is indicated by (6-2); when off the opposite end by (80 | 2); the extreme are included in the mountly laune hourly values, Göttingen time. Increasing sentence aring vertices any serious force 1

Houry readings of the Brooke balance magnetometer, at Uglaamie, Alaska, September, 1882.

(Göttingen time.)

| Date.       | 0 h          | 11               | 2h           | 34          | 4h          | 5h             | O.b.        | Th.        | 86           | 921         | 105        | 116          | Soon        | 134                | 1 th       | 156           | 165       | 17h        | 180        | 191        | 20h         | 248        | 22h          | 22    |
|-------------|--------------|------------------|--------------|-------------|-------------|----------------|-------------|------------|--------------|-------------|------------|--------------|-------------|--------------------|------------|---------------|-----------|------------|------------|------------|-------------|------------|--------------|-------|
| ept. 12 . { |              | 381              | 388          | 31-8        | 362         | 362            | 398         | 398        | 395          | 392         | 397        | 398          | 400         | 399                | 401        | 403           | 402       | 402        | 401        | 411        | 398         | 399        | 397          | 1394  |
| Temp        |              | 384              | 388          | 380         | 366         | 304<br>5 42, 5 | 385         | 388        | 396          | 393         | 396        | 397          | 309         | 399                | 102        | 404<br>34     | 403       | 403        | 402        | 112        | 308         | 398        |              | 5- 37 |
| ept. 13 {   | 392          | 396              | 3547         | .397        | 394         | 391            | 394         | 393        | 371          | 385         | 397        | 392          | 100         | 106                | 407        | 104           | 410       | 411        | 420        | 499        | 394         | 395        | 395          | 1 (1) |
| Temp        | 393          | 397              | 397          | 13963       | 393         | 301            | 394         | 393        | 370          | 385         | 397        | 392          | 399         | 1807               | 107        | 105<br>36     | 1419      | 110        |            | 108        | 395         | 394        | 395          | . 19  |
| pt. 14 }    | *****        | 401              | 407          | 106         | 101         | 100            | 402         | 101        | 103          | 405         | 400        | 396          | 404         | 1114               | 108        | 409           | 414       | 424        | 410        | 108        | 406         | 4:5        | 107          | 116   |
| Temp        |              | 398              | 404          | 405         | 405         | 400<br>36      | 403         | 36         | 1404         | 103         | 398        | 197          | 405         | 4.14<br>5 - 15 - 5 | 1400       | 410<br>5 35.7 | 414       | 36         | 36         | 109        | 406         | 17         | 1197         | 11    |
| pt. 15 {    | 405          | 105              | 407          | 407         | 407         | 4 17           | 109         | 100        | 598          | 388         | 391        | 303          | 101         | 398                | \$07       | 406           | 406       | 403        | 104        |            | 404         | 102        | 101          | 13    |
| Temp        | 40           | 39.              | 5 59         | 201         | 5 39        |                | 30          | 5 42       | . 42         | 48          | 44         | 1 45         | 46          | 45                 | 45         | 45            | 45        | 41         | 43.7       | 41.5       | 45          | 46         | 18           | 1.    |
|             | 399          | 399              | 399          | 410         | . \$15.0    | 102            | :403        | 105        | 407          | 407         | 409        | 100          | 110         | 110                | 410        | 411           | 413       | 411        | 411        | .111       | 412         | 410        | 109          | 41    |
| Temp        | 51           | 399              | 399          | 400<br>5 F. | +01<br>5 45 | 402<br>42      | 103         | 1405<br>39 | 406<br>38    | 407         | 409        | 35.          | 410         | 36                 | 36         | 111           | 413       | 412<br>35  | 411        | 411        | 411         | 36 7       | 1.9          | 11    |
| ept. 17     | 109          | 169              | 409          | 805         | 109         | 111            | 111         | 111        | 107          | 110         | 113        | 112          | 111         | 416                | 414        | 116           | 414       | 111        | 115        | 411        | 112         | 412        | 112          | 41    |
|             | 409          | 409              | 409          | \$1025      | 410         | 411            | 111         | 411        | 407          | 110         | 413        | 414          | 1414        | 115                | 414        | 116           | 111       | 111        | 415        | 111        | 412         | 112        | 112          | .11   |
| Temp        | 412          | 40.              | 5 40<br>411  | 108         | 40          | 107            | 108         | 409        | 110          | 34          | 411        | 412          | 112         | 412                | \$11       | 34            | 31        | 35<br>118  | 35<br>113  | 411        | 412         | 35.7       | 107          | 1     |
| pt. 18}     | 412          | 412              | 411          | 408         | 400         | 468            | \$104       | 109        | 410          | 411         | 411        | ,112         | 412         | 112                | 412        | 113           | 116       | 118        | 113        | 111        | 112         | 408        | 107          | 1     |
| Temp        | 36. 1<br>409 | 5 37<br>410      | 41.          | 5 46<br>410 | 44.         | 5 40<br>411    | 411         | 38         | 411          | 412         | 35<br>412  | 35.          | 36<br>412   | 113                | 113        | 36<br>418     | 415       | 36<br>114  | 36<br>112  | 36         | 110         | 109        | 38.7         | ħ.    |
|             | 409          | 410              | 410          | 410         | ,410        | 411            | 411         | 411        | 411          | 412         | 110        | 112          | 412         | 413                | 113        | 118           | 415       | 114        | 412        | 111        | 100         | 100        | 111          | 4     |
| Temp        | 414          | 38               | .413         | 41          | 415         | 39<br>114      | 415         | 37<br>410  | 36           | 35<br>410   | 407        | 110          | 35<br>414   | 35                 | 115        | 34<br>416     | 35<br>417 | 36<br>416  | 35<br>416  | 35         | 35.7<br>116 | 115. f     | 5   35 C     | 5 (   |
| pt. 20}     | 414          | 414              | 413          | 414         | 415         | .414           | :414        | 411        | 110          | 411         | 107        | 110          | 114         | 411                | 114        | 416           | 417       | 416        | 116        | 117        | 416         | 117        | 117          | i     |
| Temp        | 35           | 35               |              | 5 35        | 35          | 35             | 1.34        | 34         | 34           |             | 5 33       | 33           | . 33        |                    | 5 32       | 32            | 32        | 32         | 32         | 32         | 32          | 32         | 1.32         | 1.5   |
| opt. 21}    | 423          | 419              | 418          | 418         | 417         | 417            | 417         | 417        | 418          | 417         | 406        | 101          | 410         | 415                | 417        | 416           | 418       | 417        | 417        | 416        | 116         | 416        | 115          | 1     |
| Temp        |              | 5 33             | 1 33         | - 33        | 33          | 32.            | 5 32        | . 32       | 31           | 31          | 31         | 31           |             | 5 31.              | 5 32       | 32            | . 32      | 32         | 32         | 32         | . 32        | 32         | 32           |       |
| ept. 22 {   | 417          | 417              | 417          | 117         | 417         | 118            | 418<br>418  | 418        | 419          | 416         | 416        | 412          | 416<br>416  | 419                | 422        | 420           | 420       | 119<br>419 | 418        | 418<br>418 | 417         | 118        | 418          | 1     |
| Temp        | . 33         | 32.              | 5 32.        | 5 32.       | 5 32        | 31             | 31          | 30         | 30           | 30          | 30         | . 30         | 30.         | 5 31               | . 31       | 31            | 31        | 30         | 30         | 30 5       | 30. 3       | 30         | 30 3         | 5     |
|             | 418          | 418<br>418       | 418          | 418<br>418  | 118<br>418  | 418<br>418     | 419         | 419<br>419 | 420<br>420   | 420<br>421  | 421        | 421<br>421   | 420         | 420<br>421         | 420<br>420 | 424<br>425    | 435       | 427        | 120<br>120 | 419        | 413         | 412<br>412 | 114          | - 1   |
| Temp        |              | 32               | 33           | 33          | 33          | 32             | 32          | 30         | 29           | 29          | 28.        | 5 29         | 29.         | 5 29.              | 5 30       | 29            | 30        | 30         | 30         |            | 30. !       |            |              | 5".   |
| ept. 24     | 415          | 415              | 416          | 117         | 418         | 419            | 418         | 419        | 419          | 419         | 419        | 418          | 419         | 419                | 419        | 419           | 410       | 419        | 417        | 417        | 116         | 415        | 415          | 1     |
| Temp        | . 33.        | 415<br>5 35      | 417          | 118         | 418         | 419<br>33      | 32          | 419        | 31           | 419         | 5 30       | 418          | 30          | 30                 | 30         | 30            | 419       | 419        | 417        | 110        | 416         | 415        | 415<br>5. 30 | 1     |
| ept. 25     |              | 116              | 418          | 421         | 416         | 405            | 398         | 402        | 396          | 400         | 420        | 458          | 426         | 426                | 420        | 431           | 438       | 463        | 451        | 428        | 122         | 417        | 415          | 1     |
| Temp        | .: 31.       | - 417<br>5 - 31. | 418<br>5 31. | 422<br>5 32 | 415         | (405<br>31     | 398         | 402        | 396          | 5 29        | 420        | 429          | 426         | 426                | 420        | 430           | 438       | 463        | 450<br>30  | 427        | 422         | 417        | 1415<br>5 31 | Ţ     |
| Da 1        | 418          | 418              | 417          | 120         | 420         | 421            | ,119        | -411       | 416          | 390         | 398        | 417          | 434         | 427                | 423        | 199           | 121       | 420        | 421        | 1421       | 422         | 420        | 119          | - 1   |
| Temp        | 418          | 418              | 416          | 420<br>33   | 420         | 421<br>33      | 133         | 411        | 416          | 403<br>5 31 | 401        | 417          | 433         | 427<br>29          | 4.23       | .421          | 421       | 420        | 421        | 421        | 122         | 419        | 419          | 1     |
| ept. 27     |              | 418              | 418          | 416         | 414         | 407            | 1409        | 409        | 405          | 409         | 404        | 417          | 414         | 432                | 427        | 424           | 424       | 419        | 418        | 419        | 419         | 418        | 417          | 4     |
| Temp        | 1 34         | 418              | 418          | 415<br>36   | 414         | 407            | 409         | 109        | 405<br>33    | 409<br>33   | 404<br>32. | 416<br>5 32. | 415<br>5 33 | 432                | 427        | 424           | 33        | 419        | 418        | 419<br>33  | 419         | 418        | 417          | 5 4   |
|             |              | 418              | 418          | 417         | 416         | 416            | 415         | 415        | 412          | 408         | 411        | 412          | 413         | 416                | 418        | 419           | 419       | 418        | 415        | 414        | 412         | 413        | 413          | 1     |
| ept. 28     | 419          | 418              | 418          | 417         | 416         | 416            | 415         | 415        | 413          | 409         | 411        | 411          | 413         | 416                | 418<br>36  | 419           | 419       | 118        | 415        | 415        | 412         | 413        | 413          | 4     |
| Temp        |              | 414              | 38<br>414    | 38<br>413   | 413         | 413            | 5 39<br>413 | 38<br>414  | 415          | 412         | 416        | 419          | 422         | 418                | 419        | 36<br>416     | 415       | 415        | 414        | 36. f      | 37<br>413   | 37<br>412  | 413          | 1     |
| ept. 29     | 313          | 414              | 414          | 413         | 413         | 413            | 413         | 414        | 415          | 412         | 416        | 419          | 422         | 417                | 419        | 416           | 415       | 415        | .414       | 413        | 413         | 412        | 413          | 4     |
| Temp        | .   38.      | 5 39<br>414      | 414          | 39<br>414   | 414         | 414            | 414         | 414        | 5 37.<br>413 | 5 37<br>411 | 36<br>410  | 36<br>407    | 36<br>419   | 36<br>420          | 36<br>423  | 36            | 1 36      | 37<br>421  | 37<br>416  | 37         | 37<br>416   | 415        | 414          | 1     |
| ерт. от     | 414          | 414              | 414          | 1414        | 414         | 414            | 414         | 414        | 413          | 410         | 410        | 407          | 419         | 420                | 423        | 1424          | 423       | 421        | 416        | 414        | 416         | 415        | 414          |       |
| Temp        | 37.          | 5 38             | 38           | 38          | 38.         | 5. 38          | 38          | 38         | 37           | 36          | 35         | 35           | 35          | 34.                | 5. 34      | 5 34          | : 34      | 34         | 35         | 35         | 35          | 35.        | 5 36         | 1 1   |

Temp... 36. 4 37. 0 37. 2 37. 1 37. 6 38. 4 35. 0 35. 4 34. 7 34. 5 33. 8 38. 8 34. 1 34. 0 34. 0 33. 7 33. 9 33. 8 33. 9 33. 9 33. 8 33. 9 33.

To reduce readings to an approximately uniform series increase each reading by 40.7 \(\cdot \) 65.0 \(=\) 105.7 divisions; it is found as follows:
Mean of 10 days, September 24 to October 3, inclusive, 444.1; mean of 10 days, October 4 to 13, inclusive, 454.8; difference, 40.7 For origin of number 65.0 see note to next month. One division of scale \(=\).000803 part of the vertical force. Monthly means: Temperature, 35\(^{\cdot 1}\)1; magnitude and other contents of the content of t

Hourly readings of the Brooke balance magnetometer at Uylaamie, Alaska, October, 1882.

| Date.                    | 65                    | 10                  | 91                      | 3º                                    | \$1                  | $\delta^{\rm h}$  | . 61                 | Th.                 | 95                     | g h                 | 101                  | 115               | Yes                | n.  131             | . 14                | 15%                  | 16 <sup>h</sup>                    | 171                                | g N.i.            | 181                 | 201                    | 21                  | 22                 | 231                     |
|--------------------------|-----------------------|---------------------|-------------------------|---------------------------------------|----------------------|-------------------|----------------------|---------------------|------------------------|---------------------|----------------------|-------------------|--------------------|---------------------|---------------------|----------------------|------------------------------------|------------------------------------|-------------------|---------------------|------------------------|---------------------|--------------------|-------------------------|
| Oct. 1 {                 | 413<br>413            | 414                 | 413                     | 412                                   | 412                  | 112               | 418                  | 411                 | 410                    | 409                 | 408                  | 401               | 404                | 405                 | 406                 | 407                  | 413                                | 105                                | 403               | 403                 | 403                    | 402                 | 109                | 101                     |
| Temp                     | 36<br>401             | 38<br>402           | 40<br>402<br>402        | 402<br>402                            | 11<br>101<br>101     | 38<br>401<br>402  | 39.<br>403<br>403    | 5 40<br>395<br>396  | 41.3<br>395<br>395     | 395<br>396          | 399<br>399           | 418<br>418<br>420 | 43<br>403<br>468   | 43<br>411<br>411    | 411<br>411          | 45<br>425<br>426     | 45<br>429<br>,429                  | 423<br>422                         | 45<br>427<br>427  | 48<br>434<br>434    | 47<br>440<br>429       | 48, 5<br>430<br>428 | 46.5<br>411<br>404 | 15                      |
| Temp                     | 46.                   | 402<br>45<br>368    | 402                     | 402<br>45<br>400                      | 45<br>31.9           | 43                | 44<br>392            | . 43<br>399         | 41                     | 40.1                | 105                  | 40                | 411                | 11                  | 41                  | 40                   | 41                                 | 40.7                               | 411               | 40                  | 40<br>410              | 40.5                |                    | 42                      |
| Oct. a {<br>Temp         | 398<br>42             | 365                 | 400                     | 100                                   | 399<br>45            | 391               | 392                  | 398                 | 102                    | 105                 | 405<br>36            | 106<br>36         | 409                |                     | 107                 | 113<br>34            | 417                                | 418                                | 34                | 32                  | 410<br>83              | 412                 | 112                | 33                      |
| Oct. 4 }                 | 4117                  | 430                 | 435<br>435<br>33        | 435<br>435                            | 4014<br>4014<br>5 38 | 441<br>441<br>32  | 426<br>426           | 430                 | 430<br>430             | 424<br>422<br>30    | 443<br>444<br>30     | 436<br>436<br>30  | 467<br>467<br>30   | 456<br>455<br>30    | 445<br>445<br>30    | 446<br>446<br>30     | 453<br>458<br>30                   | 466<br>(17)                        | 457<br>456<br>32  | 442<br>440<br>30. f | 443<br>443<br>5. 30. 5 | 441<br>441<br>30. 5 | 436<br>436<br>30.5 | 142<br>443              |
| Temp                     | . 34. (<br>440<br>440 | \$34<br>\$39<br>139 | 440<br>110              | 441                                   | 439<br>439           | 440               | 436                  | 434<br>433          | 433                    | 127                 | 434<br>435           | 436               | 438<br>439         | 443                 | 441                 | 447                  | 144                                | 462<br>462                         | 100<br>400        | 456<br>456          | 402<br>491             | 473<br>473          | 470<br>460         | 30, 5<br>452<br>157     |
| Temp                     | 31. 5<br>452          |                     | 31<br>447               | 448                                   | 34<br>435            | 32                | 431                  | 5 30.<br>435        | 5 30<br>443            | 29. 8<br>465        | 475                  | 467               | 27<br>506          | 197                 | 5 27.<br>508        | 5 27 521             | 496                                | 500                                | 400               | 28<br>100           | 452                    | 20<br>450           | 29, 5<br>450       | 30                      |
| Temp                     | 454<br>30             | 450<br>30           | 447<br>30               | 448<br>30<br>449                      | 435<br>. 80<br>450   | 442<br>29.<br>452 | 430<br>5 29<br>- 450 | 435<br>29<br>450    | 442<br>28<br>450       | 405<br>27<br>451    | 478<br>27<br>451     | 467<br>27<br>451  | 505<br>27,<br>451  | 5 27.<br>451        | 5 27.<br>458        | 5 27<br>454          | 498<br>28<br>453                   | 500<br>29<br>452                   | 490<br>29<br>451  | 460<br>28<br>451    | 451<br>28<br>451       | 450<br>28<br>450    | \$50<br>28<br>450  | 450<br>28               |
| Oct. 7 }                 | 451<br>451<br>98      | 451<br>451<br>28    | 450<br>450<br>150       | 110                                   | 450<br>28            | 28                | 150                  | 17.0                | 450                    | .51                 | 459                  | 451<br>25.        | 451                | 451<br>26           | 454<br>26           | 454<br>26            | 453<br>26                          | 452                                | 451               | 451<br>26.7         | 451<br>26.5            | 450<br>97           | 440                | 140<br>400<br>27        |
| Oct. 8 }                 | 418<br>118            | 450<br>150          | 450<br>450              | 450<br>450                            | 450<br>470           | 450               | 450<br>450           | 410                 | 150<br>110             | 451                 | 452<br>452           | 453<br>453        | 454<br>454         | 155                 | 455<br>455          | 455<br>455           | 456<br>456                         | 457                                | 455               | 455<br>455          | 453                    | 453<br>452          | 27<br>452<br>452   | 170<br>170              |
| Oct. 9 {                 | 27<br>450             | 98<br>459<br>450    | 28<br>452<br>452        | 28<br>448<br>448                      | 28<br>450<br>450     | 28<br>459<br>450  | 30<br>451<br>451     | 25.<br>452<br>453   | 5 27<br>453<br>453     | 26<br>455<br>455    | 25<br>(56<br>456     | 26<br>456<br>456  | 25<br>456<br>457   | 24<br>457<br>457    | 24<br>457<br>457    | 458<br>459           | 24<br>468<br>468                   | + 24<br>459<br>459                 | 458<br>458        | 24<br>416<br>416    | 24<br>453<br>453       | 24<br>452<br>452    | 452<br>24<br>117   | \$10<br>25<br>147       |
| Temp                     | 450<br>26<br>318      | 28<br>152           | 27                      | 20.7                                  | 28.7<br>452          | 152               | 26. 1<br>452         | 5 25.1<br>452       | 24<br>450              | 23<br>451           | 23<br>451            | 23<br>474         | 23<br>513          | 13<br>482           | 466                 | 5 22<br>461          | 402                                | 23<br>463                          | 23<br>463         | 183                 | 23<br>514              | 23<br>459           | 115<br>21<br>153   | 147<br>24<br>154        |
| Oct. 10 }                | 448<br>25             | 452<br>25<br>453    | 451<br>26               | $\frac{455}{26}$                      | 452<br>25, 5         | 452<br>5 25       | #52<br>25            | 452<br>24           | 450                    | 451<br>29<br>455    | 451<br>21<br>456     | 474 20.           | 518<br>5 21<br>450 | 482<br>21<br>452    | 400<br>20,<br>459   | 46.<br>5 20          | 462                                | 462<br>21<br>469                   | 462<br>20<br>458  | 4±3<br>19.7         | 513<br>10              | 462<br>19           | 452<br>100<br>453  | 155<br>21               |
| Oct. 11 {                | 456<br>456            | 453<br>453          | 453<br>453              | 455<br>457                            | 453<br>452<br>23     | 453<br>453        | 450<br>450<br>- 23   | 446<br>447<br>21    | 454<br>454<br>20       | 454<br>19           | 456<br>496<br>18     | 459<br>459<br>18  | 450<br>450<br>18   | 452<br>452<br>118   | 4.50                | 472<br>472           | 481<br>481<br>18                   | 169                                | 458<br>458<br>18  | 469<br>17           | 464<br>464<br>5 18     | 454<br>453<br>10    | \$ 513             | 157<br>160              |
|                          | 459<br>460            | 458<br>460          | 460                     | 24<br>459<br>458                      | 456<br>456           | 455<br>455        | 450<br>451           | 449                 | 455<br>456             | 458<br>458          | 462                  | 446               | 452<br>452         | 458<br>458          | 17<br>459<br>450    | 461<br>461           | 469<br>469                         | 18<br>465<br>465                   | 462<br>463        | 17. 3<br>159<br>159 | 459<br>459             | 459<br>459          | 19<br>459<br>458   | 19:5<br>458<br>458      |
| Temp                     | -19, 5<br>458         | $\frac{20}{458}$    | 20<br>454               | 458<br>20<br>454                      | $\frac{21}{452}$     | 454<br>454        | 20<br>453            | 19<br>435           | 17<br>455              | 16                  | 15<br>455            | 15<br>458         | 459<br>459         | 159<br>159          | 15<br>460           | . 15<br>464          | 418                                | 15                                 | 15<br>160         | 14<br>459<br>459    | 14<br>159              | 139                 | 15                 | 16.5                    |
| Temp                     | 158<br>19<br>160      | 458<br>21<br>455    | 455<br>21, 5<br>454     | 454<br>23<br>454                      | 453<br>21<br>454     | 454<br>20<br>154  | 453<br>18, 5<br>454  | 455<br>17. 5<br>457 | 455<br>16<br>457       | 446<br>- 15<br>456  | 456<br>  14<br>  458 | 458<br>14<br>459  | 14.5               | 459<br>14.<br>461   | 460<br>5 14<br>465  | 465<br>14<br>467     | 168<br>14<br>472                   | $\frac{169}{14}$ $\frac{175}{475}$ | 161<br>14<br>168  | 13                  | 459<br>12.5<br>159     | 459<br>12<br>458    | 458<br>12<br>458   | 15<br>15<br>158         |
| Temp                     | 458<br>16, 5          | 455<br>17. 5        | 454<br>20               | 454                                   | 151                  | 454               | 454                  | 457<br>16           | 457                    | 456                 | 458<br>B1            | 459<br>12         | 459<br>12.         | 461                 | 466<br>5 12         | 467                  | 471                                | 476                                | 468               | 460<br>13           | 459<br>13              | 458<br>13. 5        | 158                | 158                     |
| Oct. 15 {                | 456<br>454            | 457                 | 455                     | 450                                   | 441                  | 443               | 444                  | 440                 | ,430                   | 137                 | 434                  | 454               | 454                | 445                 | 464<br>5 95         | 465                  | 469                                | 465                                | 156               | 441                 | 145                    | 444                 | 113                | 414                     |
|                          | 17. 5<br>444          | 21<br>444<br>444    | 23. 5<br>  445<br>  445 | 24. 5<br>445<br>445                   | 447<br>417           | 26<br>449<br>449  | 451<br>451           | 5 26<br>152<br>151  | 26.5<br>  450<br>  450 | 26. 5<br>449<br>448 | 453<br>451           | 451<br>451        | 463<br>464         | 1 26.<br>455<br>455 | 5 25<br>455<br>455  | 26<br>453<br>454     | 27<br>458<br>158                   | 456<br>457                         | 27<br>463<br>463  | 26. 7<br>473<br>471 | 25<br>465<br>465       | 455<br>454          | 96 5<br>452<br>451 | 前                       |
| Temp                     | 28<br>450             | 26, 5<br>451        | 25, 5<br>454            | 24. 5<br>451<br>451                   | 22. 5<br>451         |                   | 18<br>433            | 435                 | 14.5                   | 13<br>458           | 12<br>455            | 12                | 12<br>465          | 13<br>470           | 472                 | 15<br>473            | 15<br>463                          | 14. 5<br>460                       | 158               | 15<br>455           | 11                     | 14<br>455           | 14.5               | 457                     |
| Temp                     | 16, 5                 | 453                 | 154<br>19               | 451<br>18.5<br>460                    | 451<br>20. 5<br>456  | 437<br>20         | 433<br>19            | 435<br>18           | 441                    | 459                 | 456                  | 453<br>12         | 465                | 470<br>11.          | 472<br>5 11.<br>464 | 473<br>5 11          | 163<br>12                          | 12                                 | 458<br>12         | 454<br>13           | 456                    | 455<br>11           | 154                | 11.5                    |
| Oct. 18 }                | 158<br>158            | 457<br>457<br>18    | 458<br>458<br>18        | 160                                   | 456<br>456<br>13     | 455<br>455<br>14  | 455<br>455<br>14     | 454<br>154<br>13.3  | 448<br>448             | 413<br>453<br>12    | 451<br>451           | 468<br>470<br>12  | 451<br>452<br>12   | 160<br>12.          | 464<br>5 13         | 459<br>459<br>13     | 155<br>455<br>12                   | 454<br>454<br>14                   | 154<br>454<br>14  | 453<br>453<br>14.5  | 452<br>452<br>5 15     | 452<br>452<br>14    | 452<br>450<br>15   | 454<br>454              |
| 43-4-10                  | 152<br>452            | 453<br>453          | 452<br>452              | 452<br>452                            | 452<br>452           | $\frac{452}{452}$ | 452<br>452           | 453                 | 454                    | 453<br>453          | 452<br>452           | 453<br>453        | 12<br>455<br>455   | 457<br>457          | 161<br>460          | 455<br>455           | 457<br>457                         | 462                                | 458<br>458        | 454<br>454          | 454<br>454             | 47.4<br>454         | 151                | 174                     |
| Temp                     | 15 ±                  | 15<br>452<br>453    | 15<br>453               | 15<br>452                             | 15<br>152            | 15<br>452         | 15<br>452            | 15<br>453           | 14<br>452              | 453                 | 13<br>454            | 13                | 13<br>455          | 454                 | 13.<br>454          | 5 13<br>457          | 14<br>456                          | 14                                 | 154               | 114                 | 153                    | 450                 | 11                 | 14<br>452               |
| Temp.                    | 14                    | 453<br>452          | 453<br>16<br>452        | $\frac{452}{16}$<br>$\frac{452}{452}$ | 452<br>16<br>451     | 452<br>15<br>451  | 452<br>15<br>451     | 15.1                | 1 14<br>452            | 453<br>13<br>453    | 154<br>13<br>154     | 13                | 455<br>11<br>456   | 454<br>14<br>458    | 454<br>14<br>160    | 457<br>14<br>460     | 456<br>14<br>460                   | 454<br>14<br>458                   | 454<br>14<br>459  | 453<br>14<br>458    | 453<br>14<br>458       | 452<br>14.5<br>458  | 14                 | 172                     |
| Temp                     | 153<br>  15   ;       | 16                  | 152                     | 452<br>16                             | 451<br>17            | 451<br>16         | 451<br>16            | 452<br>15           | 452                    | 453<br>13           | 455<br>13            | 454<br>13         | 156                | 458                 | 160                 | 160                  | 459<br>11                          | 458                                | 11                | 459<br>11           | 458                    | 458<br>11           | 11                 | 11                      |
| Det. 22                  |                       | 456<br>456<br>14    | 456<br>456<br>14, 5     | 455<br>45 <b>5</b>                    | 455<br>455<br>15     | 455<br>455        | 455<br>455           | 454<br>454          | 446<br>447<br>13       | 448<br>448          | 450<br>450<br>12     | 455<br>455<br>12  | 451<br>451<br>12   | 169<br>169          | 476<br>476<br>13    | 468<br>108<br>13     | 477<br>177<br>13                   | 501<br>501<br>13                   | 468<br>468<br>12  | 169<br>169          | 484<br>482<br>12       | 472<br>471          | 179<br>179         | 171<br>172              |
|                          | 152                   | 457                 |                         | 14<br>457<br>457                      | 45H<br>457           | 449<br>448        | 14<br>448<br>449     | 453<br>454          | 454<br>454             | 13<br>450<br>451    | 480<br>175           | 468<br>169        | 158<br>418         | 461<br>461          | 473<br>473          | 151                  | 171<br>170                         | 468<br>468                         | 163<br>162        | 460<br>450          | 462<br>462             | 461<br>461          | 462                | 12<br>4 3<br>64         |
|                          |                       | 12<br>460           | 12<br>459               | 10<br>459                             | 461                  | 10<br>443         | 9<br>450             | 8. f<br>413         | 433                    | $\frac{4}{450}$     | 447                  | 451               | 108                | 524                 | 501                 | 482                  | 5<br>462                           | 160                                | 160               | 456                 | 152                    | 151                 | 451                | 153                     |
| Temp                     | 460<br>8<br>153       | 460 .<br>9<br>451   | 459<br>10<br>453        | 459<br>9<br>423                       | 460<br>10            | 443<br>9<br>453   | 450<br>9<br>449      | 413<br>- 10<br>422  | 433<br>9<br>447        | 451<br>8, 5<br>441  | 447<br>8<br>169      | 451<br>475        | 468<br>0<br>481    | 519                 | 502<br>9<br>467     | 485<br>9<br>461      | $\frac{463}{10}$ $\frac{462}{462}$ | 460<br>12<br>463                   | 10<br>158         | 456<br>12<br>457    | 452<br>12<br>455       | 151<br>12<br>454    | 454<br>12<br>453   | 453<br>11<br>152        |
| Temp                     | 153<br>11 .           | 451                 | 453                     | 453<br>11                             | 454<br>454<br>12     | 453<br>12         | 110                  | 423                 | 147                    | 447                 | 468                  | 174               | 482<br>10          | 471<br>471<br>10    | 107                 | 101                  | 462                                | 463                                | 157               | 457                 | 455<br>11              | 151                 | 11                 | 403<br>11. 5            |
| Oct. 20                  |                       | 451<br>452          | 454<br>456              | 452<br>454                            | 453<br>454           | 451<br>451        | 448<br>448           | 438<br>437          | 443<br>413             | 448<br>449          | 451<br>451           | $\frac{453}{453}$ | 456<br>457         | 462<br>463          | 460<br>460          | 464<br>464           | 478<br>478                         | 469<br>469                         | 470<br>469        | 462<br>462          | 457<br>457             | 455<br>455          | 455<br>455         | 250<br>100              |
| Temp                     |                       | 13<br>460<br>460    | 13 '<br>461<br>461      | 13<br>459<br>459                      | 14<br>458<br>458     | 13<br>455<br>455  | 12<br>454<br>454     | 12<br>449<br>450    | 450<br>450             | 11<br>410<br>444    | 10<br>443<br>445     | 10<br>462<br>462  | 10<br>461<br>464   | 9<br>465<br>465     | 469<br>470          | 9<br>473<br>472      | 9<br>472<br>472                    | 171<br>171                         | 9<br>479<br>479   | 463<br>463          | 161<br>461             | 159<br>459          | 8<br>159<br>460    | # 3<br># 3              |
| Temp                     | 8 :                   | 9<br>464            | 10<br>470               | 10<br>459                             | 10<br>461            | 10<br>452         | 9<br>455             | 436                 | 144                    | 6<br>451            | 5<br>459             | 5<br>461          | 462                | 5 4.3<br>4×9        | 5 4<br>520          | 503                  | 506                                | 156                                | $\frac{3.5}{475}$ | 457                 | 477                    | 462                 | 2. 5               | 3<br>467                |
| Temp                     | 3 .                   | 4 .                 | 472<br>4.5              | 459                                   | 2.5                  | 452               | 455                  | 436                 | 444                    | 451<br>- 2          | 460                  | 461               | 463                |                     | 524<br>5 1.         | 503<br>5 2. 5<br>468 |                                    | 496                                | 475<br>3.5        | 4.7                 | 481<br>5               | 461                 | 467                | 465<br>6                |
|                          |                       |                     | 450<br>448<br>8         | 451<br>451<br>8                       | 452<br>452<br>8      | 146<br>446<br>7   | 448<br>148<br>7      | 450<br>450<br>6     | 447                    | 442<br>412<br>4     | 458<br>454           | 429<br>132<br>3   | 458<br>459         | 458<br>458          | 467<br>467          | 468<br>167<br>- 1    | 472<br>472                         | 472<br>472                         | 473<br>475<br>- 1 | 479<br>173<br>- 1   | 464<br>464<br>- 2      | 463<br>463          | 470<br>471         | 470<br>469<br>0.5       |
| Oct. 30 \$               |                       | 462<br>463          | 463<br>462              | 459<br>458                            | 158<br>158           | 458<br>458        | 451<br>151           | 458<br>453          | 455<br>455             | 452<br>452          | 414<br>413           | 442<br>442        | 451<br>451         | 461<br>164          | 466<br>465          | 456<br>456           | 458<br>458                         | 451<br>451                         | 451<br>451        | 452<br>452          | 452<br>452             | 452<br>452          | 151                | 149                     |
| Temp                     | 1                     |                     | 411                     | 3<br>440                              | 4.5                  | 4.5               | 408                  | 438                 | 4.5                    | 4, 5<br>437         | 5<br>436             | 435               | 435<br>435         | 410<br>8            | 9<br>433            | 9<br>43 <b>6</b>     | 137                                | 7<br>437                           | 436               | 436                 | 7<br>437<br>437        | 8<br>436            | 405                | 145<br>12<br>135<br>435 |
| Temp                     | 16                    | 18                  | 19                      | 19                                    | 140<br>20            | 439<br>20         | 418<br>20            | 20                  | 437<br>19. 5           | 19.5                | 436<br>19            | 19                | 19                 | 20                  | 432<br>20           | 19.7                 | 437<br>19                          | 437<br>19                          | 436<br>19         | 436<br>19           | 437<br>19, 5           | 20, 5               | 455<br>21          | 435<br>21               |
| Magnet'r 4<br>R. Juced 3 | 17. 7                 | 517. 1              | 517. "                  | 447. 4<br>516. 3                      | 515, 3               |                   |                      | 440. 7<br>509. 6    | 511.4                  | 144. I<br>513. 0    |                      |                   | 524.4              | 1 457.3<br>0 526.3  | 9.4600<br>5.528.5   | 0.460, 1<br>0.529, 1 | 461. 0<br>529. 1                   | 460, 6<br>529, 5                   | 525, 6            | 522. 8              | F455, 8<br>F524, 7     | 520, 0              | 450. 1<br>519. 0   | 450, 8<br>518, 5        |
| Тетр                     | 19. 6                 | 20.4                | 20, 9                   | 20, 8                                 | 21 0                 | 20.3              | 2(), ()              | 19. 4               | 18, 3                  | 17.5                | . 17. 0              | 17. 0             | 17.                | 2 17.3              | 3 17.               | 17.1                 | 17. 1                              | 17. 5                              | 17. 6             | 17. 5               | 17.4                   | 17. 5               | 17. 7              | 18.4                    |

To reduce readings to an approximately uniform series increase each reading of the 1st, 2d, and 3d by 105.7, and all remaining readings by 65.0 divisions. We have mean of 8 days, October 27 to November 3, inclusive, 451.3, and mean, of 8 days, November 5 to 12, inclusive, 5f.6.3; difference, 65.0 dno division of scale -, 0060803 part of the vertical force. Monthly means: Temperature, 189.4; magnetemeter, 451.1; reduced mean, 520.0

Hourly readings of the Brooke balance magnetometer, Uylaamic, Alaska, November, 1882.

| Temp. 1 - 2 - 31 - 3, 5 - 4   5 - 6   -7   -8   -9   -9   -9   -9   -9   -9   -9  | Date.     | 0.0            | 111        | 25         | 3311            | 41         | [ B*       | 65            | Th.        | , wh        | - 9s   | 10k        | 111        | Moon.       | 135             | 11               | 1.55       | 161         | 17h        | 145             | 195               | 201              | 31-               | 225     | 285   |
|---|-----------|----------------|------------|------------|-----------------|------------|------------|---------------|------------|-------------|--------|------------|------------|-------------|-----------------|------------------|------------|-------------|------------|-----------------|-------------------|------------------|-------------------|---------|-------|
| No. 1   | Nov. 1    |                | 135        | 431        | 1:11            | \$100      | 431        | <b>#</b> (10) | 431        | £30         | 126    | 424        | 422        | 422         | 430             | 133              | 155        | 446         | 136        | 129             | 418               | 118              | \$2P3             | 126     | 132   |
| No. 1.   1.   1.   1.   1.   1.   1.   1.   |           | 21             | 24         | 25         | 26              |            | 11         | 28            |            | 5 28        |        |            |            |             |                 | 28               |            | 25          |            |                 |                   | 115              |                   | 25      |       |
| Note   1.65   |           |                |            | 168        | 440             | 442        |            |               | 1.13       | 111         | 111    | 445        | 148        | 451         | 150             | \$ 613           | 61-        | 117         | 8.8.5      | 145             | 445               | 115              | 446               | 417     | (50)  |
| Fig. 10   |           | 4 452          |            | 153        | 151             | 452        | 450<br>450 |               | 152        | 151         | 450    |            | 453        | 154         | \$ \$11         | 161              | 101        | 167         | 457        | 157             | 156               | 176              | 157               | 114     |       |
| Trump. 6   100   1  |           | 8              | B          |            | 7               | 7          | 7          | - 6           |            | 4           | \$     | - 13       | .1         | 1 4         | - 8             |                  | - 4        | 4           | - 8        | 1               | 1                 |                  |                   | 2       | 511   |
| Section   Sect  |           | 1,             |            |            |                 |            | \$59.7     | 186           | 1255       | 191         |        | 1.01       | 501        | 501         | 496             | 503              | Section    | 504         | 506        | 50H             |                   | 509              | 500               | 50-2    | 5.9   |
| Temp. 6 90 91 90 92 92 92 92 92 92 92 92 92 92 92 92 92   |           |                |            |            |                 |            | 507        | 507           | 500        | 508         |        |            |            |             |                 | 515              | 511        | 515<br>515  |            |                 | 511               |                  |                   |         |       |
| Trump   |           | 5              |            | 510        | 5               | 6          | - 6        | 6             | - 5        | - 8         | - 11   | 13         | :1         | 1 2         | 1.3             | 9.5              | *3         |             |            | 23              | 317               | 1                | 200               |         | 5     |
| Temps   |           |                |            | 510<br>5.1 |                 | 500        |            | 508           | 508        |             | 500    |            | 512        | 513         |                 | 51 ķ             | 516        | 517         | 517        |                 | 507               |                  | 367               |         |       |
| Temp. 10 10 12 11 10 18 8 0 47 40 20 10 18 10 18 0 47 40 40 40 40 40 40 40 40 40 40 40 40 40  |           |                | 49.5       | 493        |                 |            |            |               |            |             |        | 506<br>506 | 174        | 495         |                 | 515<br>515       | 520        |             |            |                 | 500<br>500        |                  |                   |         |       |
| Temp. 6 50 515 512 512 510 500 500 500 500 400 100 100 51 525 518 500 524 511 512 501 501 500 101 102 513 515 518 510 500 501 512 501 501 500 101 102 513 515 518 510 501 501 501 501 501 501 501 501 501   |           |                | 516        | .511       |                 | 10         | 8          | - 0           | . 7        | Ü           | · 5    | 5          | -4         | 5           | - 5             | - 5              | 4.         | 4           | 1.5        | - 1             | 4                 | 4                | 1                 | - 3     | - 3   |
| Triump  |           | 510            | 515        | 512        | 512             |            |            |               | 500        |             | 192    |            | 511        |             | 518             | 530              | 524        |             | 512        | 504             |                   | 100              | 101               | 19%     |       |
| Nov. 11   Carlo   Same   Same   Carlo   Carl  |           |                |            |            | 408             |            |            |               |            |             |        |            | 516<br>514 |             | 522<br>523      |                  |            |             |            |                 |                   | 177              |                   |         |       |
| Tremp.   450   477   484   451   453   586   477   477   477   478   489   689   689   489   480  |           | C 458          | B          | - 9        | 9               | 10         |            | 10            | 9          | 7           | 7      | B          | - 6        | 65          | . 7             | 7                | H<br>469   | - 9         |            |                 | 12                | 8.8              |                   |         |       |
| Nov. 11. 487 488 470 470 489 470 470 489 472 472 473 478 190 483 484 185 181 485 181 480 480 481 181 181 181 481 481 481 481 481 481  |           | £ 459<br>18    |            |            | 453<br>20       |            |            |               |            | 5 24        | 457    | 157        |            |             |                 |                  |            | 475         | 468        |                 |                   |                  |                   |         | 467   |
| Nov. 12   284   284   292   292   293   592   10   17   16   15   14   14   13   13   13   13   12   12   12   13   11   14   13   13   13   13   12   12   12   13   13  | Nov. 11   | ( 467<br>) 468 | 468        | 469        | 470             | 469        | 469        | 472           | 472        | 171         | 478    |            |            | 484         |                 |                  |            | 486         | 4246       |                 |                   | 157              | 155               |         |       |
| Nov. 13   |           | ( 498          | 502        | 500        | 491             | 22         | 220),      | 5 - 20        |            | 17          | 16     |            | 14. 3      | 5 14<br>559 | 14              | 1.4              | 14         |             | 13         | 572             | 12                |                  |                   | 11      |       |
| Nov. 14 (314) 496 491 497 178 197 595 592 331 C) C) C) C) 693 891 C) C) C) C) C) C) C) C) C) C) C) C) C)  |           | 10             | 59         | ()         | 199             | 7          | 495        | 5             | 3.         | 5 2.        |        |            |            | -2          | -13             | - 12 1           | (')        | 185         |            | 574             |                   | - tr             | 602               | "3      | 5     |
| Trup  | Nov. 13   | € 511<br>€ 510 | 506        |            | 497             | 479        | 495        | 507           |            | 532         |        | (Ph)       | (')        | 691         | 694             | (')              | (†)<br>(*) |             | (1)        | £ 12            |                   | 5000             | 0.13              | 56.11   | 377   |
| Trup10 10 -10 -10 -10 -10 -10 -10 -10 -10   |           | € 536          | 532        |            | -5<br>531       | 535        | 517        | -6<br>508     | -7.<br>519 | 5 -9<br>517 | 513    | -11<br>515 | 1.2.5      | -12<br>568  | -12<br>584      | 545              |            |             |            |                 | 12                |                  | :                 | 11      | 504   |
| Nov. 15. \$\begin{array}{c c c c c c c c c c c c c c c c c c c  |           | 10             | - 10       | -10        | 10              | ~10.       | 5 -10      | ~10           | 11.        | 5 - 13      | -11    | 515        | -15.0      | 1-15        | 535<br>~15      | 15.              |            |             |            |                 |                   | - (5)<br>- 15    | 15                |         | 11    |
| Temp  | Nov. 15.1 | 1 511          |            | 520        |                 |            | 503        |               |            |             |        | 159        |            |             | 526             | 508              | 525        | 521         |            | 515             |                   | 501              |                   |         |       |
| Temp. 1 - 2 - 31 - 3, 5 - 4 - 5 - 6 - 7 - 88 - 9   90 - 10, 5 - 10   90   90   90 - 8, 5 - 9   7 - 90   90   9   9   9   9   9   7 - 7   10   90   90   90   90   90   90   90  |           |                | 503        |            | 508             | 509        | -7 511     | 511           | -6<br>515  | -5<br>512   | 510    |            | 501        | 503         | -6<br>52\$      |                  |            | -4.0<br>528 | 5-3 m      | $^{-3}_{527}$   | 526               | -1.5<br>526      | 53%               | 526     | 500   |
| Nov. 15   5.09   528   529   528   524   522   519   517   518   518   518   518   515   525   538   518   539   501   537   505   530   527   530   527   530   527   530   530   527   530   530   527   530   5  |           | ( )            | - 4        | -:3        | -3.             | -4         | - 5        | -6            | -7         | 14          | -10    | -9         | -10.2      | 5 -10       | 523<br>-9       | 0                | 19         | 398<br>-8.0 | -9         | 4               | - 58              | 526              | - 9               | No.     |       |
| Temp 7 - 20 - 34 - 44 - 13 - 14 - 35 - 48 - 49   91   511   511   501   501   513   514   515   |           |                | 528        | 530        | 528<br>527      | 524<br>524 | 502        |               | 517<br>516 | 518<br>518  | 518    | 518        | 515        | 518         | 525<br>525      |                  |            |             |            | 559<br>559      | 565<br>567        | 55G<br>555       | 554<br>557        |         | 520   |
| Trupp. 0 0 0 1 1 1 1 1 1 1 2 1 0 0 0 0 0 0 0 0  |           | C 518          | 515        | 521        | -4              | - 4        | -4         | -:3           | - 8        |             | }      | -ti        | -15        | - 4         | - 1             | - 1<br>535       | - \$       | - 4         |            |                 | 548               | $\frac{-2}{534}$ | 50%               |         | 547   |
| Nov. 29   5 36   523   519   406   507   508   506   506   501   501   501   502   502   503   5  |           | 0              | ()         | 1          | 1               | . 1        | 1          | 526           | 1          | ()          | 0      | 1534       | -1         | ()          | 524             | 535<br>- 0,      | 5 -1       | 0           | 0          | 1.              | 1.5               | - 11             | 1.6               | 1 1     | . 45  |
| Temp. (2 52 52 52 52 52 52 52 52 52 52 52 51 50 51 51 50 51 52 52 52 52 52 51 50 51   |           |                | 524<br>523 |            |                 | 507        | A108       | 506           |            |             |        | 507        | 549<br>543 | 550         | 525<br>523      | 568              | 572<br>574 |             | 539        |                 |                   |                  | 5.4<br>5.8        | - 1     | 527   |
| Temp. 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 2 1 1 0 1 1 1 1 3 3 16 3 16 316 317 517 523 500 501 505 501 500 511 502 501 500 501 503 500 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 500 501 502 501 501 501 501 501 501 501 501 501 501   |           |                | 529        |            |                 | 527        |            | 544           |            |             | 536    | 1521       | -2<br>574  | 575         | 581             | 598              |            | 567         | 564        |                 | 52.6              | 57 5             | 500               |         | 1     |
| Nov. 21 (529) 329 344 309 311 313 316 316 317 523 326 331 332 337 338 331 332 337 338 311 332 338 311 332 337 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317 338 317   |           | 0              | 1          | 1          | 1               | 1          | 1          | 16            | 1)         | 1           | 63     | -1         | -13        | 5 -1        | - 1             | - 1              | -1         | - 1         | -()        | 0               | i                 | 70.7             |                   | 5       |       |
| Nov. 23   529   329   325   327   528   329   327   327   328   329   328   328   329   328   32  | Nov. 21   | 520            | 50%        |            |                 | 511        | 513        | 516           |            |             | 523    |            |            | 532<br>532  |                 | 508<br>508       |            |             |            |                 | 560               | 1                |                   | 5.0     | 513   |
| Nov. 23   \$522   \$526   \$528   \$529   \$527   \$527   \$526   \$526   \$526   \$526   \$527 |           | € 520          | 528        | 525        | $\frac{7}{527}$ | 526        | 526        | 527           |            | 507         | 526    |            | 500        | 528         | $\frac{1}{529}$ | 522              |            | 517         | 516        |                 | 51.1              | 315              | 516               | 500     | 5,0   |
| No. 21,   |           | . 7            | 7          | 7          | 7               | 7          | 7          | 24            |            | 7           | 7      | 8          | - 13       | 11          | 529             | 5 12             | 12         | 12          | 1.2        | 12.             | 12                | 1.2              | 1.                |         | 1.2   |
| No. 21,   |           | 1 523          | 1526       | 528        | 529             | 527        | 527        | 526           | 521        | 528         |        |            | 195        |             | 523<br>523      |                  | 553        | 551         | 534        | 520             | 516               | 515              | 517               | 34      | 524   |
| Trup  |           |                | 517        | 518        | 516             | 515        | 515        | 506           | 507        | 508         |        |            | 198        |             | 510             |                  | 522        | 526         | 7.113      | 7/20            | 517               | 516              | 215               | 5145    | 515   |
| Tump  |           | . 4            | 4          | 4          | 3               | . 3        | 2          | 1             | ()         | ()          | 1      | -1         | ()         | 1           | 1               | 1                | 1          | 1           | 0.         | 5 ()            | - 1               | -1               | - 1               |         | 3     |
| Nav. 25, \$\begin{array}{c c c c c c c c c c c c c c c c c c c  |           | \$ 51.0        |            | 524        | 520             | 521        | (520)      | 514           | 510        |             | 561.5  |            |            |             | 521             | 517              | 17         |             | 516        | 564             |                   |                  | 5 10              | 1       | 524   |
| Temp  |           | \$ 529         | 524        |            | 519             | 517        | 516        | 515           | 511        |             | 509    |            | 524        | 527         | 528             | 540              |            | 3718        |            | 525             |                   |                  | 524               |         | 527   |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |           | -3             | -11        | -12        | -2.             | 5 -2.      | 5 -2.      | 5 -2          | -3         | -4          | -45    | -7         | - 1        |             | -25             | -                | -4         | -8          | - 25       | -7.             |                   | - 5              | - "               | 7       | 45    |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |           | 1 525          | 113.5      | 525        | 523<br>523      | 523        | 310        |               | 521        | 515         |        |            |            |             | 523             | 225              | 524        | 529<br>529  | 528        | 521             | 511               | 515              | 514               | 513     | 520   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |           | ( 522          | 522        | 521        |                 | 518        | 517        |               | 517        |             |        | 513        |            | 7.20        | 526             | 532              | 529        | 520         | 520<br>500 | 320             | 519               | 517              | 516               | 517     | 520   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |           | -2             | - 1        | -1         | -1              | . 0        | -(),       | 5 -1          | -2         | -33         | -4     | -5         | 5          | 5           | - 3             | - 1              | -3         | -4          | - 3        | 3               |                   | -12              | - 2               | - 1     | 1     |
| Nov. 30. $\frac{1}{3}$ 8 817 518 815 515 516 517 510 511 507 506 512 512 516 521 517 514 517 515 512 511 50 80 515 $\frac{1}{3}$ 517 517 517 515 515 515 516 518 511 511 507 501 511 513 518 529 517 517 513 517 515 512 510 510 511 510 510 511 510 510 511 510 510  |           | 7 520          | 520        | 520        | 519             |            | 519        | 517           | 518        | 517         | 218    | 517        | 516        | 518         | 522             | 522              | 518        | 519         | 518        | 517             | 517               |                  | 516               | 116     | 548   |
| Temp1   0   0   1   2   2   2   1   0   0   0   0   0   0   0   0   0   | Nov. 30   | 5 518          | 517        | 518        | 515             |            | 516        | 517           | 510        | 511         |        | 506        | 512        | 512         |                 | 521              | 517        | 514         | 517        |                 |                   |                  |                   | 5. 9    | 515   |
| Magnet'r 503, 5 505, 8 504, 8 502, 5 500, 0 500, 0 500, 0 408, 1 498, 4 508, 4 508, 7 515, 2 517, 8 519, 7 529, 0 538, 2 519, 7 540, 1 534, 2 528, 1 529, 5 517, 0 521, 0 511   | Temp.     | 1              |            |            |                 |            |            |               | 116        | 911         |        |            |            |             |                 | 0                | 011        | 913         | 0          | 1               | 1                 | 0                |                   | 1       | 2     |
| Reduced: 512, 2 512, 5 514, 5 509, 2 507, 6 506, 8 507, 2 504, 6 504, 9 514, 9 515, 2 521, 7 524, 3 526, 2 540, 1 544, 7 547, 2 552, 9 540, 7 534, 9 536, 9 526, 5 536, 9 547, 2 504, 9 547, 2 552, 9 540, 7 534, 9 536, 9 547, 2   | Magnet    | 'r 505.        | 5 505,     | 8 504.:    | 8 502.          | 5 500.     | 9 500.     | 2,500.        | 7 198.     | 1 498.      | 4 508. | 4 508.     | 515.       | 2 517. 1    | 8 519.          | 7 533.<br>9 5 to | 6 538,     | 2 540.      | 7.546.     | 4 534.<br>9 540 | 9 528.<br>7 534 5 |                  | 1517. (<br>1528.) | (524. C | 511.3 |

To reduce readings to an approximately uniform system increase the readings of November 1, 2, and 3 by 65.0 divisions as explained in note to preceding month. Scale value to the first 3 days, account 3 for the next 11 days to November 14, 26 (c) cost6, for removed of month controls, average for month account of the vertical force. Monthly means: Temperature, 25.7; magic former, 54.2, where forces 1, 546.2, which is a control of the vertical force.

ber, 1882.

l remaining readings ser 5 to 12, inclusive, 8-, 4; magnetemeter,

Hourly readings of the Brooke balance magnetometer, Uglaas.ie, Alaska, December, 1882.

| -                 |                |            |                         |                   |                   |                    |  |                   |                   | 1                                  |                          |  |                     |                   |                   |                             |                                    |                    |                   |                    |                   |                                       |   | 1 1000            |
|-------------------|----------------|------------|-------------------------|-------------------|-------------------|--------------------|--|-------------------|-------------------|------------------------------------|--------------------------|--|---------------------|-------------------|-------------------|-----------------------------|------------------------------------|--------------------|-------------------|--------------------|-------------------|---------------------------------------|---|-------------------|
| Date.             | 65             | 11         | 30                      | 237               | 41                | 81                 | 451  | 71                | 90                | 91                                 | 10,                      | 1111   | None                | 135               | 141               | 15,                         | 165                                | 171                | 841               | 107                | 30,               | 31,                                   | 35,   | 331               |
| -                 |                |            |                         |                   |                   | 710                |  |                   | 516               | 519                                | 518                      | 5:11   | 524                 | 526               | 5:00              | 500                         | 541                                | 802                | 530               | 832                | 531               | 532                                   | 531   | Service .         |
| Dec. 1            | \$ 513<br>512  | 511        | 514                     | 514               | 515               | 512                | 513  | 811               |                   |                                    | 10                       | 11   | 11.                 | 5 10              | 10                | 19                          | 14                                 | 14                 | 15                | i                  | 14                | 16                                    | 16  | 1024              |
| Temp<br>Dec.2     | \$ 532         | 329        | P <sub>3</sub> -14.3    | 509               | 509               | 505                | 503  | 562               | 502               | 104                                | 506                      | 500  | 512                 | 511               | 515               | 514                         | 316                                | 517                | 514               | 312                | 512               | 511                                   | 511   | 18<br>513         |
| Temp              | 1              | 528        | 521                     | 500               | 508               | 505                | 10.3   | 502               | 502               | 104                                | 507                      | 510  | 512                 | 512               | 516               | 514<br>-0.5                 | 516                                | 517                | 514               | 512                | 512               | 511                                   | 511   | 513               |
| Dec.3             | 5 513          | 514        | 513                     | 513               | 512               | 513                | 542<br>512                                     | 412               | 511               | 311                                | 509                      | 511<br>512   | 513<br>513          | 513               | 513               | 517                         | 514                                | 514                | 513               | 512<br>512         | 511               | 510<br>510                            | 510   | 519<br>519        |
| Tomp.             | 7 513          | 51 8       | 514                     | 513               | 512               | 51.7               | .1   | 512               | 511               | 11                                 | 22                       | 1.0  | - 2                 | 22                | 1                 | 1                           | 1                                  | (1                 | - (1              | - (1               | ()                | 19                                    | 0   | -1                |
| Dec. 4            | \$ 513<br>513  | 514<br>514 | 515                     | 516               | 514<br>514        | 513                | 513  | 514               | 512               | 505                                | 501                      | 524<br>519   | 517                 | 528<br>529        | 526<br>527        | 544<br>544                  | 521<br>520                         | 540<br>539         | 538<br>540        | 524<br>524         | 513               | 512<br>512                            | 514<br>514  | 513<br>520        |
| Temp.             | 6.520          | -1<br>510  | -1                      | -1                | 519               | -1.<br>518         | 5 -2.  | 5 -3              | 516               | 1111                               | -5<br>517                | -6<br>520  | -6<br>521           | -46<br>7, 212     | -6<br>325         | 592                         | -8<br>522                          | -6<br>5-1-1        | 521               | - 5<br>520         | 510               | -5<br>520                             | 519   | 520               |
| Dec. 5 .          | 520            | 519        | 520<br>520              | 519<br>519        | 5339              | 518                | 518  | 317               | 516               | 515                                | .17                      | 521  | 521                 | 522<br>522        | 526<br>-6         | 522                         | 522                                | 5-1-1<br>5-1-1<br> | 521               | 520<br>6           | 510               | 520<br>- 6                            | 219   | 522               |
| Temp              | 5 523          | 521        | 5000<br>5000<br>5000    | 521               | 520               | 520                | 520  | 519               | 518               | 50.9                               | ari                      | 515  | 520                 | 521<br>522        | 599<br>599<br>599 | 523                         | 599                                | 520                | 520<br>520        | 519                | 518               | 517                                   | 516   | 519               |
| Dec. 6<br>Temp    | 623            | 521        |                         | 521               | 520               | 520                | 520  | 519               | 518               | 1())                               | 511                      | 516  | 520                 | . 11              | -41               | 523<br>-6                   | 522                                | 520                | 520               | 519                | 518               | 317                                   | 516   | 119               |
| Dec. 7            | 5 519          | 521        | 521<br>522              | 521<br>521        | 523<br>523        | 523<br>523         | 523  | 523<br>523        | 584<br>514        | 325<br>525                         | 326<br>526               | 528<br>528   | 527                 | 1000              | 525<br>525        | 530                         | 532<br>532                         | 532<br>532         | 325<br>525<br>525 | 520<br>520         | 517               | 515<br>516                            | 515<br>515  | 518<br>518        |
| Temp              | 519            | 520<br>2   |                         | -4                |                   | 4                  | 503  | 5 3               | 2                 | 1                                  | 1                        | 1  | (.)                 | 0                 | ()                | - 1                         | -1                                 | - 1                | - 1               | -1                 | . *3              | - 15                                  | -78   |                   |
| Dec. 8            | 5 518          | 518        | 519<br>520              | 519<br>519        | 520<br>520        | 520<br>520         | 520  | 520<br>520        | 520<br>521        | 122                                | 521<br>521               | 523<br>524   | 524<br>524          | 517               | 522               | 524<br>524                  | 524<br>524                         | 525<br>523         | 525<br>523        | 502<br>502         | 521<br>521        | 521<br>521                            | 520<br>520  | 721<br>722<br>73  |
| Temp .            | C 520          | 522        | 4.                      | - 63              | 501<br>501        | 593                | 5.0  | 500               | -8<br>502         | -9<br>514                          | 520                      | -9<br>521  | $\frac{-10}{523}$   | -10<br>503        | $\frac{-0}{525}$  | - ()<br>526                 | 527                                | 582<br>582         | 733               | 526                | -6<br>524         | -5<br>522                             | 515   | 539               |
| Dec. 9            | 522            | 522        | 522<br>722              | 521<br>521        | 521               | 521                | 5.0  | 503               | 501               | 515                                | 1111                     | 322  | 523                 | 523<br>523        | 525<br>-9         | 526                         | 327                                | 132                | 534               | 519                | 521               | 522                                   | 515   | 521<br>-9         |
| Temp<br>Dec. 10   | 522            | 525<br>525 | 525<br>525              | 524<br>524        | 31.5              | 524<br>524         | 524<br>524                                     | -4<br>523<br>523  | - 6<br>523        | 522                                | 523                      | 526  | 527                 | 532               | 532               | 32H                         | -8<br>528<br>528                   | 526                | 526               | 525                | 324               | 524                                   | 595   | 525<br>525        |
| Temp              | 592            |            |                         | 524<br>-9         | 525               | 524                | 1.5  | 523               | 523               | 522                                | 524<br>-12               | 526 - 12   | 528<br>-11.         | 532               | 532<br>-12        | 528                         | 528<br>-11                         | 526<br>-11         | 526               | 525                | 524<br>-10        | 524<br>-10                            | 523<br>-10  | 525               |
| Dec. 11 .         | \$ 525<br>525  | 525<br>526 | 524<br>524              | 524<br>524        | $\frac{524}{524}$ | 526<br>526         | 523<br>523                                     | 519<br>519        | 513<br>514        | 515<br>515                         | 513<br>507               | 503<br>504   | 511                 | 521<br>521        | 521<br>522        | 521<br>521                  | -11<br>524<br>593                  | 50 <b>0</b><br>530 | 538E<br>7.08      | 524<br>524         | 510<br>510        | 514                                   | 514<br>514  | 518<br>517        |
| Temp .            |                | - K        | -24                     | -                 | 7                 | 7                  | - 1  | -7                | -7                | 519                                | 7                        | -63  | -6                  | -43               | 525               | - 1                         | 524<br>-3                          | - 1                | -3<br>559         | - 1                | -3<br>530         | -3<br>328                             | 1   | 52H               |
| Dec. 12           | § 520<br>€ 520 | 522<br>522 | 520<br>521              | 519<br>519        | $\frac{521}{521}$ | 522<br>522         | 521<br>521                                     | 518<br>518        | 516<br>518        | 519                                | 500<br>500               | $\frac{527}{527}$  | 5111                | 521<br>521        | 528               | 527<br>527                  | 502<br>502                         | 539<br>530         | 50194             | 532                | 329               | 528                                   | 525<br>524  | 5.28              |
| Temp.             | - 6<br>v 529   | 530        | 531                     | .530              | 530               | - 14               | 529  | 527               | -10<br>524        | -11<br>523                         | 10<br>524                | 512<br>527<br>527<br>-12                                   | -12<br>522          | -12<br>513        | ~12<br>532        | -12<br>530                  | -12.5<br>527                       | -12<br>526         | -12<br>504        | 12                 | -12<br>523        | -12 $523$                             | -12<br>524  | -12<br>525        |
| Dec. 13.<br>Temp  | # 529<br>-12   | 530<br>-13 | 531<br>-13              | 530               | 53e<br>-12        | 529<br>-12         | 529<br>529<br>-12                              | 526<br>-11        | 524<br>-12        | 523<br>-12                         | 524<br>525               | 527  | 522<br>522<br>-11   | 516<br>-10        | 533<br>-10        | 530                         | 527<br>-9                          | 526                | 524               | 524                | 523               | 523                                   | 524   | 525               |
| Dec. 14           | 5 525          | 525<br>525 | 5:15                    | -12<br>525<br>525 | 525               | 525                | 524<br>524                                     | 322<br>522        | 521               | 521                                | -12<br>520               | 521<br>521   | 5.24                | 528               | 534               | 538                         | 529                                | 526                | 529               | 525                | 524               | 525<br>525                            | 524   | 524<br>524        |
| Temp              | € 525<br>=6    | -43        | 525<br>-6               | ~(1)              | 525               | 524                | - 15   | -43               | 5-10              | 521                                | 522                      | -10  | 524<br>-10          | 529<br>-10<br>543 | 534<br>-10<br>544 | 537<br>-10                  | 529<br>-10                         | $\frac{526}{-10}$  | 526               | 525<br>10          | 524<br>-10        | -19                                   | 524<br>=9   | -19               |
| Dec. 15           | \$ 524<br>524  | 523        | 526                     | 528               | 531               | 534                | 708  | 338               | 511               | 543                                | 540                      | 544  | 542                 | 543               | 544               | 543                         | 542                                | 540                | 541               | 535                | 531               | 522                                   | 516   | 514               |
| Temp.             | -9<br>514      | -3.<br>508 | 5 -1                    | 309               | 484               | 497                | 505  | 5 2 505           | 497               | 497                                | 522                      | 4<br>503   | 522                 | 580               | 5<br>334          | 536                         | 531                                | 5<br>536           | 539               | 532                | 523               | 587                                   | 532   | 522               |
| Dec. 16           | 1              | 508        | 513                     | 511               | 484               | 498                | 500  | 505               | 4116              | 196                                | 521                      | 500  | 523                 | 529               | 533               | 537                         | 581                                | 536                | 540               | 532                | 523               | 537                                   | 528   | 524<br>-9         |
| Temp<br>Dec. 17 . | 5 524          | 523        | $\frac{-1}{524}$<br>524 | 522<br>322        | 523               | 7-22               | 521<br>522                                     | 523               | $\frac{-9}{521}$  | -10<br>522                         | $\frac{-10}{522}$        | $\frac{-10}{524}$  | -10.5<br>528        | 581               | -11<br>531        | -11<br>526                  | $\frac{-11}{525}$                  | $\frac{-11}{525}$  | 524<br>524<br>524 | $\frac{-9.5}{523}$ | 523               | -9<br>523                             | ~9<br>523   | 523               |
| Temp.             | 523            | 523        | - 54                    | -34               | 500               | 523                | -1   | 523               | 521               | 522                                | 523<br>-10               | 524<br>-10   | 528<br>-10          | 531<br>-10        | 530<br>-10        | 526<br>-10                  | 525<br>-9, 5                       | 525                | 524               | 523                | 523<br>-9         | 523                                   | 523   | 524               |
| Dec. 18 .         | § 524<br>524   | 525<br>525 | 525                     | 524<br>524        | 525<br>525        | 525<br>525         | 523<br>524                                     | 523<br>523        | 524<br>524        | 525                                | $\frac{526}{527}$        | 528<br>528   | 527<br>528          | 528<br>528        | 528<br>528        | 528<br>528                  | 52E                                | 528<br>528         | 528<br>528        | $\frac{527}{527}$  | 527<br>527        | 527<br>527                            | 526<br>526  | 526<br>526        |
| Temp.             | -9<br>526      | -9<br>530  | 525<br>525<br>-9<br>528 | -36               | 523               |                    |  | -8<br>500         | -10<br>508        | -11<br>509                         | -12<br>510               | -12<br>515   | -19                 | -12<br>530        | -12<br>532        | -12<br>532                  | -12<br>533                         | -12<br>531         | -11<br>530        | -12<br>529         | -12<br>528        | -12<br>528                            | -13<br>528  | -19<br>528        |
| Dec. 19           | 526            | 531        | 530                     | 531<br>530        | 523               | 522<br>522         | 523<br>523<br>-14<br>532<br>531                | 500               | .500              | 510                                | 512                      | 515  | 523<br>523          | 530               | 532               | 532                         | 533                                | 531                | 530               | 529                | 528               | 528                                   | 328   | 529               |
| Temp<br>Dec. 20   | 14<br>530      | -14<br>531 | -14<br>532              | -14<br>532        | -14<br>583        | -14<br>532<br>532  | -14<br>532                                     | -14<br>532        | $\frac{-14}{527}$ | -15<br>531                         | -16<br>527               | $\frac{-16}{520}$  | -16<br>537<br>537   | -16 $551$         | -16<br>552        | -15<br>559                  | -15<br>571<br>570                  | -14.5<br>558       | 507               | $\frac{-13}{550}$  | -13<br>559        | -14<br>546                            | -14<br>538  | -15<br>525        |
| Temp.             | 530            | 531<br>-15 | 532<br>-15              | 532<br>532<br>-15 | 533               | 532<br>-14         | 531<br>-15                                     | 532               | 527<br>-16        | 529<br>-16                         | 527                      | 519  | -747                | 552<br>-16        | 545<br>-16        | 556<br>-15, 5               | 570<br>-15. 5                      | 587<br>-15, 5      | 557               | 551<br>-14         | 560<br>-14        | 545<br>-14                            | 538<br>-14  | 528<br>-15        |
| Dec. 21           | \$ 528<br>528  | 525<br>525 | 523<br>523              | 391               | 512<br>512        | 516<br>516         | 520  | -15<br>520<br>520 | 450               | 498                                | 527                      | 548<br>549<br>-12  | 541<br>538<br>-12   | 539<br>530        | 542<br>542        | 550<br>550                  | 543<br>343                         | 537<br>537         | 531<br>531        | 545<br>547         | 537<br>534        | 532<br>535                            | 528<br>521  | 524<br>524        |
| Temp              | 15             | -12        | -12                     | 520<br>-12        | -10               | -10                | -0.  | -10               | :451<br>-11       | 497<br>-12                         | 526<br>-12               | -12  | -12                 | -13               | -13               | -13                         | _12                                | -13                | -11               | -14<br>527         | -11               | -11                                   | -11   | -12               |
| Dec. 22           | 524<br>524     | 526<br>527 | 528<br>528              | $\frac{526}{525}$ | $\frac{526}{526}$ | 525<br>525         | 520<br>521<br>-9.3<br>524<br>523<br>-12<br>530 | 526<br>525        | 522               | -518<br>-521                       | 382<br>552               | 518<br>520   | 522<br>521          | 546<br>545        | 557<br>558        | 550<br>550                  | 545<br>544                         | 538                | 533               | 527<br>526         | 526<br>529        | 527<br>527                            | 527<br>527  | 530<br>531        |
| Temp              | 11<br>C 530    | -10<br>532 | -10<br>533              | -10<br>531        | -10 $-31$         | -11<br>528         | -12<br>530                                     | -13<br>530        | -14               | -15<br>520                         | -16<br>521<br>522<br>-15 | -16<br>521<br>521<br>-16                                   | $-16 \\ 550$        | -16<br>543        | -16<br>535        | -16<br>537                  | -16<br>538                         | -16<br>551         | -15<br>538        | -14.3<br>535       | 5 =14. 5<br>533   | -14<br>530                            | -14<br>531  | -14<br>532        |
| Dec. 23<br>Temp   | ₹ 531<br>~14   | 532<br>-14 | 533<br>-13              | 531<br>-13        | 531               | 528<br>5 -13       | 530<br>-12.                                    | 530               | 526<br>527<br>-14 | 520<br>-15<br>528                  | 520                      | 521  | 548                 | 548<br>-16        | 535               | 537                         | 539                                | 550<br>-15         | 587<br>-15        | 535                | 533<br>-15        | 531                                   | .531<br>-17   | 532<br>-16        |
| Dec. 21           | 5 532          | 534        | 534                     | 533               | -12.<br>532       | 533                | 5322   | 531               | 529<br>529        | 528                                | 534                      | 505  | 524<br>525          | 528               | 537               | 556<br>555                  | 535                                | 553                | 54.5              | 535                | 534               | 53.4                                  | 533   | 534               |
| Temp .            | ) 532<br>-16   | 534<br>-16 | 533<br>-16              | 534<br>-15. 3     | 532               | 532<br>5 -15       | 532<br>-15                                     | 531<br>-16        | -18               | 529                                | 534<br>535<br>-19        | 505<br>503<br>-20<br>522<br>-21<br>520<br>521<br>-9<br>514 | 525<br>-20          | 528<br>-20        | 537<br>-20        | 555<br>-20                  | 535<br>537<br>-20, 5<br>534<br>534 | 553<br>-20         | 546<br>-19. 5     | 535<br>-20         | 534<br>-20 ·      | 534<br>-20<br>522                     | 533<br>-20  | 534<br>-20        |
| Dec. 25           | 534            | 534        | 534<br>534              | 534<br>534        | 535<br>535        | 534<br>534         | 534<br>534                                     | 534<br>534        | 530<br>530<br>-22 | -18<br>-521<br>-522<br>-22<br>-526 | 517<br>516               | 522<br>522   | $-20 \\ 534 \\ 533$ | -20<br>539<br>539 | 539<br>538        | 532<br>533                  | 534                                | 530<br>530         | 525<br>525        | 524<br>524         | 523<br>523        | 31113                                 | 522   | 525<br>526        |
| Temp              | -20<br>525     | -21<br>527 | -21                     | -21<br>527        | -20<br>527        | -21<br>527         | -21  | -21<br>528        | -22               | -22                                | -22                      | -21  | -20                 | -139              | -19<br>583        | -18<br>533                  | -16<br>533                         | -15<br>532         | -13<br>534        | -12                | 323<br>-12<br>594 | -12                                   | -12   | 526<br>-12<br>524 |
| Dec. 26           | 527            | 528        | 527                     | 527               | 527               | 527                | 527  | 528               | 528<br>527        | 326                                | 523<br>523               | 521  | 521<br>521          | 530<br>530        | 533               | 534                         | 533                                | 532                | 534               | $\frac{524}{524}$  | 524<br>523        | 523<br>523                            | 522   | 524<br>524        |
| Tomp<br>Dec. 27   | =11<br>5-526   | 10<br>524  | -9<br>525               | $^{-9}_{524}$     | -8.<br>524        | 5-8<br>524         | -21<br>528<br>527<br>-6, 5<br>525<br>525       | -6 $523$          | 520               | $^{-9}_{513}$                      | 515                      | 514  | -8<br>516           | 516               | -8<br>519         | 521                         | -8<br>520                          | 520                | -5<br>520         | $\frac{-5}{520}$   | $\frac{-6}{521}$  | 522                                   | 522   | $^{-6}_{522}$     |
| Temp              | 521            | 524        | 524<br>-6               | 524               | 524               | 524<br>524<br>~5   | -0   | 523               | 521               | 513                                | 515                      | 513  | 516                 | 517<br>-10        | 518               | 521                         | 520<br>-11. 5                      | 520<br>-11. 5      | 520<br>-11        | 520<br>-13         | 521<br>521<br>-13 | 522                                   | 522   | 521<br>-13        |
| Dec. 28           | 521            | 524<br>524 | 524<br>524              | 522<br>522        | 521<br>521        | 515<br>516         | 516  | 510               | 508               | 506                                | 509                      | 514  | -9<br>520           | 508<br>502        | 526               | -10. 5<br>523<br>523<br>-13 | 523<br>523                         | 522<br>522         | 593               | 521                | 522<br>522        | -6<br>522<br>522<br>-14<br>522<br>522 | 522<br>-12<br>522<br>522<br>-6<br>522<br>-14<br>522<br>522<br>-14 | 522<br>522        |
| Temp              | 12             | -11        | -11                     | -11               | 521<br>-11<br>523 | -11                | 516<br>-9<br>524                               | 510               | 509<br>9          | 506<br>-10                         | -10                      | 514  | 520<br>-11          | -11               | 526<br>-12        | -13                         | -13                                | -14                | 523<br>-13        | 521<br>-14         | 522<br>-14        | 522<br>-14<br>509                     | -14   | -11               |
| Dec. 29           | 522<br>521     | 520<br>520 | 521<br>520              | 522<br>522        | 523<br>523        | 51 <b>6</b><br>517 | 524<br>524                                     | 528<br>528        | 521<br>521        | 520<br>520                         | 510<br>510               | 515<br>515   | 536<br>536          | 520<br>519        | 508<br>508        | 477                         | 501                                | 511<br>511         | 510<br>511        | 511<br>510         | 504<br>505        | 509                                   | 508<br>508  | 508<br>508        |
| Temp              | -9<br>C 513    | 513        | -5<br>516               | -3<br>515         | 516               | 517                | 4<br>518                                       | 5<br>516          | 520               | 519                                | 521                      | 524  | 525                 | 521               | 533               | 540                         | 0<br>528                           | -1<br>528          | -1. 5<br>535      | -3<br>542          | -5<br>526         | 0                                     | 521   | -8<br>523         |
| Dec. 30<br>Temp   | 512            | 512        | 518                     | 514               | 517               | 516                | 518  | 517               | 520               | 519                                | 320                      | 524  | 525                 | 521               | 581               | 541                         | 528                                | 528                | 536               | 542                | 525               | 523                                   | 521<br>522  | 523<br>-15        |
| Dec. 31           | 524            | -8<br>527  | -8<br>514               | -8. 5<br>522      | -9<br>-528        | -9, (<br>521       | 521  | -12<br>520        | -14<br>519        | -15<br>519                         | -16. 5<br>517            | -17<br>519<br>519  | -17<br>527<br>526   | -18<br>551        | -18<br>533        | -18<br>527                  | -18<br>525                         | -17 $523$          | -15. 5<br>521     | -16<br>520         | -15<br>521        | 514                                   | 515   | 509               |
| Temp              | 524<br>-14     | 526<br>-13 | 514<br>-13              | 522<br>-13        | 524<br>-11        | 521                | 521  | 521               | 519               | 519<br>-12                         | 517<br>-12               | 519<br>-12   | 526<br>-11          | 552<br>-11        | 532<br>-11        | 527                         | 525<br>-10                         | 523<br>-9          | 521<br>-8         | 520                | 521<br>-7         | 513<br>-7                             | 514<br>-7   | 509<br>-8         |
| Magnet's          | 523. 0         | 523. 2     | 523, 3                  | 522. 8            |                   |                    |  | -                 |                   | _                                  | 520. 1                   |  |                     |                   |                   | 530. 6                      |                                    |                    |                   | -                  | 523. 9            | 523. 1                                | 521. 5  | 522. 3            |
| fill and the      | FF 0           | FF 25      | T 4                     |                   |                   |                    | Jul. 0   | A 5               | A 2 410 W         | OAT: 1                             | Jen 1                    | V40. 4   | 1960. 6             | WELL O            | were c            | wire. O                     | wern T                             | 200. 4             | **** CF+ +1       | Jan.               | vann o            | Date:                                 |   | 0.41              |

Hourly readings of the Brooke balance magnetometer, at Uglaamie, Alaska, January, 1883,

er, 1882.

31.142261116335596688277211643483446663692335744661.533993397

211 221 231

| Date.   | Oh                              | 1 %                                    | 21.                              | 3"                               | 41                               | 34                                     | 61                                     | 71                                   | Na                                      | \$811                              | 10                                 | 115                                    | ,                                      | 131                                    | 141                                      | 150                                    | 141"                                | 175  | 190                                | 810-                              | 265                             | 211                                     | 22'                                    | 334  |
|---|---------------------------------|--|----------------------------------|----------------------------------|----------------------------------|--|--|--------------------------------------|---|------------------------------------|------------------------------------|--|--|--|--|--|-------------------------------------|--|------------------------------------|-----------------------------------|---------------------------------|---|--|--|
| Temp  | 312<br>340<br>38                | 312<br>512<br>511                      | 513<br>513<br>- 6<br>710         | 515<br>516<br>- 6<br>510         | 515<br>515<br>509                | 515<br>515<br>515                      | 513<br>512<br>← 5<br>505               | 512<br>512<br>512<br>514             | 515<br>-15<br>-04                       | 509<br>709<br>6<br>501             | 509<br>509<br>T                    | 495<br>495<br>7<br>497                 | 4504<br>4509<br>- 6<br>4507            | 566<br>165<br>7                        | 22<br>700<br>1                           | 5 (12)<br>5 (12)<br>7 (4)(9)           | 46<br>76<br>6                       | 51.3<br>51.5<br>5.5<br>5.5<br>5.0<br>5.0<br>5.0<br>5.0<br>5.0<br>5.0<br>5.0<br>5 | 518<br>518<br>- 1                  | 512<br>512<br>-3<br>407           | 509<br>509<br>-4<br>188         | 510<br>510<br>1                         | Litter<br>Litter<br>1<br>April         | 511<br>511<br>3<br>498                     |
| Temp .  | 111<br>- 31<br>12-6<br>- 14     | 1<br>4n7<br>4n7                        | 490<br>491<br>121                | 490<br>100<br>10                 | 5 3<br>192<br>492                | 494<br>494<br>494                      | 3<br>41/4<br>49/4                      | 4<br>4(1)<br>11)4<br>8               | 495<br>495<br>495                       | 45.4<br>46.5<br>46.7               | 493<br>493<br>5                    | 49/3<br>49/3<br>4                      | 1)<br>49)4<br>190<br>4                 | 410s<br>410s<br>410s                   | 10<br>506<br>506                         | 512<br>512<br>513                      | 10<br>502<br>502                    | 11<br>490<br>129   | 12<br>499<br>409                   | 12<br>198<br>198                  | 498<br>498<br>60a               | 12<br>499<br>499<br>5                   | 1.1<br>400<br>400<br>0                 | 17<br>5.0<br>501                           |
| Jan. 4 }  | 501<br>501<br>- 5<br>500<br>500 | 500<br>500<br>500<br>500               | 500<br>500<br>5<br>501<br>501    | 500<br>500<br>500<br>500         | 499<br>400<br>6<br>501<br>501    | 499<br>499<br>5<br>501<br>501          | 499<br>499<br>5<br>500<br>501          | 199<br>499<br>5<br>500<br>500        | 499<br>499<br>4<br>495<br>495           | 500<br>500<br>11<br>402<br>491     | 500<br>500<br>2<br>491             | 496<br>197<br>2<br>498<br>498          | 503<br>503<br>3<br>503<br>503          | 569<br>569<br>3<br>503<br>503          | 502<br>501<br>4<br>504<br>504            | 500<br>300<br>3<br>504<br>504          | 501<br>501<br>4<br>508<br>508       | 501<br>501<br>4<br>505<br>505  | 499<br>809<br>5<br>505<br>505      | 499<br>490<br>5<br>504<br>504     | 490<br>490<br>5<br>503          | 499<br>499<br>5<br>500                  | 4504<br>4504<br>5<br>4504              | 498<br>419<br>5<br>492                     |
| Temp<br>Jan. 6 } !<br>Temp                          | 5<br>195<br>197                 | 5<br>501<br>502<br>2                   | 503<br>503<br>505<br>3           | 507<br>507<br>3                  | 5<br>498<br>498<br>4             | 5<br>500<br>500<br>4                   | 590<br>501<br>8                        | 500<br>500<br>300<br>3               | 3<br>500<br>500<br>1                    | 494<br>491<br>1                    | 490<br>1<br>502<br>501<br>0        | - 0.3<br>4×9<br>4×9<br>0               | 506<br>508<br>508                      | 500<br>500<br>501<br>- 1               | 517<br>517<br>- 1                        | - 1<br>541<br>539<br>- 1               | 518<br>518<br>- 1                   | 512<br>512<br>512  | 518<br>518<br>- 1                  | 509<br>508<br>- 1                 | 502<br>502<br>502<br>- 3        | 501<br>490<br>497<br>- 3                | 499<br>504<br>505<br>- 4               | 490<br>1<br>595<br>505<br>~ 4              |
| Jan. 8  | 509<br>508<br>- 4<br>507        | 511<br>511<br>- 4<br>510<br>500        | 511<br>511<br>511                | 511<br>511<br>- 3<br>511<br>512  | 510<br>510<br>- 3,<br>509<br>509 | 512<br>511<br>5 - 3<br>510<br>500      | 510<br>510<br>- 3<br>505<br>506        | 500<br>- 3<br>501<br>501             | 501<br>501<br>(- 4<br>502<br>502        | 502<br>503<br>- 5<br>502<br>502    | 505<br>- 6<br>504<br>504           | 494<br>6<br>504<br>504                 | 474<br>478<br>- 7<br>517<br>517        | 507<br>508<br>= 8<br>505<br>504        | 510<br>510<br>- 7<br>519<br>520          | 511<br>519<br>- 7<br>519<br>510        | 540<br>541<br>7<br>518<br>510       | 528<br>525<br>- 6<br>515<br>515  | 536<br>- 8<br>513<br>513           | 584<br>587<br>- 5<br>518<br>549   | 529<br>522<br>- 5<br>569<br>500 | 502<br>501<br>- 5<br>506<br>505         | 510<br>510<br>- 4<br>507<br>507        | 5.9<br>509<br>- 4<br>507<br>507            |
| Temp  | 1135<br>124<br>144              | 510<br>-do<br>-1<br>516                | 509<br>509<br>509<br>- 1<br>517  | 509<br>509<br>- 1<br>517         | - 1<br>510<br>510<br>517         | 510<br>510<br>510<br>- 2<br>518        | 510<br>510<br>510<br>517               | 511<br>511<br>311<br>3<br>516        | 507<br>507<br>- 4<br>517                | 505<br>505<br>547                  | 511<br>511<br>511<br>- 8<br>518    | 507<br>505<br>- <b>6</b><br>508        | 507<br>507<br>6<br>517                 | 513<br>514<br>514<br>- 6<br>517        | 111<br>111<br>111<br>117                 | 519<br>519<br>519<br>517               | 5 6<br>526<br>517                   | - 1<br>103<br>103<br>- 6<br>516  | 317<br>517<br>513<br>515           | 519<br>518<br>6<br>515            | - 3<br>514<br>515<br>- 6<br>513 | - 3<br>514<br>514<br>- 6<br>513         | 514<br>514<br>511                      | 514<br>514<br>7<br>509                     |
| Temp  | - 6<br>510<br>511<br>511        | 516<br>- 7<br>514<br>513<br>- 6        | 518<br>518<br>518<br>518         | 517<br>517<br>517<br>6           | 517<br>517<br>517<br>- 6         | .518<br>516<br>516<br>- 6              | 517<br>- 8<br>514<br>515<br>- 6        | 516<br>514<br>514<br>56              | 513<br>514<br>514                       | 515<br>515<br>515                  | 518<br>9, 5<br>516<br>516<br>5 - 9 | 518<br>517<br>517<br>517<br>- 9        | 117<br>118<br>118<br>118               | 517<br>9<br>518<br>515<br>10           | 517<br>518<br>518<br>518                 | 517<br>518<br>518<br>-10               | 117<br>118<br>118                   | 516<br>6<br>518<br>518<br>4  | 515<br>517<br>517<br>517           | 31.7<br>31.7<br>31.7<br>31.7      | 513<br>- 5<br>517<br>517<br>- 0 | 513<br>517<br>517<br>517                | 511<br>- 6<br>518<br>518<br>-10        | 509<br>6<br>518<br>510<br>10               |
| Jan. 12 }   | 100                             | 519<br>519<br>-10,7<br>553<br>523      | 519<br>519<br>5-11<br>524<br>524 | 526<br>520<br>- 11<br>524<br>524 | 520<br>520<br>-10<br>524<br>524  | 520<br>520<br>-10<br>524<br>524        | 529<br>520<br>-11<br>524<br>524        | 521<br>521<br>-13<br>524<br>524      | 521<br>521<br>-12<br>525<br>524         | 500<br>500<br>-14<br>505<br>505    | 522<br>521<br>-14<br>526<br>526    | 502<br>500<br>15                       | 521<br>521<br>-11<br>527<br>527        | 501<br>-11<br>501<br>501<br>507        | 100<br>-14<br>327<br>527                 | 522<br>522<br>-14<br>528<br>528        | 50 k<br>52%<br>144<br>50 k<br>50 k  | -14<br>-14<br>-15<br>546   | 501<br>501<br>-10<br>517<br>517    | 524<br>524<br>13<br>526<br>526    | 521<br>521<br>13<br>528<br>526  | 520<br>520<br>~14<br>526<br>526         | 521<br>521<br>-14<br>526<br>516        | 521<br>522<br>15<br>526<br>526             |
| Temp<br>Jan. 14 }<br>Temp                           | 45<br>326                       | - 15<br>526<br>526<br>-16<br>521       | -15<br>526<br>526<br>16<br>550   | 526<br>526<br>526<br>-15<br>518  | -15<br>525<br>525<br>-15<br>518  | -15<br>524<br>525<br>-11<br>518        | -15<br>524<br>524<br>-14<br>517        | -15<br>5.5<br>5.5<br>-14.<br>515     | -17<br>525<br>525<br>525<br>5 16<br>516 | 524<br>524<br>524<br>- 17<br>515   | -18<br>523<br>523<br>-17<br>515    | 529<br>529<br>5-17<br>515              | 524<br>525<br>-17<br>510               | -18<br>524<br>524<br>-17<br>513        | -18<br>526<br>526<br>17<br>519           | 18<br>529<br>570<br>-17                | 107<br>-16<br>518                   | 526<br>526<br>526<br>-16<br>518  | 16<br>506<br>506<br>15             | -16<br>526<br>526<br>-13<br>517   | 16<br>526<br>508<br>15<br>514   | -16<br>525<br>524<br>14<br>507          | -16<br>520<br>520<br>14<br>504         | 16<br>522<br>522<br>14<br>508              |
| Temp  | 12<br>12<br>11                  | 51 s<br>51 s<br>- 9                    | = 6<br>518<br>518<br>-10         | - 8<br>520<br>520<br>-13         | 521<br>522<br>-13                | 521<br>521<br>-14                      | - 6<br>523<br>522<br>-15               | - 7<br>523<br>523<br>-15             | 524<br>524<br>524<br>-17                | 523<br>523<br>-18                  | 7<br>525<br>525<br>-18             | 525<br>525<br>-18                      | 527<br>527<br>527<br>-18               | - 6<br>528<br>529                      | - 6<br>554<br>504<br>-16                 | 501<br>501<br>-16                      | 5 9<br>5 9<br>5 9<br>-15            | - 6<br>526<br>526<br>-14   | - 5<br>525<br>525<br>-12           | - 6 5 522 522 -11                 | 520<br>520<br>520<br>520        | - 6. i                                  |  | 7<br>516<br>516<br>516                     |
| Jun. 17   | 3                               | 510<br>510<br>                         | 513<br>513<br>0<br>502<br>562    | 510<br>510<br>2<br>501<br>501    | 508<br>508<br>3<br>501<br>502    | 507<br>508<br>3<br>503<br>502          | 508<br>508<br>3<br>497<br>497          | 505<br>504<br>3.<br>497<br>498       | 408<br>407<br>400<br>400<br>400         | 494<br>494<br>2<br>502<br>507      | 490<br>480<br>1<br>496<br>408      | 494<br>495<br>1<br>497<br>496          | 502<br>502<br>8<br>496<br>496          | 503<br>503<br>5<br>506<br>506          | 516<br>516<br>7<br>511<br>511            | 509<br>709<br>7<br>519<br>519          | 511<br>511<br>510<br>510            | 520<br>530<br>8<br>511<br>511  | 516<br>516<br>9<br>512<br>513      | 501<br>500<br>8<br>510<br>510     | 198<br>198<br>8<br>508<br>507   | 499<br>499<br>7<br>507<br>507           | 498<br>498<br>6<br>566<br>566          | 498<br>498<br>6<br>519<br>519              |
| Temp  | 6<br>12<br>12<br>12             | 511<br>511<br>- 2                      | 511<br>511<br>- 1                | 512<br>512<br>512<br>- 2         | 510<br>510<br>- 2                | 511<br>511<br>- 2                      | 5<br>511<br>511<br>- 3                 | 510<br>510<br>- 2.3                  | 311<br>511<br>511<br>5 - 4              | 511<br>511<br>511<br>- 5           | 512<br>512<br>512<br>- 6           | 513<br>513<br>513<br>- 7               | - 1<br>515<br>518<br>- 7               | - 1<br>510<br>540<br>7                 | - 1<br>515<br>516<br>- 8                 | 516<br>516                             | - 2<br>516<br>515<br>- 8            | 518<br>517   | - 1<br>519<br>518<br>- 8           | 514<br>514<br>514                 | 515<br>515<br>518               | 2<br>516<br>516<br>- 8                  | - 2<br>517<br>517<br>- 9               | 518<br>518<br>518<br>- 9                   |
| Temp {  | 9<br>19<br>19                   | 519<br>- 9<br>519<br>519<br>519        | 519<br>519<br>- 9<br>520<br>520  | 519<br>519<br>-10<br>519<br>519  | 519<br>519<br>-10<br>516<br>516  | 520<br>519<br>-10<br>514<br>514        | 519<br>519<br>-10<br>511<br>511        | 519<br>519<br>-10<br>510<br>510      | 519<br>520<br>-11<br>509<br>508         | 515<br>515<br>12<br>512<br>512     | 512<br>512<br>-12.5<br>492<br>492  | 510<br>500                             | 507<br>512<br>-13<br>506<br>504        | 523<br>- 13<br>- 521<br>- 522          | 500<br>500<br>-10<br>504<br>505          | 523<br>523<br>-13<br>523<br>523        | 734<br>5-4<br>-13<br>520<br>520     | 506<br>504<br>13<br>501<br>501   | 5.10<br>5.00<br>-1.2<br>519<br>518 | 526<br>-11<br>-512<br>-513        | 525<br>525<br>-11<br>510<br>510 | 521<br>521<br>-11<br>508<br>508         | 518<br>517<br>-11<br>509<br>509        | 518<br>519<br>10<br>512<br>512             |
| Jan. 22 { }   | 12<br>- 4<br>- 603              | - 9<br>513<br>513<br>- 4<br>504        | 514<br>513<br>- 4<br>504         | - 8<br>513<br>513<br>- 4<br>505  | 512<br>513<br>- 3<br>504         | 512<br>512<br>- 3<br>504               | - 6<br>512<br>511<br>- 2<br>504        | - 6<br>511<br>511<br>- 2<br>508      | 511<br>511<br>- 3<br>502                | 510<br>510<br>- 3<br>503           | - £<br>510<br>510<br>- 4<br>501    | - 9<br>511<br>511<br>- 4<br>502        | - 9<br>508<br>510<br>- 3<br>408        | - 9<br>505<br>505<br>- 3<br>508        | - 9<br>516<br>517<br>- 2<br>510          | 512<br>512<br>512<br>52<br>514         | - 8<br>509<br>509<br>- 1<br>510     | 569<br>569<br>- 1<br>507   | 508<br>508<br>518<br>0<br>419      | - 5<br>507<br>507<br>- 1<br>498   | ~ 5<br>506<br>506<br>0<br>408   | - 5<br>506<br>506<br>0<br>498           | - 4<br>502<br>506<br>0<br>498          | 501<br>502<br>1<br>498                     |
| Jan. 24 { 4   | 3<br>198<br>198<br>8            | 360<br>408<br>498<br>10                | 504<br>                          | 506<br>467<br>197<br>11.         | 504<br>5 4<br>496<br>496<br>5 13 | 504<br>5<br>495<br>494<br>14           | 503<br>493<br>493<br>15                | 503<br>6<br>492<br>482<br>16         | 502<br>4<br>494<br>491<br>15            | 503<br>4<br>491<br>491<br>14       | 501<br>4<br>490<br>490<br>13.7     | 502<br>4<br>491<br>491<br>14           | 400<br>5<br>401<br>402<br>10           | 503<br>493<br>494<br>11                | 510<br>6<br>494<br>494<br>10             | 514<br>6<br>496<br>496<br>9            | 559<br>6<br>499<br><b>49</b> 9<br>8 | 507<br>6<br>502<br>502<br>7  | 511<br>511<br>5 8                  | 510<br>509<br>7                   | 498<br>511<br>513<br>7          | 498<br>500<br>500<br>5                  | 498<br>493<br>494<br>4                 | 498<br>8<br>495<br>495<br>4                |
| Jan. 25   | 96<br>3<br>11                   | 501<br>502<br>3<br>513<br>513          | 504<br>504<br>2<br>515<br>515    | 506<br>506<br>0<br>516<br>516    | 505<br>505<br>0<br>516<br>516    | 505<br>505<br>0<br>511<br>510          | 506<br>508<br>0, 3<br>505<br>504       | 506<br>506<br>510<br>510             | 506<br>506<br>- 1<br>513<br>513         | 504<br>504<br>- 2<br>512<br>512    | 505<br>505<br>- 2<br>515<br>516    | 507<br>507<br>- 3<br>515<br>517        | 518<br>516<br>- 3<br>523<br>528        | 522<br>522<br>- 4<br>516<br>516        | 520<br>520<br>- 4<br>530<br>531          | 512<br>512<br>- 4<br>559<br>559        | 520<br>520<br>- 5<br>532<br>531     | 527<br>527<br>- 4<br>526<br>526  | 516<br>517<br>- 5<br>536<br>536    | 528<br>529<br>- 5<br>533<br>533   | 527<br>+ 6<br>535<br>535        | 516<br>518<br>- 6<br>530<br>527         | 508<br>505<br>- 6<br>512<br>514        | 50 <b>7</b><br>50 <b>6</b><br>- 6<br>- 510 |
| Temp  | 18<br>18<br>18                  | = 6<br>519<br>519<br>-10<br>524        | - 6<br>517<br>518<br>-10<br>529  | 520<br>520<br>520<br>-10,<br>527 | - 6<br>520<br>520<br>5-10<br>526 | - 6<br>523<br>522<br>-11               | - 6<br>520<br>520<br>-11<br>523        | 5 1<br>521<br>-11<br>520             | - 8<br>521<br>521<br>-12.<br>521        | - 0<br>521<br>520<br>5-13<br>599   | - 9<br>523<br>523<br>-14           | - 9<br>505<br>505                      | -10<br>506<br>506<br>-15<br>527        | -10<br>519<br>519<br>-15<br>529        | -11<br>520<br>520<br>-15<br>529          | -11<br>708<br>727<br>-16               | -10<br>543<br>542<br>-15<br>526     | - 9.4<br>535<br>535  | 5 = 9<br>531<br>530<br>-15<br>525  | - 9<br>526<br>527<br>-15<br>527   | - 9<br>526<br>527<br>-15<br>526 | -10<br>524<br>524<br>-15                | -10<br>522<br>522<br>-15<br>523        | -10<br>522<br>523<br>-15<br>525            |
| Temp<br>Jan. 29 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 22<br>45<br>26<br>26            | 525<br>-14<br>526<br>526               | 529<br>-14<br>526<br>526<br>-14  | 526<br>-13<br>528<br>528<br>-14  | 526<br>-13<br>526<br>526<br>-13  | 522<br>522<br>-13<br>525<br>525<br>-13 | 523<br>-13<br>525<br>525               | 520<br>-13<br>525<br>525             | 521<br>-15<br>525<br>525<br>545<br>5-15 | 522<br>-15<br>525<br>526<br>-15    | 525<br>525<br>-16<br>525<br>-16    | 525<br>526<br>-16<br>526<br>526        | 527<br>-16<br>526<br>527<br>-16        | 529<br>-16<br>522<br>522<br>-150       | 529<br>-16<br>528<br>528                 | 527<br>527<br>-16<br>526<br>516        | 526<br>-15<br>528<br>528<br>-15     | 527<br>527<br>-15<br>528<br>528<br>-15   | 525<br>-14.:<br>526<br>526<br>-14  | 527<br>5 -14<br>524<br>523<br>-14 | 526<br>-15<br>522<br>522<br>-11 | 525<br>525<br>-15<br>521<br>521<br>(-14 | 523<br>-15, 5<br>520<br>520<br>-15     | 524<br>-16<br>521<br>522<br>15             |
| Jan. 10   | 23<br>14, 5<br>27               | -14<br>525<br>525<br>-14<br>529<br>528 | 504<br>505<br>-14<br>527<br>530  | 525<br>525<br>-15<br>528<br>528  | 5 6<br>517<br>-15<br>519<br>519  | 527<br>527<br>-15<br>529<br>529        | -12<br>527<br>527<br>-15<br>529<br>529 | -13, 527<br>527<br>527<br>-15<br>506 | 527<br>527<br>527<br>517<br>517         | 527<br>528<br>-18<br>514           | 526<br>525<br>-18<br>510<br>510    | -16<br>525<br>525<br>-18<br>516<br>517 | 526<br>526<br>526<br>-19<br>519<br>520 | 523<br>523<br>523<br>-19<br>523<br>523 | 5-15<br>527<br>-527<br>-10<br>527<br>528 | -16<br>520<br>520<br>-19<br>532<br>533 | 520<br>521<br>-19<br>-532<br>-532   | 523<br>523<br>523<br>-19<br>536<br>536   | 520<br>520<br>-18<br>536           | 509<br>529<br>-19<br>529<br>529   | 530<br>530<br>-19<br>528<br>528 | 529<br>529<br>-19<br>523                | 528<br>528<br>528<br>-18<br>519<br>519 | 527<br>528<br>-18<br>520<br>520            |
| Temp  | 18                              | -18<br>512, 7                          | -18                              | -19<br>5 51% (                   | -18                              | -17                                    | -17                                    | 5.6<br>-16.1                         | 5 -18<br>9 510.                         | 514<br>-18<br>8:500. 8<br>7 - 6, 4 | ,-18                               | -18<br>1508. :                         | -18<br>5510. :                         | -18<br>513.                            | -18<br>0 517. 4                          | -18<br>4 519. 9                        | -17<br>519.:                        | -16<br>1513.   | 507<br>-15<br>5 517.1<br>1 - 5.    | -15                               | -15<br>2 514. 4                 | 503<br>-14<br>511.<br>- 5.              | -12                                    | -10<br>-10<br>-510. 6<br>- 5, 4            |

Hourly readings of the Brooke balance magne ometer, at Uglaamic, Alaska, February, 1883.

|                   |                   | ,                 | 1                 |                     |                     |                     |                   |                     |                   |                     |                    |                    |                    |                     | -                 |                     |                    |                     |                     |                   |                               | ~                  |                  |                   |
|-------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------------------|---------------------|--------------------|--------------------|--------------------|---------------------|-------------------|---------------------|--------------------|---------------------|---------------------|-------------------|-------------------------------|--------------------|------------------|-------------------|
| Date.             | 0 h               | 116               | 25                | 31                  | 111                 | 2.                  | <b>(</b> \$1)     | i li                | N/h               | 811                 | 101                | 112                | 10                 | 155                 | 111               | 15h                 | 161                | 175                 | 155                 | 195               | 20%                           | 215                | 221              | 231               |
| tools 1 1         | 522               | 520               | 516               | 512                 | 511                 | 512                 | 508               | 506                 | 346               | 504                 | 501                | 5.00               | 501                | 1943                | 5 10              | (99                 | 702                | 501                 | ân.)                | 792               | 513                           | 50%                | 530              | E04               |
| Feb. 1 {<br>Temp  |                   | - 0.              |                   | 1.                  |                     |                     |                   |                     | - 7               | . 9                 |                    |                    | 9                  |                     | ь                 | 18                  | 8                  | 7                   | 7                   | 7                 |                               |                    | 7                | 7                 |
| Feb. 2 }          | 495               | 506               | 199<br> 500       | 489<br>489          | 497                 | 501                 | 504<br>504        | 497<br>497          | 199<br>199        | 302                 | 503                | 501                | 1.1                | 519                 | 7.00              | 244                 | 599                | 523                 | 529<br>529          | 520<br>30 %       | 517                           | 4,18               | 506<br>5 8       | To9<br>To         |
| Temp<br>Feb. 3 {  |                   | 511               | 508               | 507                 | 507                 | 506                 | 505               | 197                 | 184               | 4-7                 | - L                | - 1<br>50 5        | 501                | 196                 | 542               | 321                 | 522                | 511                 | 581                 | 515               | $\tilde{h}_{n}(\hat{\theta})$ | 191                | 1965             | 1 195             |
| remp              |                   | 511               | 508               | 308<br>1            | 508<br>4            | 500<br>6            | 504               | 497<br>8            | 157               | 487                 | 1112               | 505                | 7                  | 190                 | 711               | 5.2                 | 522<br>7           | 511                 | 532                 | 512<br>6, 7       | 507                           | 1 111              | 1.1,             | 12                |
| Feb. 4 }          | 498<br>498        | 495<br>495        | 494<br>494        | 496<br>195          | 496<br>496          | 191<br>491          | 489               | 488                 | 47.5<br>47.8      | 459<br>466          | 479                | 472                | 176<br>178         | 502                 | 105               | 509                 | 510<br>510         | 504<br>504          | 506<br>506          | 508<br>500        | 597<br>597                    | 1                  | 1-7              | 1-17              |
| Temp<br>Feb. 5 {  | . 13              | $\frac{14}{489}$  | 15<br>196         | 15<br>493           | 495                 | 5 18<br>491         | 480               | 19<br>481           | 17                | 16                  | 15.1               | 463                | 1-0                | 15<br>478           | 187               | 150                 | 455                | 14                  | 14<br>501           | 13, 3             | 13.7<br>457                   | 185                | 13               | 1.0               |
| Temp              | . 13              | 489<br>+ 13       | 14                | 193                 | 495<br>14           | 481                 | 482               | 482                 | 16                |                     | 482<br>5   15.1    | 495<br>5 15        | 179                | 5 16<br>5 16        | 187<br>16.        | 5 17                | 195                | 497<br>5 17.3       | 502                 | 19                | 156                           | 21                 | 20.5             | 181<br>21         |
| ren. 0)           | 482<br>482        | 482<br>482        | 150               | 481                 | 482<br>482          | 478                 | 478<br>478        | 474<br>475          | 172<br>171        | 473<br>173          | 475<br>475         | 176<br>176         | 47.6               | 178                 | 476<br>476        | 177                 | 1 -01              | 101                 | 105                 | 1 2               | 1-5                           | 177                | 156              | 156               |
| Temp<br>Feb. 7    | 489               | 491               | 492               | 23<br>493           | 493                 | 26<br>495           | 20<br>296         | 425                 | 26<br>195         | tog                 | 5 25<br>496        | 496                | 25<br>496          | 25<br>494<br>194    | 497<br>497        | 497<br>497          | 197<br>197         | 196<br>196          | 494<br>194          | 45 G              | 1+9<br>1+9                    | 1-6                | 4-1              | 11                |
| Temp              | : 13              | 12                | 193               | 493<br>12           | 494                 | 105                 | 10                | 313                 | 105               | 1195                | 196                | 196<br>7<br>481    | 488                | 8<br>495            | 301               | 501                 | 10                 | 11                  | 12                  | 13                | 11.7                          | 17                 | 18               | 20                |
| Feb. 8 }          | 482<br>482<br>19  | 484<br>184<br>19  | 485<br>485<br>18. | 485<br>485<br>5 19  | 486<br>486          | 485<br>485<br>20    | 481<br>481        | 485<br>485<br>18    | 467               | 489<br>489<br>5 12. | 488<br>488<br>5 11 | 481                | 458                | 196<br>5 9          | 503               | 501                 | 501                | 50 -<br>9           | 500                 | 497               | 495                           | 493                | 493              | 494<br>493<br>10  |
| Temp }            |                   | 496               | 497<br>497        | 497<br>498          | 496<br>496          | 495<br>494          | 491               | 494<br>494          | 194               | 492<br>192          | 192                | 4141<br>1341       | 4                  | 483                 | 1-1-              | 187                 | 185<br>185         | 4-3                 | 1~1                 | (76<br>179        | 479<br>470                    | 175                | 17:              | 170<br>171 5      |
| Temp              | : 10              | 10                | 10                |                     | 5 12<br>481         | 13                  | 13                | 14                  | 10                | 12                  | 12 :               | 5 11               | 11                 | 11                  | 10                | 19                  | 21<br>07           | 12                  | 23                  | 11                | 5.4                           | 16.                | 1.7              | 27                |
| Feb. 10 }<br>Temp | 471               | 473<br>5 27       | 475               | 477                 | 481                 | 482<br>5 18         | 186               | 481                 | 1-0               | 1.2                 | 4 -51              | 494                | 195                | 110s<br>5 - 5       | 263               | 504                 | 67                 | 5(6)                | 506                 | Ted<br>ob.        | 56                            | 5 6                | 1007             | 100               |
| Feb. 11 {         |                   | 510<br>510        | 510               | 510<br>510          | 510<br>510          | 510<br>510          | 509<br>519        | 5) u<br>5) u        | 311               | 5/9                 | 500<br>510         | 506<br>506         | Section 2          | 512<br>512          | 513<br>512        | 514<br>515          | 516<br>516         | 517<br>517          | 509<br>509          | 509<br>509        | 509                           | 511                | 312<br>312       | 512<br>512        |
| Temp              | - 2               | 512               | - 3<br>512        | - 3<br>512          | 512                 | 512                 | - 1<br>51:        | - 2                 | - 5               | -4                  | - 5<br>513         | - 5.<br>512        | 5 - 5              | - 5<br>510          | - 5               | 4.7<br>711          | 1-4                | 569                 | - 3<br>507          | 54 7              | 506                           | 701                | - 4.5<br>56.5    | - 1               |
| Feb. 12 {<br>Temp | 512               | 512               | 512               | 512                 | 512                 | 510                 | 317               | 512                 | 3/3               | 517                 | - 5                | 512                | ăcu<br>1           | 311                 | 312               | 311                 | 312                | la st               | 507                 | 397               | 5. 6                          | 500                | 40.5             | 703               |
| Feb. 13           | 503<br>502        | 502<br>502        | 591<br>500        | 199                 | 10.8                | 40                  | 194               | 400                 | 19G<br>49G        | RF<br>LFD           | 4114               | 495<br>495         | 1.6                | 107                 | 19<br>Les         | 2012<br>3012        | 503                | 502                 | 500                 | 499               | 4901<br>499                   | 5c0                | 50 ia            | 200<br>201        |
| Temp              | - 5               | 501               | 502               | 8,<br>502           | 5 10<br>502         | 12<br>500           | 13<br>532         | 502                 | 12<br>500         | 139                 | 1.9                | 195                | 704                | 367                 | 5 - 6,<br>509     | 5 6                 | 523<br>500         | 523<br>523          | 6<br>517            | 117               | 506                           | 5.3                | 501              | 502               |
| Feb. 14 }         | - 4               | 501               | 592               | 50g<br>5            | 502                 | 566                 | 502               | 12                  | 500               | 1.09                | 155                | 405                | 54                 | 1                   | 5:9               | 519                 | 1                  | 520                 | 717                 | 517<br>0          | 545                           | 10                 | 391              | 501               |
| Feb. 15 }         | 503               | 505               | 50.5              | 502                 | 503                 | 100                 | 700               | #17                 | (2)               | 8.0                 | 1000               | \$16.1             | 10                 | 400                 | 490               | 493                 | 192                | 492                 | 4 3                 | 104               | 195                           | 495                | 46               | 1.6               |
|                   | 494               | 494               | 10<br>498         | 499                 | 500                 | 7:0                 | 11                | 5 -                 | 311               | 500                 | 502                | 564                | 5.9                | 510                 | 13<br>505         | 511                 | 121                | 514                 | 91.5<br>51.         | 510               | 500                           | 510                | 510              | 10<br>511         |
| Temp              | 9                 | 495               | 498               | 498<br>6<br>511     | 500                 | .000<br>- 6         | 49.3              | 1                   | 5 /               | 5ct]<br>0, ,        | 502                | 701<br>- 1.<br>503 |                    | 381                 | 5.6               | 511                 | 321<br>512<br>512  | 513<br>- 3<br>- 512 | 571<br>- 275<br>708 | 510               | 500<br>4<br>501               | 510                | 1                | 511               |
| Feb. 17;          | 512<br>512        | 512<br>512<br>- 2 | 511               | 511                 | 510<br>510          | 510                 | 7 (               | 3 J<br>5 9          | 564<br>564        | 100                 | 497                | 5.3                | ,                  | de                  | 524<br>524        | 513                 | 512                | 512                 | 508                 | 117               | 5.1                           | South              | 5 1              | 1.1               |
|                   | 508               | 507               | 504<br>505        | 506<br>506          | 504<br>504          | 504                 | 584<br>504        | 105                 | 5.5               | 5 15                | 506<br>506         | 50 g               | 3 1                | 598                 | 507               | 507<br>507          | 508<br>508         | 510                 | 207                 | 500<br>500        | 501<br>501                    | 500<br>500         | 499<br>490       | 196<br>1: 6       |
| Temp              | 508<br>2<br>497   | 507<br>3<br>497   | 3<br>496          | 3<br>495            | 496                 | 31<br>49 1          | 1-7               | 195                 | 194               | 11                  | 193                |                    | 193                | 19.7                | 4.06              | 1 196               | 97                 | 497                 | 456                 | 4                 | 301<br>5<br>195               | 1500               | 100              | 8                 |
| Feb. 19 {<br>Temp | 497               | 497               | 496<br>11.        | 405                 | 496                 | 111                 | 127               | 100                 | 111               | 4.4                 | 197                | 194                | 493                | 195                 | 1.6               | 490                 | 1:17               | 497                 | 496                 | 195<br>16         | 105                           | 196                | 105              | 195               |
| Feb. 20 {         | 494               | 493               | 492<br>491        | 101                 | 491                 | 190<br>190          | 1×5<br>490        | 490                 | 491<br>1-1        | 100<br>1100         | 452                | 4-1                | 495                | 510                 | 516<br>517        | 529<br>529          | 513<br>513         | 507<br>507          | 706<br>506          | 499               | 500<br>501                    | 501                | 2                | 3.4               |
| Temp              | 1.3               | 13                | 1.5<br>503        | 15                  | 504                 | 1.5<br>502          | 15                | 13<br>500           | 31.4              | 504                 | 5: 4               | 505                | 9<br>505           | 51.6                | 517               | 512                 | 512                | 5                   | 5<br>509            | 1                 | 3 3                           | 5.1                | 1 5              | 1.5               |
| Feb. 21 {<br>Temp | 3                 | 504               | 501               | 3                   | 504                 | 5(4)                | 313               | 503                 | 564               | Ae4                 | 504                | 5 15               | 504                | 507                 | 516<br>- 2        | 512                 | 517                | 514                 | 509                 | 505               | - 1                           | . 01               | 7 4              | 11 o              |
| Feb. 22 }         | 505<br>505        | 511<br>512        | 502               | 510<br>511          | 507<br>507          | 501<br>500          | 193<br>493        | 502<br>503          | 500<br>por        | 497<br>497          | 504                | 5[10<br>50B        | 512<br>512         | 523<br>524          | 526<br>526        | 529<br>529          | 537                | 542                 | 541<br>537          | 515               | 5.16<br>5.18                  | 5 :7               | 47               | 5.16<br>5.14      |
| . emp             |                   | 509               | 508               | 511                 | 3<br>598            | 514                 | 3, 5<br>513       | 500                 | 1.5<br>492        | 0,3<br>514          | 5.2                | 509                | 513                | 521                 | 532               | 546<br>546          | 526                | - 5<br>5ad          | 537<br>537          | - 41<br>71,6      | 5,4                           | 516                | -:               | 117               |
| Temp              | ~ 5               | 508<br>- 5        | 508               | 511                 | 509                 | 514<br>- 5          | 512<br>- 6        | 50 <u>9</u><br>- 6  | 491<br>- S        | 714                 | 51°2<br>-11        | -11                | 513<br>-11         | 521<br>-11          | 532<br>-12        | 546<br>-12          | 536<br>-11         | 558<br>-11          | 537<br>- 9          | 556<br>-10        | 115                           | 7.6<br>- 9         | 14               | 146<br>           |
| Feb. 24 }         | 516<br>516        | 518<br>518        | 516<br>516        | 517<br>517          | 518<br>518          | 517<br>517          | 517<br>517        | 512<br>512          | 516<br>517        | 518<br>518          | 517<br>518         | 500<br>504         | 507<br>507         | 515<br>516          | 519<br>520        | 530<br>530          | 580<br>579         | 355                 | 547<br>547          | 547               | 5.0                           | 543<br>545         | 17               | 1                 |
| Temp<br>Feb. 25 { | - 7<br>527        | - 7<br>526        | 527               | 505                 | - 6<br>511          | 497                 | - 6<br>503        | - 6<br>513          | 511               | 522<br>522          | -10<br>522         | -11                | -11<br>530         | -11<br>532          | -12<br>530        | -12<br>529          | -12<br>525         | -12<br>525          | -12<br>524          | 521               | 524<br>524                    | -11<br>524         | 12<br>24         | 34                |
| Temp              | -10               | - 9               | 530<br>- 8        | 505<br>= 8.7        | 511                 | 198<br>- 9          | - 9               | 513                 | 514<br>-11        | 522                 | 522<br>-13         | 521<br>-13         | 531                | 531<br>-14          | 529<br>-14        | 528<br>-11          | 525<br>-14         | 525<br>-13, 7       | 525<br>-12          | 524<br>-12        | -12                           | 21                 | 1.7              | 11                |
| Feb. 26 {         |                   | 520               | 520<br>519        | 519                 | ,518<br>,518        | 517<br>518          | 516<br>515        | 513                 |                   | 511                 | 518<br>518         | 520<br>520<br>-14  | 522<br>522         | 526<br>525          | 538               | 550                 | 529<br>529<br>- 16 | 525<br>526          | 534<br>534          | 536               | 531<br>530                    | 524<br>524         | 520<br>520       | 519<br>520        |
|                   | -11<br>521<br>521 | 522               | 521               | - 9<br>-518         | 514                 | 511                 | 512<br>519        | 510<br>510          | -11<br>507        | -13<br>507          | -14<br>498<br>400  | 508                | -14<br>506         | -15<br> 511<br> 511 | 15<br>515         | -16<br> 528<br> 599 | 533                | -16<br> 533<br> 522 | -15<br>589<br>590   | -16<br>554<br>559 | -17<br>545<br>510             | -17<br>532<br>539  | 17<br>524<br>519 | -13<br>506<br>708 |
| Tenn              | -13               | 523<br>- 9<br>522 | 520<br>- 4<br>510 | 516<br>- 3<br>- 514 | 513<br>= 0.5<br>504 | 510<br>- 1<br>- 499 | 512<br>- 0<br>484 | 510<br>- 0.5<br>485 | 507<br>= 2<br>479 | 508<br>- 4<br>500   | 490<br>6<br>493    | 509<br>6<br>508    | 505<br>- 7<br>-513 | 511<br>- 8<br>- 536 | 515<br>- 8<br>518 | 522<br>- 9<br>530   | 538<br>- 9<br>522  | 533<br>- 9<br>551   | 539<br>9<br>535     | ,55 <u>2</u><br>9 | 549<br>- 9<br>512             | 5.88<br>= 9<br>565 | 400              | 7                 |
| Feb. 28 {         | 523<br>= 1.5      | 521               | 510               | 500                 | 505                 | 498                 | 483               | 488                 | 477               | 500                 | 493                | 508                | 513                | 584                 | 518               | 530                 | 621                | 551                 | 539                 | 527               | 511                           | 564                | 500              | 502               |
| Magnet'r.<br>Temp |                   | 504. 0            | 502.8             | 501. 7              | 502, 0<br>5, fl     | 500, 4<br>6. I      | 498. 9<br>6. 1    | 498. 4<br>6. ii     | 496. 9<br>4. 5    | 497. F              | 49s 2              | 498.1              |                    |                     |                   | 511.7               |                    | 1517                | 313 5<br>5 0        | 512 .             | 507.4                         | 501                |                  | 10.3<br>1.0       |

One division of scale = .00%1739 part of the vertical force. Monthly means: Temperature, 3%,7; magnetometer, 504.3

Hourly readings of the Brooke balance magnetometer at Uglaamie, Alaska, March, 1883.

ry, 1883.

504.3

P 215 22 23

| Date.                | Oh         | 1.16            | 91                 | 34                  | 10                     | 21:                   | gh.                    | 71                | g <sub>a</sub> li  | ţ,h               | 10                | 116               | Noon              | 186               | 146                | 155               | 16h                 | 17h         | 1%                 | 191               | 20%           | 214          | 224         | 23h                |
|----------------------|------------|-----------------|--------------------|---------------------|------------------------|-----------------------|------------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|---------------------|-------------|--------------------|-------------------|---------------|--------------|-------------|--------------------|
|                      |            |                 | _                  |                     | **                     | -                     |                        |                   | •                  |                   |                   |                   |                   |                   |                    |                   |                     |             |                    |                   |               |              |             | -                  |
| Mar. 1 {             | 502<br>502 | 592             | 561                | 500                 | 198                    | 197                   | 187                    | 485               | 196                | 194               | 495               | 184               | 494               | 523               | 509                | 512               | 530                 | 529         | 513                | 502               | 522           | 499          | 495         | 501                |
| Mar. 2 . }           | 503        | 507<br>508      | 5/ 6<br>507        | 309<br>510          | 505                    | 493<br>493            | \$193<br>\$194         | 494<br>493        | 467                | 474<br>473        | 10<br>484<br>480  | 507<br>507        | 534<br>533        | 534<br>534        | 546<br>545         | 551<br>551        | 543<br>543          | 556<br>549  | 548<br>547         | 505<br>518        | 526<br>526    | 518<br>518   | 522<br>524  | 518<br>516         |
| Temp                 | 4<br>520   | 3.              | 5 3                | 5:1                 | 504                    | 311                   | - 6<br>- 5:14          | ~ 1<br>5:46       | 501                | 5 = 4<br>512      | - 4.7             | - 5<br>:06        | 514               | - 8<br>519        | - 50               | -16<br>508        | 10<br>55G           | -1°         | -10                | -11               | -10, 3<br>539 | 5-10-5       | -10<br>514  | -9<br>517          |
| Mar. 3 }             | 519        | 21              | 522                | 521                 | 317                    | Hi                    | 5 5<br>5 - 6           | 506               | 207                | 511               | 517               | 50G<br>-10        | 514<br>-10        | 519<br>-10        | 504<br>504<br>-10  | 51.9              | 206<br>-10          | 540         | 537                | 529               | 529<br>-10    | 516          | 514         | 7                  |
| **                   | 516<br>516 | 517<br>517      | 515<br>515         | 513<br>513          | 626                    | 625                   | 626                    |                   | (1)                | 516<br>516        | 509<br>599        | 514<br>518        | 58.4<br>58.4      | 546<br>548        | -10<br>548<br>548  | 511               | 517                 | 550         | 542<br>541         | 508<br>547        | 536<br>536    | 5.0          | 740<br>540  | 543<br>543         |
| Temp                 | - 6<br>543 | - 5<br>543      | ~ 4<br>540         | - 3<br>567          | 525                    | 520                   | 5 1                    | 510               | L-109              | 513               | 5-1<br>520        | 504               | 551               | 547               | 550                | - 5<br>550        | 518                 | 54.1        | 511                | - 5 3<br>536      | 529           | 521          | - 6<br>517  | 511                |
| Temp                 | 543<br>- 5 | 543             | H0<br>- 3          | 537                 | 523                    | 523                   | 5 - 1                  | 510               | 5 0                | 513               | 5_0               | 784<br>- 5        | 519<br>- 5        | 547<br>- 5<br>501 | 551                | 570<br>- 6        | 548                 | 546<br>- 3  | 511                | 536               | 5.9           | 519          | 517         | 511                |
| Mar. 6 }             | 597<br>597 | 5.46<br>505     | 50G<br>50 <b>G</b> | 506<br>507          | 56B<br>563             | 50.8<br>50.8          | 510<br>510             | 511<br>511        | 515<br>515         | 500<br>500<br>500 | 526<br>526        | $\frac{5.9}{529}$ | 505<br>504        | $\frac{501}{528}$ | 595<br>595         | 544<br>544        | 547<br>547          | 542<br>542  | 544                | 55.0<br>540       | 2004          | 51 s<br>500  | 5 5         | 510<br>510         |
| Mar. 7 {             | 539        | 510             | 542                | 538                 | 5.86                   | -35                   | $5^{\circ}\frac{2}{4}$ | 517               | 526                | - 1<br>313        | $\frac{9}{502}$   | - 3<br>535        | - 3<br>531        | - 4<br>585        | - 5<br>551<br>552  | - 6<br>549        | 553                 | - 6<br>550  | 517                | - 7<br>559        | 552           | 550          | 554         | 548                |
| Temp                 | 539<br>- 5 | 540             | 542<br>- 3         | 38                  | 53B<br>- 2             | 535<br>- 3            | 1504                   | 517<br>- 4        | 526<br>- 6         | 526<br>- 7        | 5/2<br>- 8        | 536<br>- 9        | 532               | 535<br>-10        | - 111              | 549<br>-11        | 550<br>-11          | 550<br>11   | 546<br>-10         | 559<br>-11        | 551           | .550<br>-11  | 550         | 543<br>-8          |
| Mar. 8 }             | 548        | 549<br>548      | 748<br>748         | 546<br>546          | 545<br>545             | 540<br>539            | 723<br>1723            | 514<br>514        | 517                | 515<br>514        | 3°5<br>320        | 588<br>537        | 550<br>550        | 562<br>564        | 560<br>560         | 769<br>569        | :27                 | 572<br>572  | 555<br>555         | 547<br>547        | 544           | 550          | 207<br>206  | 571<br>572         |
| Mar. 9               | 552        | - 6<br>550      | - 5<br>551         | - 5                 | 545                    | - 3<br>533            | 510                    | - 5<br>545        | 549                | - 8<br>549<br>550 | 552<br>552        | -10<br>555        | 10<br>559<br>559  | 10<br>584         | -10<br>561<br>561  | -10<br>559<br>559 | -10<br>560          | -10<br>566  | ,=10<br>579<br>579 | -10<br>572<br>569 | -11<br>558    | -13<br>561   | -11<br>519  | ~11<br>560         |
| Temp                 | 11         | 510<br>510      | 551<br>-11         | 514                 | 544<br>-10             | 53(2<br>- 10          | -11                    | 548<br>-11        | 559<br>-13         | 550<br>-15<br>551 | 552<br>16         | 556<br>16         | -17               | 384               | -15                | 924               | 560                 | 566<br>-18  | -17                | -17               | 17.7          | 531<br>5-17  | 759<br>- 17 | 260<br>- 16<br>259 |
| Mar. 10 {            | 260        | 50              | 26.5<br>16.1       | 7.59                | 357                    | 551<br>571            | 503                    | 553<br>553        | 554<br>554         | 551               | 549<br>519        | 48<br>518         | 548<br>551        | 556<br>556        | 556<br>556         | 560<br>560        | 568<br>569          | 571<br>571  | 570<br>570         | 564               | 500<br>550    | 576          | 357         | 579                |
| Mar. 11.             | 509<br>559 | 559<br>559      | -10<br>519<br>519  | - 120<br>556<br>556 | 5 -10, .<br>553<br>553 | 5 = 10.<br>550<br>540 | 5 -11<br>-549<br>-549  | -12<br>550<br>549 | 551<br>551         | -15<br>552<br>552 | -17<br>552<br>553 | 18<br>551         | -18<br>556        | -19<br>576<br>576 | -19<br>575         | -19<br>572<br>572 | 571                 | 567<br>567  | 565<br>565         | 5.9<br>559        | 519<br>559    | 559          | 559<br>559  | 550                |
| Temp .               | -18        | -15<br>558      | -12<br>555         | -10.<br>552         | 5 = 8<br>549           | 545                   | 5 9 .<br>514           | 5 -11.            | 5 - 10.<br>545     | 5 - 15<br>546     | -16<br>545        | 551<br>17<br>545  | 557<br>-17<br>548 | -17<br>548        | 575<br>-18         | -1 h              | 571<br>5-18<br>5502 | -18<br>555  | 563<br>-17         | -17               | 17            | - 17         | 16<br>511   | -16                |
| Mar. 12              | 558        | 556<br>-10      | 555                | 552                 | 548<br>5 - 6           | 517                   | 511                    | 544               | 315                | 546               | 546               | 545               | 548<br>- 9        | 548<br>-10        | 550<br>550<br>- 10 | 559<br>159<br>-10 | 562                 | 537         | 552<br>552         | 544               | 545           | 511          | 542<br>= 6  | 515<br>515         |
| Mar. 13              | 544<br>545 | 543<br>543      | 543<br>543         | 542<br>542          | 540<br>540             | 539<br>539            | 529<br>529             | 533               | 523<br>523         | 528<br>528        | 527<br>527        | 539<br>540        | 558<br>554        | 556<br>557        | 563<br>562         | 576<br>575        | 565<br>564          | 560<br>560  | 103<br>155         | 550<br>549        | 549<br>549    | 545          | 518<br>548  | 513                |
| Temp                 | - 3        | - 1<br>548      | 517                | 547                 | 547                    | 0<br>545              | - 1<br>514             | - 1<br>543        | 538                | - 5<br>538        | - 6<br>527        | - 7<br>586        | - 7<br>550        | - 7<br>551        | - 8<br>372         | - 8<br>561        | - 9<br>555          | 554         | 554                | 555               | 553           | 551          | 519         | 549<br>549         |
| Mar. 14              | 347        | 548             | 547                | 547                 | 547                    | 545                   | 54                     | 543               | 58                 | 587               | 527               | .36<br>9          | 545               | 550               | 570                | 561               | a: 5                | 554         | 554                | 575               | 111           | 751          | 749<br>9. : | 549                |
| Mar. 15              | 548<br>548 | 549             | 517                | 542                 | 524                    | 514                   | 519                    | 526               | 525                | 521               | 321               | 520               | 537               | 542               | 54.5               | 540               | 539                 | 541         | 50%                | 567               | 587           | 5.17         | - /-        | 50%                |
| Temp                 | -5<br>537  | -3<br>5 :7      | 5 -1<br>526        | 536                 | 547                    | 5 6<br>5)6            | 536                    | 5 2 535           | 5 2<br>52 <b>9</b> | 5 2               | 0, 3<br>535       | 515               | - 1<br>586        | ,529              | 539                | - 2. :<br>543     | 51- 3<br> 547       | 548         | 5 - 3              | - 3<br>51)        | 3             | - 1 1<br>505 | 1 1         | 9, 3               |
| Mar. 16 }            | 2          | 537             | 536                | 5:16                | £37<br>0,              | 536<br>5 0            | 526                    | 536               | 529                | 528<br>- 4        | 535               | 535<br>5          | 587<br>~ 6        | 539               | 539                | 542               | 547                 | 548         | 552                | 539               | 35.8          | 5.5          | 5.48        | 7.17               |
| Mar. 17 \            | 536        | 507<br>507      | 537<br>537         | 536<br>536          | 537<br>536             | 535<br>535            | 533<br>533             | 533<br>533        | 532                | 532<br>532        | 528<br>528        | 525<br>526        | 584<br>584        | 592<br>593        | 544<br>544         | 541<br>541        | 387<br>557          | 537         | 537<br>537         | 5114<br>5114      | 594<br>524    | 504<br>501   | 5.14        | 511                |
| Temp                 | 584        | 534             | 504                | 535                 | 531                    | 530                   | 5. 1.                  | 5 1 528           | 528                | - 1.3<br>529      | 5 - 3<br>529      | - 3<br>531        | 5 13              | 585               | - 4<br>547         | - 4<br>545        | 541                 | - 4         | 50.9               | - 3<br>537        | 500           | 200          | 5.16        | 526                |
| Temp                 | 334        | 584             | 545<br>5 L.        | 535<br>5 2.1        | 531                    | 530<br>4              | 5_0                    | 528               | 528                | 529               | 529               | 531               | 503               | 535               | 547                | 544               | 540                 | 538         | 509<br>G           | - 6               | 506           | 585<br>5     | 536         | 506<br>- 1         |
| May. 19 . }          | 305<br>305 | 534<br>534      | 533<br>533         | 532                 | 529<br>529             | 525<br>525            | 525<br>524             | 525<br>525        | 527<br>527         | 527<br>527        | 528<br>528        | 5. 0<br>529       | 5/3<br>523        | 547<br>507        | 536<br>536         | 5.45<br>5.45      | 537<br>537          | 5.7         | 557                | 706               | 5.00          | 50.6         | 3.17        | 3.7                |
| Temp                 | 537        | 5 L.<br>536     | 5 2<br>585         | 5 3                 | 533                    | .5<br>581             | 5 4.5<br>530           | 5 3 .<br>530      | 5 1 530            | - 1<br>531        | 533               | - 3<br>534        | 537               | 507               | - 5<br>535         | 6<br>539          | - 6<br>539          | - 6<br>539  | 540                | 540               | 500           | 540          | 5.9         | 3 g                |
| Temp                 | .5.7       | 5.46            | - 535<br>5 - 2 .   | 543<br>5 2.3        | 533<br>5 4             | 530                   | 530<br>1               | 530<br>0          | 530                | 531<br>- 4        | 3011              | 584<br>- 6        | 53G<br>- 6        | 507<br>- 7        | 5.18               | 539               | 500                 | 5. 9        | 540                | 540<br>- 7        | * (a<br>6     | 515          | 7.49        | 5.9                |
| Mar. 21              | 538<br>538 | 537<br>537      | 535<br>535         | 533                 | 531                    | 530<br>530            | 520<br>530             | 519<br>520        | 509<br>509         | 509<br>508        | 513<br>512        | 524<br>524        | 533               | 542<br>542        | 542<br>742         | 542<br>542        | 547                 | 548<br>548  | 543                | 5%                | 540           | 5.1          | 556<br>555  | 44                 |
| Temp                 | 530        | 529             | 5 2<br>530         | 5 3<br>516          | 3<br>513               | 507                   | 3<br>510               | 512<br>512        | 513                | 507               | - 3<br>514        | - 4<br>338        | - 4<br>539        | 145<br>145        | 546                | 508               | 540                 | - 4<br>518  | 5 (9               | 547               | 528           | 516          | 519         | \d                 |
| Temp                 | 529        | 529<br>2        | 530                | 516                 | 512                    | 5 4                   | 510                    | 512               | 513<br>4           | 508               | 514               | 538               | 539               | 540               | 540                | 535<br>2          | 540                 | 54          | .49                | 547               | 325<br>3      | 391          | 519         | 32T<br>6           |
| Mar. 23 5            | 521<br>520 | 520<br>521      | 520<br>520         | 522<br>522          | 515<br>518             | 514<br>515            | 198<br>199             | 184               | [*9<br>[80]        | 196<br>196        | 504<br>504        | 507<br>507        | 507<br>507        | 516<br>516        | 536<br>536         | 584<br>585        | 584<br>584          | 530<br>531  | 258<br>258         | 520<br>519        | 518<br>518    | 517<br>317   | 515         | 21                 |
| Mar. 24              | 520<br>520 | 5 6<br>520      | 519<br>519         | 5 8<br>517<br>517   | 514<br>513             | 513<br>512            | 513                    | 512<br>519        | 499                | 505               | 509<br>509        | 510<br>510        | 512<br>512        | 514               | 511                | 515               | 523<br>523          | 520<br>520  | 518                | 514<br>514        | 512<br>511    | 508          | 506         | 30]                |
| Temp                 | 591        | 520<br>8<br>428 |                    | 5 9<br>496          | 9<br>495               | 9                     | 513                    | 186               | 498                | 505<br>475        | 7                 | 471               | 6                 | 513<br>6<br>476   | 514<br>6<br>477    | 515<br>6<br>475   | 6<br>490            | 6<br>178    | 517<br>7<br>379    | 461               | 10            | 11           | 1           | 15                 |
| Mar. 25              | 501        | 409             | 498<br>498         | 496                 | 495<br>495<br>5 19     | 489                   | 453<br>453<br>5 19     | 186<br>20         | 482<br>20          | 475               | 474<br>474<br>20  | 471<br>20         | 475<br>475<br>20  | 476<br>20         | 477                | 475<br>21         | 420                 | 478         | 470<br>21          | 101               | 102           | 13           | 21.         | 137                |
| Mar. 26              | 456        | 455             | 454<br>453         | 445<br>445          | 115                    | 415                   | 411                    | 410<br>440        | 422<br>432         | 438<br>438        | 441<br>441        | 116<br>116        | 459<br>460        | 467               | 463<br>463         | 468<br>468        | 169<br>473          | 469<br>469  | 468<br>468         | 467<br>167        | 459<br>459    | 479<br>479   | 474         | 112                |
| Temp                 | 26.<br>436 | 5 27            | 26<br>129          | 445<br>28<br>427    | 27.                    | 5 13                  | 25<br>427              | 23<br>431         | 432<br>20<br>429   | 18<br>419         | 111<br>16<br>132  | 15                | 15<br>417         | 15                | 463<br>15<br>459   | 14.<br>166        | 5 14<br>464         | 14<br>472   | 15<br>474          | 15                | 17<br>453     | 18.1         | 5 19. 1     | 5 21               |
| Mar. 27              | 435        | 426             | 429                | 4.7                 | 413                    | 421                   | 428<br>5 25            | 420               | 429<br>1.5         | 429<br>25         | 132               | 412               | 118               | 459               | 459<br>23.         | 466               | 465                 | 471         | 174                | 474<br>474<br>93  | 452           | 415          | 459         | 115                |
| Temp<br>Mar. 28      | 430<br>4.5 | 129<br>130      | 434                | 454                 | 138                    | 435<br>434            | 470<br>130             | 438<br>438        | 439<br>139         | 447               | 414               | 416               | 482<br>455        | 475<br>475        | 477<br>479         | 188               | 516<br>516          | 511         | 512<br>512         | 50s<br>50s        | 482           | 478<br>478   | 169         | 163                |
| Temp                 | 97<br>456  | 5 27<br>433     | 26<br>420          | 5 25<br>40a         | 24                     | 5 23<br>425           | 171                    | 100<br>100        | 18<br>436          | 17                | 15<br>119         | 13<br>455         | 459               | 10                | 163                | 5 8<br>469        | 7<br>468            | 7<br>460    | 467                | 8<br>451          | 9             | 10           | 12          | 5 14 .<br>403      |
| Mar. 29 {            | 45%        | 433             | 121                | 405                 | 197                    | 126                   | 1.1                    | 432<br>20         | 437<br>21          | 438               | 118               | 455<br>19         | 161               | 152               | 163                | 470               | 468<br>19           | 10          | 467                | 449               | 410           | 414          | 102         | 4.63               |
| Mar. 30              | 432        | 431             | 430                | \$ 30<br>\$30       | 430                    | 428<br>428            | 431<br>432             | 402               | 433<br>434         | 436               | 133               | 436<br>436        | 442<br>443        | 451               | 454<br>454         | 451<br>451        | 151                 | 453<br>453  | 451<br>452         | 150<br>450        | 419           | 117          | 415<br>115  | 411                |
| Temp                 | 412        | 29.<br>139      |                    | 5 29,<br>439        | 5 29<br>439            | 29<br>438             | 29<br>439              | 28<br>442         | 26<br>443          | 24<br>414         | 23<br>442         | 21.               | 5 26.1<br>449     | 5 20<br>447       | 19                 |                   |                     | 5 15<br>462 | 15<br>158          | 15<br>456         | 15.5<br>450   | 5 17<br>447  | 19          | 413                |
| Mar. 31              | 442        | 439<br>25       | 439                | 439                 | 439                    | 438                   | 439                    | 442<br>5 22       | 143<br>20.         | 144               | 412               | 447               | 152<br>20         | 447               | 448                | 450<br>17         | 458                 | 462         | 458                | 455               | 150<br>5 17.  | 417<br>5 20  | 411         | 413                |
| Temp .<br>Magnet'r . |            |                 |                    | 7 511.              | -                      |                       | 1 508.                 |                   |                    |                   |                   |                   | 5 515.            |                   | 9 526.             | 5 528.            | 2 530.              | 8 550.      | 1.528.             |                   |               | 5 510. 3     | 2.516. (    | 515.0              |
|                      | 519.       | 5.518.          | 3 517.             | € 515               | 3.515.                 | 6.514                 | 0.512.                 | 1.507.            | 8 303              | 1.758.<br>5 2.    | 0.509.            | 9.514.            | 4.522             | 1 527.            | 8 530.<br>5 0.     | 1.532.            | 1514.               | 7 534       | 3.552.<br>5 0.     | 4.52%             | 3.323.        | 1520.        | 1.519.3     | 018.1              |
| 2                    |            | . 01            |                    | - 41                | ***                    | 0                     | **                     |                   | - 601              | dia i             |                   | - 01              |                   |                   |                    |                   |                     |             |                    |                   |               |              |             |                    |

To reduce readings to an approximately uniform series increase each reading between March 29, 45, and close of the month by 46.0, distincts, 450.1; mean 10 days, March 30 to April 8, inclusive, 499.1; mean 10 days, March 30 to April 8, inclusive, 439 4, difference, 40.9 Monthly means: Temperature, 1.5; reagnetometer, 56.3; reduced mean, 599.2.

\*March 29, about 4a, m, Gott, time, magnets cleaned of slight frost that had collected.

† Scale value up to March 4, 85, 2017.9; after the date, 360.0101; average for month, 300.087 part of the vert, latter.

H. Ex. 44----66

Hourly readings of the Brooke balance magnetometer at Uglaamie, Alaska, April, 1883.

| The control of the co | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 2h 3h                             | 40             | 55 ; €                 | b 7h             | 85          | 9h         | 10k 1             | €h Noos                        | . 13h              | 14h              | 154           | 161 1                  | P 48                          | 195        | 20%            | 215          | 224          | 236          | Corta       |
|--|--|-----------------------------------|----------------|------------------------|------------------|-------------|------------|-------------------|--------------------------------|--------------------|------------------|---------------|------------------------|-------------------------------|------------|----------------|--------------|--------------|--------------|-------------|
| Tree   12  | An 15 444 446  | 418 449                           | 443            | :<br>443 440           | 445              | 440         | 435        | 440 44            | 5 456                          | 468                | 462              | 459           | 61 46                  | 459                           | 457        | 458            | :<br>:457    | 457          | 457          | 40 0        |
| Tree   1.   1.   1.   1.   1.   1.   1.  | Tem 22 20  |                                   |                | 91 25<br>455 455       | 21<br>457        | 456         | 456        | 454 46            | 0 460                          | 461                | 472              | 475           | 76 47                  | 481                           | 473        | 468            | 466          | 464          |              | 40. 9       |
| Apper 9 and  | Tem 14 , 14  | 154 455<br>14 13                  | 14             | 13, 5 13               | 2 11             | 8. 7        | 6          | 5                 | 4 3                            | 1                  | 0                | -1 .          | - 1 -                  | 2 - 1                         | 0          | 0, 5           | 3, 5         | - 5          | 7            | 41 H        |
| Ap-9   607   408   153   150   | Tem 9 10   | 159 157<br>12 12                  | 157<br>10      | 458 458                | 3 1458<br>3.51 7 | 455<br>5. 5 | 456        | 450 47            | 66 468<br>6 1                  | 481                | 482              | 469           | 186 50<br>- 5 =        | 5 - 4                         | - 3        | - 1.5          | 478          | 2.5          | 477          |             |
| Ap. 5, 123   271   686   687   686   687   | Ap. 4 167 462  | 454 458                           | 459 ±<br>10, 5 | 459 15<br>10           | 7 454<br>7.5 6   | 458         | 454        | 458 47<br>5 0.5 - | 8 462<br>1 - 2                 | 465                | 468              | 477           | 182 48<br>- 5 -        | 6 486                         | 490        | 482            | 478          | 477          | 475          |             |
| Ap 6, 400, 400, 400, 400, 400, 401, 402, 403, 403, 403, 403, 403, 403, 403, 403  | Ap. 5 \ 473 471<br>473 470                           | 468 467                           | 465<br>465     | 463 463<br>463 463     | 462              | 463         | 462        | .467 40           | 13 '464                        | 167                | 475              | 481           | 183 [47                |                               |            |                | 464<br>7     | 463          | 463          | 43.5        |
| The control of the co | Ap 6 459 456<br>456 456                              | 453 454<br>453 453                | 453            | 453 453<br>453 453     | 454<br>454       | 453<br>453  | 453        | 453 43            | 1458                           | 4.59               | 461              | 165           | 466 46                 |                               |            |                | 462          |              | 461          | 44.4        |
| AP 9, 485 643 656 665 665 667 672 672 672 673 674 674 674 674 674 674 674 674 674 674  | Ap. 73 460 460<br>460 460                            | 160 459                           | 459<br>459     | 458 458<br>458 458     | 459<br>1 459     | 460         | 461<br>462 | 462 40<br>463 40  | 14 464<br>13 464               | 4ti.               | 466<br>466       | 466           | 467 41                 | 7 467                         | 1117       |                | 466          | 466<br>466   | 465<br>465   | 45, 3       |
| Tem. 9, 9, 9, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10   | Tem 9, 5 10  | 463 463                           | 463            | 162 463                | 2 463            | 464         | 464        | 464 40            | 14 467                         | 44397              | 470              | 471           | 471 47<br>471 47       | 2 472                         | 471        |                |              |              | 469          | 46. 2       |
| Tem. 4. 10   | Tem 7 9  | 9 9.<br>469 468                   | 5 10           | 9.5<br>467 46          | 467              | 467         | 468        | 468 4             | 2 - 3<br>68 468                | - 4<br>469         | 470              | - 6<br>470    | - 6 [-<br>470 47       | $\frac{6}{0} = \frac{5}{470}$ | - 3<br>469 | 4 19           | - 1<br>469   | 1<br>469     | 468          | 47. 1       |
| Tem   10   10   10   10   10   10   10   1   | Ten. 6 6   | 6 0                               | 10<br>465      | 10   1                 | 7. (<br>462      | 462         | 463        | 163 40            | 1 1<br>64 .464                 | 465                | $\frac{-1}{465}$ | 467           | 468 40                 | 2 - 1<br>7 466                | 4/16       | 406            | 465          | 5<br>464     | 463          | 48.0        |
| Ap.11  | Tem., 6 6.5  | 8 8                               | 9              | 9, 5                   | , 8              | 1 8         | . 7        | 7                 | 5 5                            | . 5                | 5                | 4             | 4                      | 4 4                           | .5         | 6              | 6, 5         | 7.7          | 10           | 14.8        |
| AP-17, [59] [132] 4.88 438 57 453 156 455 455 455 455 455 456 458 469 469 469 469 469 467 469 469 469 469 469 469 469 469 469 469  | Ap.11   462   462<br>Tem   10   11.5                 | 463 462<br>12.5 11                | 461<br>12      | 460 46<br>13 1:        | ) 454<br>2.5 11  | 455<br>10   | . 8        | 7                 | 6 5                            | .5                 | 5                | 4             | 5                      | 5 5                           | - 6        | 7              | 7            | 9. 7         | - 11         | 10.7        |
| APA-13, 456, 454, 454, 454, 454, 454, 454, 454   | Ap.12 459 459<br>Tem 11.5 13                         | 458 458<br>14 14                  | 457<br>15      | 456 45<br>15 1         | 6 455<br>4 13    | 455<br>12   | 455<br>10  | 455 48<br>9       | 50 458<br>7 6                  | 462                | 166              | 166           | 166 46<br>4            | 4 464<br>5 6                  | 463        | 462            | 460          | 459<br>14    | 457          |             |
| Ap.14   55   525   545   449   448   447   447   448   448   119   129   450   451   452   452   451   451   451   453   452   452   451   | A P.11 458 454                                       | 454 453                           | 452            | 151 15                 | 451              | 450         | 150        | 451 43            | 50 .451                        | 453                | 437<br>437<br>8  | 458           | 461 48<br>6. 5         | 0 460                         | 462        | 459<br>10      | 458<br>12    | 456<br>14. 3 | 455          | 50 <b>6</b> |
| Ap.15   422   450   440   410   410   448   448   448   448   448   448   448   448   449   448   448   449   448   448   449   448   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449   448   449  | Ap.14 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \          |                                   | 448            |                        | 148              | 448<br>448  | 419        | 450 43            | io 451                         | 452                | 4.59             |               |                        | 1 454                         | 4.54       | 453            | 4.53         | 452          | 152          | 51.5        |
| Ap. 16   40   44   44   44   44   44   44   4  | Ap.15 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \          |                                   |                |                        | ) 448            | 448         | 449        | 448 4             |                                | 148                |                  |               | 452 45                 | 3 452                         | 451        | 450            | 446          | 412          |              | 52.3        |
| Tem 2. 24.5 20.5 21.5 21.5 21. 22.1 521 - 20. 19 16 11 12 10 0 7 7 6 4 3 3 0 3 5 4 4 5 7 6 6 6 4 7 47 17 37 47 17 47 47 17 47 47 47 17 47 47 5 47 47 17 47 47 18 18 18 18 18 18 18 18 18 18 18 18 18   | A v. Lii ( 437 449                                   | 443 444<br>143 444                | 411            | 445 ,440               | 5 547            | 448         | 451<br>451 | 452 45<br>452 45  | 55 450                         | 463                |                  | 170           | 17<br>472 47<br>472 47 | 1 471<br>1 472                | 472        | 469            | 469          | 469<br>468   | 108          | 51.2        |
| Tem 8 7 10.5 8.0 8.5 10 10 9 88 8.5 4.0 2.5 1 -1 .2 -3 .4 -4 -4 -2 -1 0 2 2 .4.5 7.5 7.5 4 1.5 4 1.5 1 | A 1 = ( 168 469                                      | 23 5 21.<br>469 469               | 469            | 467 146                | 463              | 465         | 166        | 46× 47            | 1 473                          |                    |                  | 480           | 180 45                 | $\frac{3}{0} - \frac{3}{481}$ | 5 4<br>479 | 479            | 477          | 475          | 174          | 51-1        |
| Then 10 10 10 10 12 12 12 11 12 12 12 10 5 7 7 5 7 3 1   | Tem 8.5 10.5   | 8. a - 8.<br>468 - 466            | 5 10<br>465    | 10 9<br>164 46         | 1 8              | 8.7<br>464  | 465        | 466 47            | 1 - 1                          | 479                | 483              | 490           | 487 42                 | 4 - 2<br>7 484                | - 1<br>4≥4 | 480            | 479          | 478          | 475          | 55 ()       |
| Tem 11 51 5 15 167 175 175 168 189 189 11.5 17 175 450 450 450 450 450 450 450 450 450 45  | Tem 10 10 5  | $\frac{12}{473}$ $\frac{12}{469}$ | 11             | 12 13<br>455 45        | 2 10 5<br>1 450  | 451         | 458        | 3<br>470 40       | $\frac{1}{18} = \frac{1}{473}$ | - 3<br>470         | - 4<br>471       | - 5<br>475    | 482 48                 | 5 - 4 6 4 5 4                 | 485        | - 3<br>476     | 171          | 473          | 463          | 55.9        |
| Then 11 52 1 5 15 17 17 17 17 17 16 16 15 17 17 17 16 16 15 17 17 17 17 17 17 17 17 17 17 17 17 17   | Tem 7 75   | 9 9                               | 11             | 11 - 10                | 10               | 8           | 7. 7       | 6                 | 5 4                            | 4                  | 3                |               | 3                      | 3 5                           | ' 5        | - 6            | 8            | 9            | 11.5         |             |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | Tem 11 15  | 160 461<br>1 5 15                 | 456            | 446 456<br>17. 5 15    | 450<br>16        | 16          | 452<br>15  | 459 43<br>15 1    | 7 459<br>4 13                  | 100                | 12               | 463<br>12     | 164 4t<br>13 1         | 5 466<br>3 14                 | 5 10       | 17. 3          | 18           | 20           | 21           | 57.0        |
| Tron 20 21.5 25.5 25.0 29 19 19 18 16.5 15 14 13 11 11 10 10 18 48 48 48 49 40 40 40 40 40 40 40 40 40 40 40 40 40   | Ap.21   456   455<br>Tem   22   22                   | 455 454<br>23 24                  | 454            | 453 450<br>25 1 26     | 158              | 453<br>25   | 453        |                   |                                | $\frac{454}{5-20}$ | 454              | 454<br>19, 5  | 154 45<br>19 1         | 4 455<br>9 19                 | 455        | 455<br>5 18, 5 | 455<br>18. 5 | 455<br>19    | 455<br>20. 3 |             |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | Ap 22 / 455   155                                    | 455 454                           | 453            | 453 .450               | 453              | 454         | 4.4        | 453 47            | i4 458                         | 462                | 462              | 463           | 465 46                 | 7 4116                        | 462        | 463            | 459          | 459          | 454          | 58, 5       |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | Ap 28 ( 454 458 453                                  | 453 453                           |                | 152 151                | 451<br>451       | 451         | 152        | 455 45<br>455 45  | 7 458<br>7 458                 | 462                | 463<br>463       | 466           | 168 46<br>168 41       | 7 467<br>7 467                | 450        | 464            | 463          | 461          | 459          | 59-4        |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $A p 21 + \frac{459}{459} = \frac{459}{459}$         | 459 457<br>459 457                | 156            | 154 - 154<br>454 - 454 | 454<br>455       | 455<br>455  | 455<br>455 | 456 45<br>456 45  | 67 -459<br>67 -459             | 460                | 160<br>460       | 462<br>462    | 462 47<br>462 47       | 471<br>472                    | 479<br>478 | 476<br>476     | 481<br>481   | 165<br>164   | 448          | 60.3        |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | A DO 1 118 438                                       | 442 428<br>445 424                | 429 ·          | 440 (43)               | 436              | 438<br>439  | 110        | 445 44            | 0 456                          | 454                | 448              | 465           | 162 46                 | 2 462                         | 457        | 47 -           | 152          | 450          | 449          | 61-2        |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | Tein 21 21<br>Appen 1 153 449                        | 22 23<br>449 445                  | 143<br>443     | 24, 5° 23<br>442 - 436 | 434              | 22<br>435   | 21<br>436  | 20 1<br>436 44    | 8 . 17<br>1 . 146              | 4.53               | 452              | 451           | 450 45                 | 8 20<br>3 462                 | 457        | 118            | 448          | 449          | 450          | 62, 1       |
| Ten 94.5 [14] 518 519 520 517 528 519 520 517 518 519 520 52 525 525 520 520 520 520 520 520   | Teta 27 28<br>Ap. 27 \ 149                           |                                   |                |                        | 27<br>504        | 28<br>511   | 25<br>516  | 24 5<br>518 5.    | 1 26                           | 5 20.3             | 5 20<br>526      | 19. 5.<br>512 | 19 1 1<br>517 55       | 9 20<br>9 525                 | 20<br>503  | 21             | 520          | 522          | 24. 6<br>515 |             |
| Ap. 20   548   548   548   548   549   548   549   548   549   548   549 | Tem 94 5   | 518 519                           | G20            | 519 59                 | 28. 5            | 26          | 21         | 520 5             | 11. 5 20<br>5 530              | 19                 | .527             | 510<br>17, 5  | 317 - 31<br>17, 5 - 1  | 2 505<br>8 19                 | 19         | (523           | 22           | . 27         | 28           |             |
| April 528 528 528 528 528 528 529 521 520 523 524 525 524 525 525 526 526 526 526 526 527 527 528 528 528 529 529 528 528 529 529 528 528 529 529 528 528 529 529 529 529 529 529 529 529 529 529  | Tem 28, 5 29   | 518 518<br>31 31                  | 520<br>13, 5   | 518 529<br>33 33       | 517              | 518<br>29   | 519        | 520 50<br>24 0    | 530<br>5 5 22                  | 529<br>21          | 529<br>20        | 531<br>19.5   | 531 5<br>19 1          | 0 529<br>9 21                 | 529        | .528<br>23, 5  | 527<br>5 25  | 528          | 528          |             |
| Ap 30 \ 5 28 509 507 508 507 508 507 508 508 509 508 509 509 508 509 500 508 508 508 508 503 502 508 508 508 508 508 508 508 508 508 508   | Ap.29 528 518<br>Tem 28 29                           | 528 528<br>30 , 29                | 31             | 528 1529<br>34 36      | 524              | 525<br>26   | 524<br>25  | 525 50<br>23 5    | 5 526<br>1 5 20                | 526                | 5:39             | 53.2          | 532 55<br>18 1         | 1 530<br>7 18                 | 529        | 528<br>19      | 528<br>22    | 529<br>24    | 528<br>25    |             |
| Magn'r 465, 4 465, 2 464, 7 463, 1 462, 5 461, 6 461, 1 462, 2 462, 7 463, 2 464, 8 436, 5 469, 1 471, 6 474, 1 475, 4 476, 3 477, 4 477, 3 476, 4 474, 1 472, 3 471, 1 469, 3   | Ap 30 \ 528 529 529                                  | 527   528<br>527   527            | 527            | 528 528<br>528 528     | 529<br>529       | 528<br>528  | 529        | 529 51<br>529 51  | 8 529<br>8 529                 | 530                | 535              | 535           | 535 53                 | 6 536                         | 531        | 532            | 528<br>528   | 528<br>528   | 531          |             |
| Redu d. 509, 6 509, 4 508, 9 507, 6 506, 7 505, 8 505, 3 506, 4 506, 9 507, 4 509, 0 510, 7 513, 3 515, 8 518, 3 519, 6 520, 5 521, 6 521, 5 520, 6 518, 3 516, 5 515, 3 518, 5  | Magn'r 465, 4 465 2                                  | 464. 7 463                        | 1 462 5        | 461. 6-161             | . 1 462. 2       | 462. 7      | 463 :      | 5464. a 4.        | 6 5 469                        | 1 471              | 3 474.           | 1 475. 4      | 176 3 47               | 7. 4'477                      | 3 476      | 4 474. 1       | 172.3        | 471.         | 469. 3       |             |

Scal value of one division up to April 15, 0001017; between April 15 and 27, 0002413, after April 27, 65, 0003031; average for month, 0001814 part of the vert, force. To reduce readings to an approximate uniform series apply the corrections indicated in last column. We have means of 10 days April 27 to 26, inclusive, 460.1; mean of 10 days. April 28 to May 7, inclusive, 52; 2, difference 62; 1. Monthly means: Temperature, 12.15; magnetometer, 468.7; reduced mean 51; 3.

Hourly readings of the Brooke balance magnetometer, Uglaamie, Alaska, May, 1883.

1883.

15 225 236 Carte

for month, .0001844 L. We have means ans Temperature.

|                    |              |              |                  |              |                 |               |              |              | -                  |                        |                   |              |            |              |                  |                   |              |                    |               |                 |             |                  |             |                   |
|--------------------|--------------|--------------|------------------|--------------|-----------------|---------------|--------------|--------------|--------------------|------------------------|-------------------|--------------|------------|--------------|------------------|-------------------|--------------|--------------------|---------------|-----------------|-------------|------------------|-------------|-------------------|
| Date.              | 0 h          | 114          | 21               | 3h           | 41              | 5h            | 6h           | 7h           | Sp                 | gh                     | 10h               | 116          | Nonz       | 131          | 141              | 154               | 161          | 176                | 18h           | 19 <sup>t</sup> | 20          | 245              | 221         | 234               |
| lay t {            | 530          | 530          | 530              | 531          | 531             | .531          | 531          | 527          | n24                | 529                    | 529               | 531          | 533        | 530          | 532              | 534               | 536          | 537                | 537           | 536             | 531         | 529              | 528         | 528               |
| Temp               | 530<br>19. 3 | 5 20         | 20.              | 5 20         | 20.             | 5 19.         | 5 20         | 19           | 17                 | 16.5                   | 16                | 15.5         | 14.        | 5 13         | 12               | 10                | 11           | · 13               | 14            | iń              | 18          | 20               | 23          | . 91              |
| fay 2 }            | 528          | 530          | 530              | 528          | 530<br>531      | 530           | 531<br>531   | 532<br>532   | 530<br>530         | 521<br>521             | 529<br>529        | 529<br>530   | 533        | 535          | 542<br>542       | $\frac{542}{542}$ | 542<br>542   | 542<br>542         | 540<br>540    | 538<br>538      | 536<br>536  | 535<br>535       | 535         | 534<br>534        |
| Temp               | 25.<br>535   | 5 24.7       | 534              | 5 21 594     | 20:             |               | 5 18.        | 5 16.5       | 5.15               | 13. 5                  | 31. 3             | 10           | 536        | 7            | . 6              | 536               | 6            | 6. 3               | 506           | 536             | 11          | 13               | 1.4         | 16.               |
| ayil               | 535          | 534          | 534              | 534          | 534             | 534           | 533          | 534<br>534   | 531                | 531<br>531             | 531<br>531        | 537<br>537   | ,536       | 537          | 537<br>537       | 236               | 537          | 537<br>537         | 5.86          | 5 166           | 585<br>585  | 584<br>584       | 533         | 533<br>533<br>221 |
|                    | 16.3<br>545  | 548          | 17.<br>550       | 5 17.<br>551 | 5 18            | 18<br>520     | 17<br>523    | 16<br>524    | 16<br>524          | 14<br>524              | 13<br>524         | 12<br>527    | 530        | 528          | 529              | $\frac{7}{530}$   | 530          | 530                | 529           | 12<br>528       | 322         | 14               | 522         | 201<br>322<br>322 |
| Temp.              | 345          | 548          | 550<br>21        | 551<br>20.   | 563<br>5 20     | 520<br>5 20.  | 523<br>5 19. | 5 18.7       | 524<br>523<br>1 17 | 14<br>524<br>525<br>16 | 524               | 528          | 530<br>12  | 528          | 529<br>. 10      | 530               | 530          | 530<br>12          | 29            | 72a<br>14. 5    | 522<br>16 : | 522              | 522         | 522<br>5 21       |
| · · · · ·          | 500          | 522          | 522<br>522<br>23 | 521          | 520<br>520      | 520           | 520<br>520   | 520<br>521   | 518<br>518         | 519<br>519             | 519<br>519        | 520<br>520   | 521<br>521 | 524<br>524   | 525<br>525       | 530<br>529        | 528<br>528   | 526<br>526         | 522<br>522    | 523<br>522      | 514<br>514  | 508<br>508       | 494         | 494<br>194        |
| Temp               | 21<br>496    | 190          | 23               | 23           | 24              | 2373          | 23           | 1313         | 22                 | 21                     | 21                | 20           | 20         | 20<br>495    | 20               | 20                | 21           | 21                 | 223           | 25              | 27          | 28.5             | 32          | 33.5              |
| lay 6              | 106          | \$506        | 490              | 187          | 485             | 486<br>486    | 485<br>485   | 476<br>176   | 476                | 481<br>482             | 483               | APP.         | 480        | 495          | 514<br>515       | 514<br>511        | 509<br>509   | 501<br>502         | 506<br>506    | 500<br>500      | 489         | 489              | 488         | 186               |
|                    | 36<br>490    | 38<br>492    | 493              | 39.<br>493   | 5 39<br>496     | 38<br>497     | 38.<br>498   | 5 37         | 483                | 34.5                   | 495               | 32           | 500        | 31<br>511    | 507              | 3.2<br>509        | 315          | 515                | 510           | 503             | 501         | 5 31.5<br>501    | 500         | 333<br>4398       |
| ay 7 }             | 490          | 492          | 493              | 494          | 496             | 498           | 497          | 491          | 483<br>25          | 488                    | 495               | 501          | 509        | 510          | 21               | 509               | 515          |                    | 740           | 5 ig<br>24      | 501         | 501              | 500<br>28   | 198               |
| Inne Si            | 100          | 497          | 502              | 495          | 195             | 495           | 495          | 494          | 494                | 194                    | 494               | 496          | 502        | 5414         | 504              | 502               | 505          | 594                | 503           | 500             | 196         | 494              | 498         | 498               |
| Temp               | 499<br>30    | 497          | 502<br>33        | 195<br>34    | 495             | 496<br>34     | 195          | 494          | 494<br>32          | 494                    | 494               | 496          | 502        | 504          | 26.              | 502               | 505<br>26    | 504<br>26          | 503           | 27              | 496<br>29   | 494              | 500<br>34   | 37                |
|                    | 500 - 501    | 497          | 497<br>496       | 498<br>490   | 489<br>489      | 491<br>491    | 492          | 492<br>493   | 494<br>494         | 493                    | 495<br>495        | 496          | 494<br>494 | 499<br>499   | 500<br>500       | 501<br>501        | 502<br>502   | $502 \\ 502$       | 505<br>505    | 502<br>502      | 499<br>499  | 497<br>497       | 497         | 496               |
| Temp               | 38<br>495    | 493          | 40               | 39           | 39:             | 5 37.         | 5 35         | 35<br>495    | 33<br>497          | 32<br>498              | 30                | 28.7<br>499  | 28.<br>500 | 5 28<br>501  | 501              | 5 28<br>502       | 28<br>502    | 28<br>502          | 28<br>500     | 28              | 29<br>195   | 30<br>493        | 32          | 34<br>192         |
| av 10              | 404          | 193          | 492              | 491          | 491             | 494           | 494          | 495          | 497                | 498                    | 4560              | 499          | 500        | 501          | 501              | 503               | 502          | 502                | 500           | 1111            | 495         | 4503             | 492         | 492               |
| Tomp               | 4000         | 493          | 494              | 494          | 493             | 492           | 35<br>492    | 36<br>494    | 34<br>496          | 32. 5<br>496           | 31.3<br>492       | 491          | 29<br>501  | 28<br>502    | 28<br>500        | 28<br>500         | 499          | 498                | 498           | 197             | 496         | 36, 5<br>497     | 496         | 495               |
| Temp               | 40           | 493          |                  | 494<br>5 41  | 494             | 492           |              | 494<br>35, 3 | 496                | 495                    | 492<br>32.7       | 491          | 501<br>31. |              | 905              | 500               | 31           | 498                | 498           | 497             | 497         | 497<br>36        | 496         | 195<br>5 38       |
|                    | 496<br>496   | 497          | 497              | 494          | 495             | 495           | 496<br>496   | 495<br>496   | 494                | 496                    | 497               | 498          | 498        | 500<br>500   | 500<br>500       | 501<br>501        | 501<br>501   | 500<br>500         | 500<br>500    | 495<br>498      | 497         | 496              | 495         | 495<br>495        |
| Temp               | 37           | 38<br>495    | 39<br>495        | 38<br>495    | 136             | 36<br>495     | 36<br>497    | 34<br>492    | 33                 | 32<br>493              | 31<br>493         | 30           | 29.        | 49F          | 5 29.1<br>503    | 29<br>505         | 29           | 30<br>508          | 29. 5<br>503  | 31<br>496       | 33<br>495   | 34.5<br>491      | 36<br>497   | 37                |
| ay 13 } !          | 495          | 495          | 495              | 195          | 495             | 496           | 498          | 492          | 493                | 493                    | 493               | 492          | 492        | 498          | 503              | 515               | 503<br>503   | 508                | 503           | 45%             | 495         | 494              | 497         | 497               |
| Temp<br>ay 14 {    | 467          | 4505         | 499              | 36<br>502    | 36<br>500       | 498           | 432          | 35<br>494    | 500                | 409                    | 31<br>495         | 499          | 29<br>500  | 2k.<br>503   | 5 27             | 511               | 28<br>507    | 28<br>503          | 501           | 30<br>501       | 30.<br>499  | 10.              | 34<br>496   | 10.1              |
| Tomp               | 497<br>34    | 498          | 499              | 502<br>5 34  | 500<br>34       | 498           | 491          | 495          | 32                 | 499                    | 498               | 499          | 500        | 503          | 505<br>5.28      | 511               | 507          | 503                | 301           | 501             | 499         | 495              | 195         | 493<br>42         |
| 5                  | 492<br>492   | 456          | 485              | 487          | 479             | 479           | 479          | 472          | 467                | 456                    | 457               | 456          | 466        | 181          | 480              | 187               | 493          | 497                | 489           | 488             | \$25        | 478              | 176         | 170               |
| Temp               | 43           | 41           | 47.              | 5 42.        | 5 46<br>481     | 47            | 48           | 47           | 47                 | 44                     | 42                | 40           | 39         | 37.          | 5 37             | 36                | 36.          | 97                 | 199           | 37. 5           | 39          | 10.5             | 42          | 43.               |
| ay 16}             | */2          | 475          | 478              | 480<br>480   | 481             | 481           | 483          | 480          | 473<br>473         | 470<br>470             | $\frac{470}{471}$ | 476<br>476   | 484        | 494          | 501<br>501       | 494<br>494        | 499<br>499   | 503                | 499           | 457<br>457      | 182<br>182  | 478<br>478       | 476<br>476  | 173               |
|                    | 42<br>473    | 471          | 471              | 35<br>471    | 172<br>172      | 39.<br>473    | 5 38<br>475  | 38<br>476    | 36<br>179          | 3.<br>479              | 34<br>478         | 33<br>479    | 482        | 483          | 32.<br>486       | 486               | 33. 3<br>487 | 492                | 35<br>490     | 487             | 39<br>485   | 486              | 42 .        | 5 11<br>486       |
| Temp               | 473          | 471          | 471<br>43.       | 471<br>5 42. | $\frac{472}{5}$ | 473<br>41.    | 475<br>5 40  | 476          | 178<br>37          | 479<br>5 36            | 478<br>35         | 479          | 482        | 483          | 486<br>32        | 486<br>32         | 487          | 492<br>5 32 °      | 490           | 487             | 485         | 486<br>5 33      | 486         | 486<br>36         |
| av 11 5            | 486<br>486   | 491          | 489<br>490       | 494          | 494             | 493           | 494          | 494          | 494                | 494<br>495             | 495<br>495        | 495<br>495   | 196        | 498<br>499   | 500<br>500       | 498               | 501<br>501   | 499<br>499         | 197           | 496<br>496      | 493<br>194  | 493<br>493       | 491<br>491  | 489               |
| Temp               | 35.          | 34. 3        | 35               | 35           | 35              | 34            | 33           | 494          | 494<br>32          | 31                     | 30.7              | 29           | 496        | 28.          | 5 28             | 497<br>28.        | 29           | 330                | 31            | 34.7            | 33.         | 5 34             | 36          | 38                |
| ay 19 3            | 490<br>490   | 489          | 491<br>491       | 485<br>487   | 486<br>486      | 489           | 491<br>491   | 482<br>481   | 481<br>481         | 491<br>491             | 492<br>492        | 492<br>491   | 502        | 507<br>507   | 508              | 512<br>512        | 506<br>506   | 506<br>505<br>5-28 | 503           | 504<br>504      | 494<br>493  | 491              | 4×9         | 497<br>198        |
| Temp               | 37<br>487    | 493          | 489              | 5 B8<br>489  | 489             | 36<br>490     | 490          | 34<br>486    | 33<br>488          | 31<br>489              | 490               | 491          | 494        | 25<br>494    | $\frac{24}{496}$ | 25<br>498         | 26 3<br>498  | 499                | 30<br>496     | 31.7            | 497         | 5 35<br>482      | 36<br>479   | 5 38<br>179       |
| ny 20 {            | 488<br>39    | 493          | 190<br>37.       | 489<br>5 87  | 489             | 489           | 487          | 486<br>36    | 488                | 489<br>33              | 489               | 491          | 494        | 143.1        | 496<br>26        | 498<br>26         | 498          | 499                | 495           | 492<br>32.7     | 197         | 483<br>35.5      | 479         | 179<br>40         |
| 5                  | 480<br>479   | 479          | 421              |              | 510             | 512           | 514          | 515          | 517                | 521                    | 528               | 533          | 548        | 27<br>550    | 547              | 600               | 593          | 567                | 566           | 560             | 552         | 548              | 549         | 548               |
| Comp               | 42           | 479<br>43. 7 | 471              |              | 509<br>45       | 146.          | 514<br>51 46 | 514          | 516<br>3: 40.      |                        | 528<br>34         | 533<br>31. : | 548        |              | 5 28             | 400               | 592<br>5 29  | 567<br>30          | 566           | 560<br>34       | 35.         | 548<br>5 36. 5   | 550<br>39   | 518               |
|                    | 545<br>547   | 540<br>540   | 557              | 529<br>529   | 584<br>585      | 536<br>508    | 540<br>540   | 544<br>315   | 541<br>541         | 550<br>550             | 546<br>546        | 551<br>552   | 563<br>563 | 550<br>550   | 559<br>559       | 56<br>567         | 561<br>561   | 559<br>558         | 555<br>555    | 553<br>553      | 558<br>558  | 552<br>552       | 552<br>552  | 551<br>551        |
| Femp               | 42. :<br>553 | 551          | 45<br>553        | 44<br>550    | 43<br>550       | 42.<br>549    | 5 39 545     | 5 37         | 544                | 33<br>546              | 32<br>550         | 30. 5<br>547 | 550        | 20.          | 5 29<br>560      | 262               | 30           | 365                | 31<br>559     | 554             | 552         | 552              | 551         | 35<br>550         |
| ay 2 1 } ]<br>Temp | 353          | 551          | 553              | 550          | 550             | 548           | 545<br>36    | 550<br>35    | 544                | 546                    | 550               | 547          | 550        | 560          | 560              | 562               | 559<br>30    | 365                | 559           | 554             | 352         | 552<br>5 35      | 351<br>37   | 550               |
| 21.94 5 5          | 550          | 549          | 550              | 549          | 5.9             | 549           | 550          | 550          | 331                | 32<br>550              | 549               | 547          | 548        | 553          | 556              | 558               | 557          | 558                | 555           | 549             | 547         | 544              | 549         | 548               |
| Temp               | 550<br>39    | 549<br>40    | 550<br>41        | 540<br>41    | 549<br>41       | 549<br>41     | 550<br>39.   | 550<br>5 38  | 551<br>36          | 550<br>34              |                   | 547          | 548<br>31. | 553<br>5 31. |                  | 558<br>5 31       | 557<br>31.3  | 558<br>5 32<br>552 | 555<br>33     | 549<br>35       | 547<br>36.  |                  | 550<br>40   | 548<br>42         |
| ty 25 } [          | 548<br>548   | 548<br>548   | 549<br>549       | 548          | 547<br>547      | 547<br>547    | 548<br>548   | 548          | 547                | 548<br>548             | 549<br>549        | 547<br>517   | 548        | 553<br>553   | 553              | 555<br>555        | 555<br>555   | 552<br>552         | 549<br>549    | 547             | 546         | 545<br>545       | 544<br>541  | 543<br>543        |
| Temp               | 43           | 13<br>541    | 541              | 542          | 5 44 543        | 43.           | 5 42 510     | 5 41         | 1 40<br>530        | 39<br>537              | 537               | 37<br>540    | 36.<br>546 | 5 36<br>543  | 34<br>548        | 37                | 37<br>549    | 38. :<br>556       | 38.3<br>549   | 40. :<br>544    | 541.        | 5 43 7           | 541         | 48<br>541         |
| FA 50 - 3 0        | 543          | 541          | 341              | 542          | 543             | 541           | 540          | ,541         | 539                | 537                    | 536               | 540          | 545        | 543          | 348              | 548               | 549          | 556                | (549)         | 543             | 542         | all<br>5.45 :    | 541         | 541               |
|                    | 541          | 541          | 51               | 50           | 48,<br>543      | .5 49<br>.543 | 1543         | 543          | 545                | 543                    | 41<br>540         | 40<br>542    | 39.<br>545 | 552          | 39<br>552<br>552 | 39<br>552         | 548          | 5' 40<br>548       | 40 :<br> 548  | 5 43<br>517     | 43.<br>1546 | 543              | 540         | 48<br>541         |
| Temp               | 541<br>49    | 541          | 541              | 542          | 543<br>48       | 543           | 543          | 543<br>44    | 545<br>41.         | 543<br>5 39. 2         | 537<br>38.:       | 543          | 1545       | 551          | 552<br>35        | :552<br>: 35.     | 548<br>5 37  | 548                | 348           | 547<br>5 39     | .546<br>40  | 543<br>42        | 540<br>44.  | 541               |
| 01.94 5            | 543<br>543   | 542<br>542   | 541              | 541<br>541   | 543<br>544      | 543<br>543    | 542<br>542   | 541<br>541   | 544                | 539                    | 539<br>540        | 542          | 546<br>546 | 553          | 552<br>551       | 551<br>551        | 550<br>550   | 547                | 555<br>555    | 548             | 544<br>544  | 544              | 543<br>543  | 543               |
| Tomp               | 48           | 49           | . 50             | 49           | 45              | 5 46          | 45           | 43           | 42                 | 41                     | 39                | . 38         | 37.        | 5 37         | 36               | 36.               | 36.          | 5 39               | 36. 3         | 42              | 41          | 47               | 48.         | 5 51              |
| av 29              | 541<br>541   | 540<br>540   | 541              | 540          | 532<br>532      | 534<br>534    | 534<br>535   | 533<br>533   | 533<br>533         | 535<br>535             | 543               | 539<br>539   | 541<br>541 | 542<br>542   | 546<br>546       | 543<br>543        | 547          | 549                | 545<br>545    | 543             | 541<br>541  | 543              | 543<br>543  | 543               |
| Temp               | 543          | 543          | 54.              | 51 54        | 545             | 51            | 549          | 5 46         | 541                | 542                    | 539               | 39           | 38<br>540  | 538          | 5 37 546         | 37.<br>550        | 5 37.<br>548 | 5 38               | 38 3          | 540             | 510         | 40<br>539        | 538         | 5 41 541          |
| ay 30 3            | 543          | 543          | 544              | 545<br>5  40 | 345             | 5 1           | 511          | 542          | 541                | 542                    | 539               | 540          | 540        | 538          | 546<br>5 36      | 549<br>36         | 548          | 550                | 1544<br>5, 38 | 540             | 540         | 539              | 538         | 510               |
| Temp               |              | 539          | 539              | 340          | 510             | 540           | 533          | 532          | 531                | 38<br>531              | 38                | 540          | 543        | 543          | 543              | 3547              | 1549         | 546                | 345           | 542             | 538         | 537              | 537         | ,536              |
| Temp               | 540<br>41    | 539<br>42    | 539              | 540<br>42    | 540             | 41            | 533<br>80    | 532          | 531                | 88                     | 537<br>37         | 36           | 543<br>86  | 543<br>35    | 543              | 35                | 549          | 546<br>5 36        | 545<br>37     | 342<br>38       | 538<br>30.  | . 537<br>5 41. 6 | 507<br>5-42 | 536               |
|                    |              |              |                  |              |                 |               | 1            |              |                    |                        |                   |              |            |              |                  |                   |              |                    |               |                 |             |                  |             |                   |

One division of scale up to May 3, 23%, .0003031; between May 4 and 21, .0001926; and after May 21, 3%, .0001948. Average for month, .0002031 part of the vertical force. Mouthly means: Temperature, 329, 8 magnetometer, 517 2

Hourly readings of the Brooke balance magnetometer, Uglaumic, Alaska, June, 1883.

| Date.             | ( 0)                    | - 1 <sup>5</sup>   | 21                      | 35               | \$h                 | $5^{\mathrm{h}}$   | 6:                 | 7                  | К-                   | şp.               | 10%                  | 11h              | Noor                | 181                  | 14                | 151               | 16               | 175               | 18h                                     | 164                 | 20h                | 216                | 221                | 236                       |
|-------------------|-------------------------|--------------------|-------------------------|------------------|---------------------|--------------------|--------------------|--------------------|----------------------|-------------------|----------------------|------------------|---------------------|----------------------|-------------------|-------------------|------------------|-------------------|---|---------------------|--------------------|--------------------|--------------------|---------------------------|
| June 1            | ( 500<br>( 550          | 137                | 54                      | 533              | 543                 | 5,60               | 'C 11              | 5.2                | 50.5                 | 5.0               | 531                  | 504              | 534                 | 537                  | 532               | 534               | 538              | 543               | 540                                     | 542                 | 531                | 517                | 518                | 517                       |
| Temp              | . 45<br>( 519           | 4.4<br>523         | 49<br>525               | 51<br>529        | 52<br>531           | 52                 | 52<br>520          | 515                | 45.5<br>529          | 520               | 5 45                 | 45<br>531        | 45<br>539           | 15<br>538            | 45<br>546         | 44<br>551         | 45<br>550        | 46.<br>562        | 562                                     | 50<br>559           | 51<br>558<br>555   | 50<br>544          | 54<br>556          | 7.7                       |
| June 2.<br>Temp   | . 55                    | 598<br>53,         | 525<br>5 59             | 529<br>50        | 5.48                | 531                | 529                | 315                | 521                  | 5.3               | 508<br>41            | 531              | 539                 | 5.68                 | 517<br>37         | 551<br>36.        | 550<br>5 36,     | 5 37<br>5 37      | 561<br>37<br>551                        | 559<br>5 38         | 1,11               | 10                 | 506<br>11.7<br>507 | 7                         |
| June 3            | 1000                    | 508                | 3.17                    | 547              | 711                 | 533<br>533         | 5.14               | 333                | 5.15<br>5.13         | 5.6               | 550<br>550           | 3.13<br>3.15     | 537                 | 541<br>541           | 540<br>540        | 541<br>541        | 543<br>543       | 543<br>543        | 551                                     | 542<br>542          | 589<br>539         | 537<br>537         | 5.15               | 1.7                       |
| June 4            | 44<br>€ 537             | 5 17.<br>5.68      | 5 49<br>538             | 505              |                     | 5.4                | 5.47               | 5.0                | 5.19                 | 59                | 5 40<br>579          | 542<br>542       | 512                 | 37                   | . 36.<br>547      | 5 36.<br>546      | 546              | 545<br>545        | 38<br>544                               | 590<br>543          | 511                | 510                | 5.5                | -47                       |
| Temp              | ₹ 557<br>- 44           | 338<br>, 43        | 13                      | 3.15             | 10.                 | 1 10               | 10                 | 39                 | 509                  | 36,               | 509<br>5 45          | 512              | 542                 | 547<br>5 :02<br>5:9  | 547<br>52<br>540  | 546<br>32<br>541  | 546<br>32<br>541 | 545<br>52<br>541  | 514<br>34<br>510                        | 548<br>85, 1<br>559 | 541<br>5 87<br>585 | 5.00               | 1054<br>41         | 12 5                      |
| June 5 .<br>Temp  | 5 536<br>7 536<br>4 4 L | 5.36<br>5.46       | 3 (5)<br>1 (5)<br>1 (7) | 17.5             | 5                   | 333                | 334<br>354<br>46   | 395<br>353<br>44   | 545<br>505<br>44     | 506<br>506<br>42  | 307<br>307<br>1.9    | 5 17             | 1.5                 | 5539                 | 540               | 541               | 541              | 511               | 540                                     | 500                 | 508                | 507<br>41.7        | 525                | Sil.                      |
| June 6            | 553                     | 532<br>532         |                         | 500<br>5a1       | 561                 | 502<br>502         |                    | 701                | 530                  | 561<br>561        | 508                  | 511<br>511       | 547<br>547          | 5 (36<br>759<br>710  | 539<br>539        | 541<br>540        | 541<br>541       | 35<br>511<br>540  | 5 - 96<br>505<br>585                    | 570                 | 531                | 506<br>500         | 5.9                | 127                       |
| Temp              | 45                      |                    | 15                      | 19<br>526        | 45                  | 15.7               | 47<br>527          | 45<br>524          | 1<br>520             | 13                | 11<br>506            | 1.9<br>51.8      | 5 39                | 5.0                  | 38<br>534         | 38.<br>538        | 5 10 536         | 41<br>504<br>504  | 13<br>532<br>532                        | 45<br>530           | 15<br>528          | 47<br>528          | 48.1<br>527        | - 31                      |
| June 7<br>Temp    | ₹ 527<br>52             | 526<br>53          | 527<br>53               | 116              | 3.7                 | 599<br>70, 7       | 197                | 524<br>49          | 501                  | 520<br>48         | 526                  | 52%              | 530<br>12.          | 533<br>5 42          | 335<br>41.        | 538<br>5 41.      | 506<br>5 41      | -11               | 41.                                     | 500<br>12.5         | 528<br>43.         | 528<br>5 45        | 527<br>46.         | 50                        |
| June 8            | 318<br>328              | 317<br>327         | 527<br>27               | 529              | 504<br>504          | 5.42<br>5.42       | 582<br>552         |                    | 3.3                  | 5.71              | 532<br>532           | 502<br>552       | 502<br>502          | 531<br>570           | 556<br>556        | 540<br>540        | 542<br>542       | 538               | 540<br>541                              | 5 3<br>533          | 527<br>527         | 527<br>527         | 525                | 1.1                       |
| Temp June 0       | C 272.8                 | 49<br>529<br>529   | 19<br>529               | 48<br>529        | \$6<br>550          | $\frac{46}{582}$   | 4.5<br>527         | 4.1<br>530         | 120                  | 525               | 40<br>525            | 550<br>550       | 500                 | 5 08<br>504          | 37.<br>543        | 5.38              | 543              | 39<br>543         | 514<br>514                              | 10, 1<br>545        | 587                | 5 43<br>500        | 531                | 17                        |
| Temp              | 46                      | 146                | 529<br>16               | 529<br>46        | 550<br>45           | 5.2                | 43                 | 41                 | 529                  | 529<br>40         | 526<br>33            | 27.              | 550<br>5 1.7<br>533 | 534<br>36,           | 541<br>5 36       | 544<br>36<br>533  | 548              | 543<br>36<br>503  | 544<br>- 36<br>531                      | 545<br>37<br>500    | 587                | 5.0                | 10.5               | 13                        |
| June 10<br>Temp   | 1.2                     | 501<br>501<br>-44  | 512                     | 743<br>743       | 75.2<br>5.2<br>45   | 501<br>501<br>44.7 | 5.11               | 31                 | 581<br>581<br>5 41.5 | 532<br>40.        | 542<br>532<br>5 - 49 | 5.02             | 532                 | 584<br>594<br>5-37.  | 535               | 534<br>5-38       | 705<br>39        | 588               | 53.1                                    | 100<br>42           | 507                | 526<br>556<br>46   | 50                 | 122                       |
| June 11.          | 1 522<br>1 500          | 7/212              | 522<br>522              | 521              | 70.1                | 523<br>523         | 500                | 517                | 516                  | 515               | 518                  | 521<br>521       | 522                 | 3.28                 | 529<br>579        | 503<br>533        | 395              | 585<br>585        | 41<br>584<br>583                        | 529<br>529          | 508<br>525         | 527<br>5 7         | 70d<br>7. d        |                           |
| Temp .            | 50                      | 500<br>51<br>504   | 525                     | 504<br>54<br>595 | 523<br>54<br>525    | 73, 1<br>526       | 52                 | 49.<br>528         | 3.47<br>529          | 1.1               | 42.                  | 5 42<br>550      | 41                  | 40<br>533            |                   | 5 39.             | 5 (30).<br>135   | 5 (0,<br>533      | 5 42<br>502                             | 43, 3               | 5.41               | 750                | 10.5               | 15                        |
| June 12<br>Temp   | 105<br>49               | 524<br>524<br>49 : | 5 <u>9</u> 5<br>5 49.   | 525<br>5 - 50    | 525<br>525<br>49. 3 | 526                | 527                | 508<br>44          | 529<br>43            | 529<br>529<br>48  | 52.0<br>52.9<br>1.2  | 529              | 501                 | 533                  | 534<br>5 39.      | 5 337<br>5 40     | 505<br>40        | 500               | 532<br>40                               | 112                 | 501                | 5 m<br>5 42        | 1                  | i, i                      |
| June 13           | 328<br>328              | 528<br>528         | 367<br>327              | 526<br>520       | 526<br>526          | 30.5               | 531<br>531         | 528<br>528         | 525                  | 530<br>531        | 5.1                  | 530<br>530       | 500<br>500          | 100<br>500           | 532<br>532        | 533<br>533        | 60 J<br>70 J     | 505<br>705        | 593<br>593                              | 529<br>529          | 528<br>528         | 507<br>507         | 526<br>526         | 525                       |
| Temp<br>June 14.  | 46<br>525               | $\frac{46}{527}$   | 47<br>527<br>527        | 47<br>559        | 47<br>532           | 16<br>530          | 500<br>500<br>500  | 42.3<br>520<br>520 | 1                    | 42<br>523<br>523  | 12<br>529<br>529     | 500              | 40.<br>532          | 5 40<br>534          | 40<br>535         | 40<br>533         | 536<br>537       | 41<br>543         | 42<br>537                               | 43<br>534<br>534    | 4.4<br>500<br>502  | 45<br>50 i<br>510  | 530                | 18                        |
| Temp              | 525<br>48<br>580        | 17<br>528          | 19                      | 529<br>47<br>526 | 589<br>45<br>595    | 529<br>45<br>525   | 11<br>524          | 43<br>524          | 42.7<br>524          | 704<br>704        | 329<br>40<br>5.4     | 530<br>40<br>524 | 502<br>40<br>525    | 534<br>40<br>525     | 535<br>40•<br>526 | 583<br>40<br>527  | 40<br>527        | 543<br>39,<br>530 | $\frac{537}{5-40}$<br>$\frac{529}{529}$ | 40.1<br>528         |                    | 142                | 530<br>- 11<br>525 | 41.5                      |
| June 15 . Temp .  | 750<br>45               | 15                 | 51. 3                   | 36               |                     | 152                | 52.5               |                    | 131.5<br>131.5       | 40                | 40                   | 45               | 47                  |                      | 47                | 16                | 17               | 46                | 46.                                     | 18                  | 48                 | 59                 | 31                 | 21                        |
| June 16.          | 523                     | 523<br>723<br>52 1 | 525<br>525              | 526<br>526       | 527<br>527<br>528   | 527                | 507<br>507         | 100                | 5.29                 | 540<br>530        | 530<br>250           | 501<br>501       | 5 (2)<br>5 (2)      | 47<br>503<br>503     | 584<br>584        | 504<br>574        | 701<br>3014      | 504<br>534        | 534<br>534                              | 530<br>530          | 526<br>526         | 51.8<br>508        | 517                | 5.75                      |
| Temp . June 17    | 526                     | 52 7<br>527        | 596                     | 5.0              | 48<br>520<br>519    | 47.5<br>5 0        | 16                 | 315                | 5 45<br>515          | 517               | 42.3<br>521<br>521   | 5 41.3<br>526    | 5 11<br>522         | 31<br>524            | 10<br>545         | 535<br>535        | 5 40.<br>587     | 5 11 542          | 41<br>16                                | 42.1<br>505         | 13. i<br>531       | 5 45.1<br>509      | 38<br>325<br>525   | 525<br>59, 5<br>523       |
| Temp              | 526<br>51               | 587<br>587<br>51   | 526<br>50 3             | 529<br>5 50      | 150                 | 30.0<br>49         | 510<br>17 5        | 514                | 5;5<br>44            | 317<br>43         | 12                   | 526<br>41        | 50g<br>39,          | 511<br>5138          | 535               | 585<br>38         | 338              | 542<br>39         | 546<br>39.3                             | 535<br>5 H          | 531<br>43          | 527<br>45          | 111                | 15                        |
| June 18 .         | 30 i<br>52 i            | 513<br>513         | 524<br>553              | 519              | 516<br>516          | 501<br>501<br>50   | 517                | 496<br>495         | 502<br>503           | 514<br>514        | 5.36                 | 533<br>533       | 547<br>546          | 533<br>533           | 543<br>543        | 588<br>588        | 548<br>548       | $\frac{546}{547}$ | 544<br>544                              | 539<br>539          | 530<br>530         | 526<br>525         | 528<br>528         | 527                       |
| June 19.          | 528                     | 530                | 53<br>729               | 529<br>529       | 51.7                | 1.12               | 129                | 50                 | 519                  | 394<br>594        | 5 46<br>500          | 50H              | 5 42.<br>54]        | 5 12<br>358          | 41<br>535         | 40.<br>546        | 5 40<br>512      | 544<br>544        | 5 41<br>543                             | 535                 | 5.40               | 531                | 530                | 16<br>531                 |
| Temp              | 47                      | 330                | 52 )<br>48<br>529       | 529<br>17.1      | 526<br>5 47<br>529  | 47                 | 16                 | 317                | 519                  | 41                | 5.00                 | 10.0             | 1 13                | 524<br>- 38.3<br>533 | 5 08              | 38                | 549<br>38        | 544<br>544        | 343                                     | 535<br>39<br>544    | 335                | 10                 | 500<br>46<br>500   | Jal<br>15                 |
| June 20           | 530<br>530<br>49        | 588<br>588<br>50   | 529                     | 527<br>527<br>50 | 529<br>49, 5        | 529<br>529         | 528<br>47          | 11 ·               | 521<br>521           | 529<br>520<br>47  | 531<br>731<br>41     | 11               | 1.4                 | 5.73                 | 555<br>735        | 507<br>508<br>508 | 508<br>508<br>58 | 543               | 546<br>547<br>10.1                      | 785<br>5 H. 3       | 527                | 526<br>524<br>44   | 526<br>48          | 15<br>127<br>13.7<br>19.5 |
| June 21           | 397<br>397              | 528<br>528         | 5.15                    | 525<br>505       | 526<br>526          | 527                | 529                | 3.11<br>305        |                      | 5.00              | 5 1                  | 792<br>500       | 5 (2<br>502         | 531<br>531           | 505<br>515        | 536<br>536        | 536<br>536       | 536<br>535        | 585<br>385                              | 593<br>583          | 532<br>532         | 1.5                | 3314<br>3001       | 5.9<br>52.0               |
| June 22           | 59, 5                   | 13, 5              | 50                      | 32<br>328        | 52<br>527           | 507<br>50 5<br>527 | 49<br>528          | 45<br>529          | 45, 5<br>530         | 5.0               | 12                   | 40<br>531        | 40<br>532           | 533                  | 39<br>534         | 39<br>534         | 38<br>537        | 541               | 584                                     | 5.33                | 41<br>500          | 5.0                | 15<br>527<br>527   | 12.3                      |
| Temp              | 530<br>49               | 50                 | 100                     | 525              | 327<br>349, 5       | 527<br>40          | 525<br>47          | 5.9<br>15          | 7-10<br>4-4          | 5. 1<br>42        | 41                   | 501              | 532<br>39           | 533                  | 734<br>38         | 584<br>38         | 518              | 541<br>38         | 534<br>39                               | 539<br>39, 3        | 500<br>5 34        | 5.9<br>43          | 13                 | 529<br>45.5               |
| June 23 }         | 7(%)<br>70 F            | 501<br>501         | 580                     | 525<br>528       | 513<br>513          | 513<br>514         | 518                | 511                | 515<br>515           | 522<br>522        | 528<br>528           | 535<br>536       | 531<br>530          | 536<br>536           | 542<br>542        | 543<br>543        | 539<br>540       | 535<br>535        | 533<br>534                              | 531<br>532          | 592<br>582         | 501<br>551         | 531                | 542                       |
| Temp<br>June 24 . | 5.11                    | 550<br>500<br>500  | 532                     | 46<br>500        | 45<br>500<br>530    | 44<br>532          | 43<br>529          | 531<br>531         | 4.0                  | 239<br>554<br>531 | 502<br>502           | 38<br>531        | 38<br>529           | 38.                  | 503               | 39<br>533         | 38               | 38<br>540         | 39<br>536                               | 29<br>534           | 301<br>701         | 500                | 40<br>531<br>531   | 1                         |
| Temp              | 12                      | 1.1                | 42<br>531               | 42<br>531        | 42<br>529           | 732<br>42<br>530   | 529<br>- 12<br>530 | 41<br>501          | 539<br>41<br>530     | 41                | 582<br>40<br>581     | 701<br>40<br>301 | 529<br>59<br>501    | 533<br>39<br>531     | 533<br>58<br>532  | 503<br>18<br>503  | 587<br>38<br>539 | 540<br>38<br>542  | 536<br>38<br>546                        | 544<br>39<br>543    | 531<br>40          | 42<br>535          | 40                 | 43                        |
| June 25 Temp      | 14.5                    | 5.11               | 16                      | 531<br>46        | 528<br>46           | 530<br>46          | 570                | 581                | 530<br>42. 5         | 531               | 531                  | 501              | 531<br>- 40         | 581<br>40            | 502               | 504<br>39         | 539<br>38.       | 542<br>5 38       | 546<br>39                               | 545                 | 587<br>753<br>49   | 501                | - 17               | 41                        |
| June 26 . ;       | 182                     | 503<br>503         | 531                     | 531              | 581                 | 5.02               | 532<br>532         |                    | 701.5<br>7-00        | 5.70              | 500<br>529           | 197<br>527       | 500                 | 502<br>5. 2          | 536<br>536        | 535<br>535        | 589<br>589       | 543               | 541<br>540                              | 5003                | 500<br>500         | 590                | 5.1                | 5.1                       |
| June 27           | 5.2                     | 11.5<br>552        | 43                      | 41.7<br>55.3     | 11 5                | 41.5               | 14                 | -17                | 1_7                  | 4.2<br>5.26       | 41<br>321            | 11               | 11                  | 40<br>540            | 40<br>547<br>548  | 40<br>545         | 39<br>545        | 39                | 39<br>541                               | 5 40                | 11                 | 1.                 | - 12               | 1                         |
| Temp .            | 7.7                     | 42                 | 5)<br>42                | 5.03             | 31.                 | 5.1                | 41.5               | 47                 | 5.7                  | 11                | 40                   | 534              | 11.9                | 510                  | 518<br>41<br>531  | 545<br>41         | 545<br>41        | 3/8 m             | 543<br>43                               | 533                 | 738                | 11                 | 501<br>45          | 10 L                      |
| June 28 . )       | 5-1<br>520              | 529<br>528         | 51.5<br>528             | 501<br>501       | 變                   | 5.55               | 311                | 5_6<br>5_6         |                      | 5,50              | 301                  | 551<br>551       | 542<br>544          | 537                  | 533               | 534<br>534        | 535<br>535       | 556<br>536        | 528<br>527<br>47.3                      | 524<br>524          | 523<br>523         | 201                | 521                | 7.0                       |
| Temp<br>June 29.  | 16.5<br>519             | 520<br>520<br>520  | 17                      | 46 °             | 16.                 | 47                 | 11                 | 43                 | 317                  | 517               | 42                   | 41.              | 42<br>516           | 42<br>520            | 523               | 43<br>525         | 43<br>529        | 532               | 17.3<br>526<br>525                      | 5.1                 | 51.<br>521         | 20<br>20<br>720    | 515                | -13                       |
| Temp              | 5.0<br>59<br>517        | 520<br>59<br>520   | 500<br>500<br>500       | 519<br>519       | 117                 | 317<br>38, 5       | 17                 | 46                 | 31,                  | 51"<br>52         | -13<br>-70           | 514<br>- 50<br>- | 518<br>49           | 520<br>5 49          | 523               | 595<br>48<br>546  | 529<br>47.       | 5 47<br>5 47      | 46.                                     | 521<br>5 47<br>518  | 521<br>48<br>599   | 520<br>49 7<br>509 | 515                | 1                         |
| June 30           | 517<br>517              | 500<br>500         | 520                     | 519<br>519<br>54 | 300<br>300<br>34, 5 | 521<br>522<br>51   | 22                 | 412<br>512<br>50   | 518                  | 512<br>512<br>49  | 506<br>504<br>45     | 392<br>333<br>17 | 530<br>530<br>46.   | 585<br>735<br>5 46   | 587<br>587<br>45  | 546<br>546        | 543<br>5-45      | 514<br>514<br>45  | 543<br>543<br>44.                       | 546<br>546<br>5 44  | 588<br>584<br>45   | 509<br>509<br>45   | 126<br>47          | 19                        |
| Magnet'r          |                         | 528, 0             |                         |                  | 527. 9              | -                  | 527. 1             |                    | 525. 5               | W10.77            | 1 529, 7             | -                |                     |                      |                   | 7 537             | 6.538,           |                   |   | -                   |                    | 3 529. (           |                    | 525,0                     |
| Temp              |                         |                    |                         | 48.              | 48, 0               | 47. 6              | 46, 6              | 14. 5              | 13. 9                | 12.               | 41.                  | 40.              | F 40,               | 3 39.                | 8 39,             | 6 39,             | 4 39,            | 4 30.             | · 40,                                   | 41.                 | B 42.              | 7 44. (            | 1 1                | 17 0                      |

One division of scale .00 data part of the vertical force. Monthly means: Temperature, 439.7; magnetometer, 531.0

Hourly readings of the Brooke balance magnetometer, Uglaamie, Alaska, July,

21 225 230

21

Date

Temp. 2

July 3 ...
Temp...
July 4 ...
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Temp. July 7 .. { Temp July 8 Temp....
July 9 ... {

July 13 ... {
Temp.... July 14 ... Temp. July 15

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July 16 ...

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July 17 ...

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July 18 ...

Temp July 19 . . { Temp July 20 .

July 20 ... {
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 July 22 ... {
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July 24 . . { Temp. July 25 . . }

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July 26 ...
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July 27 ...
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July 28 ...
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July 29 ...
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July 30 .. }

Temp

1...{

| Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec | Dec division of scale = .001948 part of the vertical force. Monthly means: Temperature, 45.8; magneton, 548.2

# EXPEDITION TO POINT BARROW, ALAS.: A.

Hourly readings of the Brooke balance magnetometer, at Uglaamie, Alaska, August, 1883.

| Date.                                   | θ1           | \$h             | 24           | 3h             | 4h                 | 5k             | 6h          | 7h           | Sh           | 92          | 10 <sup>b</sup>            | 114                        | Noon.        | 124                  | 144          | 15 <sup>h</sup> | 164          | 17h          | 18*          | 195          | 20h            | 214          | 220          | 23           |
|---|--------------|-----------------|--------------|----------------|--------------------|----------------|-------------|--------------|--------------|-------------|----------------------------|----------------------------|--------------|----------------------|--------------|-----------------|--------------|--------------|--------------|--------------|----------------|--------------|--------------|--------------|
|   | 550<br>550   | 536             | 530          | 536            | 534                | 528            | 5 0         | 542          | 548          | 547         | 546                        | 555                        | 551          | 549                  | 549          | 558             | 557          | 560          | 560          | 559          | 553            | 545          | 546          | 549          |
| Temp                                    | 45           | 48.5            | 59           | 49.            | 5 51.              | 5 50. 5        | 51.1        | 50, 5        |              | 49          | 49                         | 48                         | 48           | 49                   | 48           | 47              | 47.5         | 47           | 48           | 47           | 48             | 49           | 50           | 51           |
|   | 548          | 547             | 548          | 548            | 546                | 514            | 535         | 524<br>528   | 534          | 546<br>546  | 550<br>551                 | 551<br>551                 | 546          | 550<br>549           | 548<br>548   | 553<br>554      | 555<br>555   | 553          | 552          | 553<br>553   | 550            | 549          | 549          | 547          |
| Temp                                    | 52           | 547             | 548<br>48    | 547            | 546                | 544            | 534<br>47   | 44. 5        |              | 43          | 42                         | 41. 5                      | 41           | 41                   | 41           | 41              | 41           | 41.5         | 41.5         | 42. 3        | 44             | 46           | 549          | 517          |
| 1107 7 5                                | 545          | 545             | 544          | 546            | 546                | 514            | 545         | 545          | 547          | 548         | 548                        | 547                        | 546          | 549                  | 557          | 554             | 553          | 554          | 554          | 553          | 552            | 552          | 551          | 559          |
| Temp                                    | 546          | 514             | 544          | 516            | 544<br>5 53.1      | 544<br>5 52.7  | 54.5        | 546          | 548<br>48    | 543<br>46   | 549<br>45                  | 547                        | 548<br>43, 5 | 549<br>42.5          | 557          | 554<br>42       | 554<br>41    | 554<br>41    | 554<br>41, 5 | 553<br>42    | 552 43. 5      | 552<br>45    | 551          | 550<br>£ 46  |
| ne 4 5                                  | 550          | 550             | 549          | 549            | 551                | 549            | 549         | 551          | 550          | 552         | 551                        | 552                        | 552          | 552                  | .553         | 552             | 553          | 553          | 554          | 5.53         | 553            | 553          | 552          | 551          |
| Temp                                    | 550          | 550<br>48       | 549<br>48    | 549            | 550                | 549            | 549         | 551          | 551<br>44    | 552<br>43   | 551                        | 552<br>42                  | 552          | 553<br>41. 5         | 553<br>41    | 552<br>41       | 553          | 553<br>41    | 554          | 553<br>49    | 553            | (553         | 552          | 551<br>5 45. |
|   | 551          | 551             | 551          | 551            | 550                | :552           | 552         | 551          | 551          | 551         | 550                        | 549                        | 550          | 551                  | 555          | 555             | 561          | 563          | 562          | 560          | 551            | 547          | 549          | 351          |
|   | 551          | 551             | 551          | 551            | 550<br>45          | 551            | 552         | 551<br>45    | 552          | 552<br>43   | 549                        | 549<br>41                  | 550<br>40, 5 | 551                  | 554          | 557             | 561<br>40    | 563          | 562          | 560          | 551            | 547          | 549          | -0           |
| Temp                                    | 45, 5<br>553 | 552             | 46<br>552    | 553            | 551                | 550            | 549         | 546          | 544          | 545         | 547                        | 555                        | 558          | 559                  | 558          | ::64            | 561          | 566          | 567          | 566          | 562            | 554          | 556          | 558          |
| ug. o                                   | 553          | 552             | 553          | :553           | 552                | 551            | 519         | 546          | 544          | 545         | 548                        | 555                        | 558          | 559                  | 558          | 563             | 561          | 566          | 567          | 566          | 561            | 554          | 556          | 3.74         |
| Temp                                    | 557          | 556             | 556          | 555            | .553               | 43. 5          | 554<br>554  | 551          | 42.5         | 553         | 554                        | 554                        | 40. 5<br>553 | 40<br>557            | 558          | 40, 5           | 562          | 40<br>559    | 40<br>557    | 556          | 554            | 553          | 553          | 554          |
| ug. 7 3                                 | 556          | 556             | 556          | 555            | 553                | -553           | 553         | 551          | 553          | 554         | 554                        | 554                        | 553          | 557                  | 558          | 560             | 504          | 559          | 558          | 556          |                | 553          | 553          | 51           |
| Temp                                    | 43<br>553    | 43<br>553       | 551          | 43<br>549      | 548                | 547            | 43<br>548   | 546          | 42<br>545    | 546         | 548                        | 548                        | 550          | 40<br>549            | 40<br>551    | 40<br>554       | 553          | 519          | 549          | 547          | 43<br>546      | 544          | 541          | 511          |
| 17210 5                                 | 553          | 553             | 551          | 549            | 518                | 517            | 548         | 546          | 545          | 548         | 518                        | 548                        | 550          | 549                  | 551          | 555             | 553          | 550          | -548         | 547          | 546            | 514          | 541          | 512          |
| emp                                     | 45<br>540    | 45, 5           | 48           | 1 48, 5<br>539 | 538                | 52<br>538      | 52          | 51           | 50           | 49<br>537   | 538                        | 539                        | 49<br>542    | 49                   | 49<br>548    | 49. 5<br>548    | 49.5<br>546  | 49. 5<br>546 | 50, 5        | 543          | . 53. a<br>542 | 54. (        | 539          | 59           |
|   | 540          |                 | 540          | 530            | 538                | 537            | 535         | 537          | 536<br>537   | 537         | 538                        | 539                        | 542          | 545                  | 547          | 548             |              | 547          | 544          | 543          | 513            | 542          | 538          | 5.17         |
| 'emp                                    | 60, 5        | 63. 5           | 62           | 62. 5          |                    | 64             | 63. 7       | 62, 3        | 60           | 58          | 57                         | 55                         | 53           | 52                   | 51           | 50. 5           | 51.5         | 52           | 54           | 55           | 56. 5          | 59           | , 61         | 62           |
|   | 537<br>537   |                 | 535<br>536   | 536            | 536<br>536         | 536<br>535     | 535<br>536  | 537          | 539          | 540<br>540  | 542<br>542                 | 544<br>544                 | 544          | 547                  | 547<br>547   | 548<br>548      | 548          | 548          | 547          | 546<br>546   | 546<br>546     | 544          | 543<br>543   | 542          |
| emp                                     | 63.5         | 64.5            | 65           | 64             | 63. 3              | 63, 6          | 62          | 59           | 57           | 55          | 53                         | 52                         | 50. 5        |                      | 48.5         | 48.5            | 48           | 47.5         |              | 51           | 52             | 53           | 55           | .71          |
|   |              |                 | 544          | 547            | 547<br>545         | 548            | 547         | 538          | 531          | 540         | 544<br>544                 | 548<br>549                 | 547          | 550<br>550           | 551          | 553<br>553      | 554          | 555          | 555          | 553          | 551            | 550          | 547          | 517          |
| 'emp                                    | 56           | 54.5            | 54           | 53             | 53                 | 52. 5          | 51          | 50           | 50           | 49          | 48                         | 47. 5                      | 48           | 47.5                 | 47           | 47              | 46.5         | 46, 5        | 47.5         | 47.5         | 48             | 49.          | 50           | 5,           |
|   |              |                 | 545          | 544            | 544                | 546            | 544         | 543<br>544   | 544          | 545         | 545                        | 545                        | 544          | 545                  | 546          | 549<br>549      | 549<br>549   | 553<br>553   | 553          | 549          | 543            | 543          | 543          | 513          |
| emp                                     | 55. 5        | 55. 5           | 56. 5        | 56             | 543                | 545            |             | 54           | 544          | 53          | 53                         | 52. 5                      |              | 51.5                 |              | 50. 5           |              | 49.5         | 49           | 49           | 50             | 52           | 54.5         | 513          |
| . 12 5                                  |              |                 | 543          | 543            | 544                | -545           | 545         | 545<br>547   | 547          | 547         | 547                        | 547                        | 548          | 548                  | 549          | 551<br>551      | 554          | 551          | 549          | 549<br>548   | 547            | 545          | 546          | 540          |
| emp                                     | 543          | 543             | 543<br>56. 5 | 543<br>54. 5   | 545                | 544            | 545         | 50           | 517          | 547         | 49                         | 547<br>  48. 5             | 518<br>48    | 548                  | 549          | 47              | 554<br>46. 5 | 552          | -549<br>1-47 | 47           | 47             | 47. 5        | 548          | 54           |
| g. 14 }                                 | 549          |                 |              | 547            | 547                | 54H            | 548         | 548          | 545          | 546         | 543                        | 545                        | 548          | 553                  | 553          | 335             | 557          | 550          | 553          | 552          | 550            | 549          | .547         | 54.4         |
|   | 49. 5        | 549<br>49, 5    | 547          | 546            | 547                | 548            | 548         | 540<br>49    | 545          | 546         | 548<br>44. 5               | 545<br>45                  | 548          | 553                  | 553<br>44    | 555<br>44       | 557<br>43    | 556<br>43    | 552          | 552<br>44    | 550            | 548          | 547          | 516          |
| r 15 5                                  |              | 546             | 545          | 544            | 541                | 546            | 545         | 544          | 545          | 546         | 545                        | 545                        | 545          | 549                  | 547          | 549             | 549          | 548          | 547          | 543          | 543            | 542          | 541          | 539          |
| ( '                                     | 49           | 52.5            | 65           | 53, 5          | 56.5               | 53             | 56          | 56           | 54           | 52          | 53                         | 53                         | 53           | 50                   | 51           | 49.5            | 50           | 50           | 52           | 54           | 57             | 58           | 59           | 60           |
|   | 537          | 537             | 536          | 538            | 530                | 538            | 540         | 539          | 540          | 542         | 543                        | 544                        | 544          | 545                  | 546          | 547             | 548          | 548          | 548          | 548          | 548            | 549          | 549          | 550          |
|   | 69. 5        | 536<br>- 61, 51 | 536<br>-60 - | 538<br>60. 5   | 539                | 538            | 540         | 540          | 540          | 542         | 548<br>54                  | 544                        | 544          | 545                  | 546          | 547             | 548          | 549          | 549<br>49.5  | 548<br>49. 5 | 548            | 349<br>49    | 549          | 150          |
|   |              |                 |              | 550<br>550     | 550                | 549            | 549         | 550          | 550          | 551         | 552                        | 53<br>551                  | 52<br>553    | 553                  | 554          | 50. 5<br>555    | 556          | 49.5<br>554  | 554          | 355          | 556            | 555          | 553          | 352          |
|   |              |                 |              | 550            | 550                | 549<br>47.5    | 549         | 549          | 551          | 551         | 552                        | 551                        | 553          | 552                  | 554          | 556             | 555          | 554          | 554          | 555          | 556<br>41      | 556          | 553          | 552          |
|   |              |                 |              | 48<br>548      | 47. 5<br>547       | 547            | 547         | 547          | 45<br>548    | 44.5<br>531 | 44<br>544                  | 44<br>543                  | 550          | 44<br>560            | 43.5<br>564  | 43<br>564       | 42<br>562    | 561          | 40.5<br>571  | 40<br> 569   | 564            | 560          | 556          | 556          |
| 4.30 1 2                                | 52           |                 | 550 .        | 547 .          | .548               | 547            | 347         | 547          | 548          | 531         | 544                        | 544                        | 550          | 560                  | -564         | 564             | 562          | 562          | 571          | 569          | 564            | 560          | 557          | 556          |
|   |              |                 | 52           | 58<br>549      | 52. 5<br>549       | 52             | 51<br>556   | 50<br>556    | 48, 5<br>555 | 47<br>557   | 46<br>557                  | 45<br>558                  | 45<br>559    | 44.5<br>559          | : 44<br>5°9  | 560             | 42. 5<br>560 | 42. 5<br>560 | 42.5<br>560  | 42<br>558    | 42. 5<br>559   | 558          | 557          | 45<br>550    |
| 5 19                                    | 55           | 555             | 552          | 549            | 549                | 555            | 556         | 556          | 555          | 557         | 557                        | 558                        | 559          | 559                  | 559          | 561             | 560          | 560          | . 61         | 558          | 559            | 558          | 557          | 55(          |
|   | 48           |                 | 43           | 42. 5<br>553   | $\frac{41.5}{552}$ | 550            | 41<br>551   | 40, 5<br>553 | 553          | 39<br>552   | 38<br>550                  | 38<br>556                  | 38<br>557    | 37, 5<br>55 <b>9</b> | 37<br>559    | 37<br>559       | 36, 5<br>561 | 36. 5        | 37<br>560    | 37<br>560    | 39<br>559      | 40. 5<br>559 | 560          | 45<br>560    |
| $: 20 \begin{cases} 5 \\ 5 \end{cases}$ |              | 553             | 552          | 553            | 552                | 552            | 5.1         | 553          | 553          | 552         | 549                        | 556                        | 557          | 559                  | 559          | 559             | 561          | 560          | 560          | 560          | 360            | 560          | 561          | 560          |
|   |              |                 | 46, 5<br>561 | 46. 5<br>561   | 48<br>560          | 560            | 47          | 46<br>560    | 44           | 42          | 41                         | 40                         | 39. 5        |                      |              |                 | 38           | 36<br>564    | 36. 5        | 36           | 35. 5          | 36<br>560    | 36           | 36           |
|   |              |                 |              |                | 560                | 560            | .561<br>561 | 560          | 560<br>560   |             | 55 <b>6</b><br>55 <b>6</b> | 55 <b>7</b><br>55 <b>7</b> | 560<br>560   | 561<br>561           | 563<br>563   | 565<br>565      | 566<br>566   | 564          | 563<br>563   | 562<br>563   |                | 560          | 560          | 561<br>561   |
| mp                                      | 36           |                 | 36, 5        | 36, 5          |                    | 36, 5          | 36          | 36. 5        | 30.5         | 36, 5       | 36                         | 36                         | 36           | 35                   | 35, 5        | 35              | 34.5         | 34.5         | 34.5         |              | 34             | 34.7         | 35           | 33           |
|   |              |                 |              | 561<br>561     | 559<br>559         | 558<br>557     | 557         | 558<br>557   | 558<br>558   | 558<br>558  | 556<br>556                 |                            | 555<br>555   | 560<br>560           | 564<br>564   | 563             | 563<br>563   | 566<br>566   | 566<br>566   | 562          |                | 560          | 560          | 566          |
| mp                                      | 37           | 38              | 38           | 37. 5          | 39                 | 40             | 40          | 40           | 39           | 38          | 37                         | 36                         | 35, 5        | 34. 5                | 34           | 34              | 34           | 34           | 35           | 35           | 35, 5          | . 37         | 38           | 35           |
|   |              |                 |              |                | 558<br>550         | 558<br>558     | 558         | 554          | 556<br>556   |             |                            |                            |              | 562<br>562           | 560<br>560   | 562<br>561      | 566<br>567   | 561<br>560   | 557<br>537   | 562<br>562   | 558<br>558     | 558          | 555<br>556   | 5557         |
| mp                                      | 40 .         | 40.5            | 41           | 42             | 42                 | 41             | 41          | 40, 5        | 40           | 40          | 39                         | 39                         | 39           | 39                   | 39           | 39              | 39           | 39           | 40           | 40           | 41             | 41           | 42           | 4:           |
| . 24 8 2                                |              |                 |              |                | 554<br>554         | 554<br>554     | 537<br>538  | 539<br>539   | 538<br>538   | 536<br>536  |                            | 533<br>538                 | 537<br>536   | 538<br>538           | 537          |                 | 545          | 543<br>543   | 542          | 540<br>541   | 540            | 539<br>539   | 541          | 541          |
| этр                                     | 44           | 45              | 46           | 46             | 46                 | 45             | 45          | 44           | 44           | 44          |                            | 43                         | 43           | 42.5                 | 537<br>43    | 43              | 43           | 42.5         | 42           | 41.5         | 41             | 41           |              | 1 41         |
| emp 5<br>5.25 \{ 5                      | 42           | 143 .           | 543          | 144            | 543                | 544            | 544         | 544          | 543          | 541         | 542                        | 540                        | 543          | 547                  | 548          | 548             | 548          | 548          | 548          | 547          | 546            | 546          | 546          | . 1          |
| emp                                     | 42 :         | i43 :           | 10           | 40, 5          | 543<br>40          | 545<br>. 40, 5 | 545<br>40.5 | 544<br>40    | 543<br>39, 5 | 541<br>39   | 38                         | 37. 5                      | 543<br>37    | 547<br>36            | 348          | 548<br>36       | 548<br>35. 5 | 35. 5        | 548<br>35. 5 | 547<br>35. 5 | 546<br>35. 5   | 37           | 546<br>37, 5 | 5 38         |
| z. 26 } 5                               |              | 45 :            | 45           | 145            | 544                | 543            | 544         | 543          | 544          | 542         | 541                        | 537                        | 538          | 541                  | 540          | 541             | 542          | 540          | :40          | 541          | 543            | 512          | 542          | 543          |
| mp                                      | 46 :<br>40   |                 | 45 3         | 41             | 544<br>42          | 543            | 544<br>43   | 544<br>43    | 544<br>43    |             | 541<br>45                  | 537<br>46                  | 538<br>47    | 540<br>46.5          | 541<br>46. 5 |                 |              | 540          | 540          | 541<br>41.5  |                | 541          |              | 545          |
|   |              |                 |              |                |                    | 48<br>543      |             | 545          |              |             |                            |                            |              |                      |              |                 | 517          | 548          |              |              |                | 547          | 514          |              |
| 7. 27 } 5                               | 42 3         | 41              | 42           | 543            | 543                |                | 544         | 544 i        | 546          | 546         | 546                        | 545                        | 545 :        | 547                  | 547          | 547             |              | 548          |              | 546          | 547            | 547          | 544          | 1            |
|   | 44.5         | 44              | 44           | 43, 5          | 43                 | 43             | 43          | 41           | 40           | 39. 5       | 39                         | 39                         | 39           | 38. 5                | 37. 5        | 37.5            | 37           | 37           | 38           | 38           | : 38. 5        | 39. 5        | 41           | 1            |
| mp                                      |              |                 |              |                |                    |                |             |              |              |             |                            | -                          |              |                      |              |                 |              |              | -            |              |                |              |              |              |

One division of scale  $\simeq .0001948$  part of the vertical force. Monthly means: Temperature, 45°.5; magnetometer, 549.6

234

| 546 | 546 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549 | 549

Recapitulation of monthly mean values (inclusive of disturbances and uncorrected for changes of temperature and variations in scale value) of the hourly readings of the balance magnetometer, at Uglaamie, Alaska, 1882-'83.

| lettingen civil time   |                                  | Or                   | 1 <sup>h</sup>           | 2h               | 34               |                      | 4h                                     | 54      |                  | 65               | 7h  |
|--|----------------------------------|----------------------|--------------------------|------------------|------------------|----------------------|--|---------|------------------|------------------|---|
| rglaamie civil time  | ·····' Noon                      | +53m.6.              | 13h+-53m,6.              | 14h+53m,6.       | 15b + 53         | m.6. 16              | 3 <sup>b</sup> + 53 <sup>m</sup> .6. + | 17h+53n | .6. 18           | +54m.6.          | 19h+53m,6   |
| -  |                                  |                      |                          |                  |                  |                      |  |         | 1                |                  |   |
| 1882.  |                                  |                      | man o l                  |                  |                  |                      |  |         |                  |                  |   |
| September 12 to 30   |                                  | 517.3 ;<br>517.7     | 516.0<br>517.1           | 516. 6<br>17. 2  |                  | 16. 8 ±              | 514. 9<br>515. 3                       | 51:     | 3, 9             | 515, 1           | 514.<br>509.  |
| ovember  |                                  | 512.2                | 512.5                    | 511. 5           |                  | 19. 2                | 507. 0                                 | 506     |                  | 507. 2           | 504.  |
| becember   | *****                            | 523. 0               | 523. 2                   | 523. 3           |                  | 22.5                 | 521. 5                                 |         | 1. 2             | 521.9            | 519.  |
| 1880.  |                                  |                      |                          |                  |                  |                      |  |         |                  | 1                |   |
| Various.   |                                  | 511.5                | 512.7                    | 51. 5            | 51               | 13. 6                | 512.9                                  | 510     | 2. 7             | 511.7            | 511.  |
| chruary  |                                  | 503, 2               | 504.0                    | 500.0            |                  | 01.7                 | 502 0                                  | 500     |                  | 498, 9           | 408,  |
| areli  |                                  | 519, 5<br>5eg, 6     | 518, 3                   | 517. 6           |                  | 15. 3                | 515. 6                                 |         | 1. 0             | 512 4 505 3      | 507.  |
| pril   |                                  | 514.5                | 509, 4<br>514, 2         | 508, 9           |                  | 97. 6<br>14. 8       | 506. 7<br>514. 7                       |         | 5, 8<br>3, 5     | 513. 5           | 506.<br>512.  |
| (1))   |                                  | 525 4                | 528, 3                   | 528. 6           |                  | 28. 1                | 527. 3                                 | 52      | 7. 8             | 527. 1           | 524.  |
| nly  |                                  | 540.5                | 545, 9                   | 514.1            |                  | 12, 6                | 542.0                                  |         | 2.8              | 542.9%           | 543.  |
| menst 1 to 27, inclusive   |                                  | 549.0                | 548.1                    | 547. 7           | 54               | 17.5                 | 547. 3                                 | 54      | 7. 2             | 546. 3           | 546.  |
|  |                                  |                      |                          |                  |                  |                      | -                                      | -       |                  |                  |   |
| ottingen civil time  |                                  | qh I                 | g) i.                    | 165              | 116              |                      | Noon.                                  | 13h     |                  | 11"              | 15°   |
|  |                                  |                      |                          |                  |                  |                      |  |         |                  |                  |   |
| glaamie civil time   | 20 <sup>b</sup>                  | + 5315.0.            | 21 <sup>h</sup> 4 53m.6. | 22h + 53m,G.     | 23h : 53         | 3m,e*, ()            | )h+53m,6.                              | 15+53°  | n.6. 21          | -t 53m.6.        | 3h-1-53m,6.   |
| 1882.  |                                  |                      |                          |                  |                  |                      |  |         |                  |                  |   |
| ptember 12 to 58   |                                  | 513, 3               | 512.3<br>513.0           | 514, 0<br>517, 7 |                  | 15, 5<br>18, 6       | 519, 4<br>524, 0                       |         | 0. 7<br>6. 8     | 521. 2<br>528. 9 | 522.<br>529.  |
| o. mber  |                                  | 504.9                | 514. 9                   | 515. 2           |                  | 21. 7                | 524. 3                                 |         | 6.2              | 540 1            | 544.  |
| receibet   |                                  | 516, 2               | 517. 5                   | 520. 1           |                  | 20.4                 | 525, 2                                 |         | 7. 6             | 529, 6           | 500   |
| 1883.  |                                  |                      |                          |                  |                  |                      | 1                                      |         |                  | 1                |   |
| IDB B.A  |                                  | 510.6                | 509, 8                   | 509, 1           | - 50             | 08. 5                | 510.3                                  | 51      | 3, 0             | 517. 1           | 519.  |
| ebruary  |                                  | 446, 9               | 497. 6                   | 498, 2           |                  | 98 3                 | 501.6                                  |         | 5, 9 (           | 569. 4           | 511.  |
| Date la Constantination of the Constantinatio |                                  | 566, 4<br>566, 9     | 508, 0<br>507, 4         | 509, 9<br>509, 0 |                  | 14 4<br>10, 7        | 522.2                                  |         | 7. 8             | 530, 4<br>518, 3 | 532.<br>519   |
| Lay  |                                  | 511.8                | 512. 1                   | 513, 2           |                  | 14.8                 | 518.7                                  | 52      | 5.8              | 523.7            | 526   |
| Hilli  |                                  | 525.5                | 527.1                    | 529. 7           | 53               | 30, 6                | 532.8                                  | (1-)    | 4. ()            | 535. 7           | 537   |
| nly  |                                  | 546.4                | 542, 8<br>546, 9         | 544. 0           |                  | 46, 6                | 549, 5                                 |         | 0.5              | 552.7            | 553.  |
| august 1 to 27, inclusive  |                                  | .110. 4              | 540. 9                   | 547. 1           | 11-              | 48.4                 | 549, 1                                 | 0.0     | 1, 2 )           | 552, 2           | 554.  |
|  |                                  |                      | -                        |                  | -                |                      |  |         |                  |                  |   |
| Sttingen civil time  | 161                              | 175                  | 185                      | 19h              |                  | 20%                  | 21                                     | i       | 221              | 235              |   |
| glaamie civil time   | 4h.4 53m.6.                      | 5h p.53m,(           | G. <b>6</b> 54-535       | .6 7h : 53n      | 6. 85            | +-53m.6.             | 9h + 53m                               | 6. 10h  | 4.53m,6,         | 115 + 53m        | Mean<br>.6.   |
|  |                                  |                      |                          |                  |                  |                      |  |         |                  |                  |   |
| 1882.  |                                  |                      |                          |                  |                  |                      | i                                      |         |                  |                  | i.  |
| eptember 12 to 30  | 524, 0                           | 524.                 | 2 523                    | 2. 6 52          | D, G             | 517. 8               | 516                                    | . 9     | 516, 6           | 517              | . 0 517.  |
| h tober  | 529. 9                           | 529.                 | 5 523                    | 5, 6 ; 52        | 2, 8             | 524.7                | 520                                    | . 0 :   | 519, 0           | 518              | C5 520  |
| ovember  | 547. 2                           | 552.                 |                          |                  | 1. 9             | 536, 0               | 523                                    | 5.5     | 530, 5           | 515              | 8 1 522   |
| becember   | 529, 4                           | 530.                 | 4 52                     | 9, 3 52          | G. 1             | 523, 9               | 523                                    | . 1     | 521. 5           | 522              | 1.3 523.  |
| 1883   |                                  |                      |                          | 1                |                  |                      | 1                                      |         |                  |                  |   |
| anuary   | 519. 3                           | 518.                 |                          |                  | 6. 2             | 514. 4               | 511                                    |         | 510.2            | 510              |   |
| ebruary  | 514. 4                           | 533.                 |                          |                  | 2.3 1            | 507. 4               | 594                                    |         | 504, 5<br>519, 9 | [et]             | 2. 3   504<br>3. 9   520                                |
| pril   | 534. 7 ·<br>520. 5               | 534.<br>521.         |                          |                  | 8, 5 (<br>0, 6 ( | 523. <b>4</b> 518. 3 |  |         | 519. 9           |                  | $\begin{array}{ccc} 0.9 & 520 \\ 0.5 & 510 \end{array}$ |
| lay  | 526. 3                           | 525.                 | 6 523                    |                  | 0.5              | 517. 3               |  | . 6     | 514. 8           | 51               | 3.8 517   |
|  |                                  |                      |                          |                  |                  |                      |  |         | 528. 5           |                  | 3.0 j 531   |
| une  | 538, 8                           |                      |                          |                  | 5, 6 }           | 531. 9               |  |         |                  |                  |   |
| uie<br>uly<br>ugust 1 to 27, im lesive   | 538. 8 4<br>555. 5 †<br>554. 8 1 | 539,<br>556,<br>554, | 8 55                     | 6.7   55         | 5. 0<br>3. 0     | 551. 9<br>551. 9     | 550                                    | . 2 1   | 518. 2<br>549. 1 | 547              | 7 1 : 548<br>9 3 549                                    |

Solar diurnal variation of the vertical force (inclusive of disturbances). Expressed in scale divisions and uncorrected for changes of temperature, 1882-83.

|  |                    |                           |                         | geo or ee               |                                  | .,                       |                      |                         |           |
|--|--------------------|---------------------------|-------------------------|-------------------------|----------------------------------|--------------------------|----------------------|-------------------------|-----------|
| Göttingen civil time                                 |                    | $\theta_{\mu}$            | ih.                     | 2 <sup>b</sup>          | 85                               | 49                       | 5h                   | Qp.                     | 71        |
| Ugl- mic civil time                                  | 3                  | Toou 1 59m B              | 10h : 20m fl            | 1.4h : 52m /3           | 18h - 50m (I                     | - 16h s 59m 6            | . 17h i 52m d        | 18h + 53m.6.            | 100       |
| Ugi mie civii time                                   |                    | 10011 + 55**.0.           | 10"+00".0.              | 14"+ 00",0,             | 10"                              | 10" + 03".0.             | 17"+10",0,           | 10"- -00"-0,            | 1100 170  |
| 1882.  |                    |                           |                         |                         |                                  |                          |                      |                         |           |
| September  |                    | - 0.3                     | - 1. 0<br>- 2. 9        | - 1.0<br>- 2.8          | - 0.8<br>- 3.7                   | - 2.7<br>- 4.7<br>- 15.1 | - 8.7<br>- 6.3       | - 2.5<br>- 7.7<br>-15.5 | - I       |
| November   |                    | - 2.3<br>-10.5            | -10.2                   | - 2.8<br>-11.2          | 13 5                             | ~ 15 1                   | 15. 9                | -15.5                   | -15       |
| December   |                    | - 0.7                     | 0, 5                    | - 0.4                   | - 1.2                            | - 11.2                   | - 2.5                | - 1.8                   | - (       |
| January 1883.  |                    | - 17                      | - 0.5<br>- 0.3          | + 0.3                   | - F 0 1                          | - 0.3<br>- 2.3           | - 0.5                | - 1.5                   | 3         |
| February<br>March<br>April<br>May                    |                    | $-\frac{1}{0}\frac{1}{7}$ | - 1.9                   | - 1.5<br>2 6            | = 2.6<br>= 4.9                   | - 2.3                    | - 3. 9<br>- 6 2      | - 5.4                   | - 1.      |
| April  |                    | = 3.3<br>= 2.7            | - 3.5<br>- 3.0          |                         | - 5.3<br>- 2.4                   | - 6.2                    | = 7.1                | = 7.8<br>= 7.8<br>= 5.7 | 1         |
| nay  |                    | - 3 4                     | 3, 3                    | ~ 2.4                   | - 2.9                            | $=\frac{2.5}{3.7}$       | - 3.2                | - 1. 11                 |           |
| 4, 48t   |                    | - 1. 7<br>- 0. 6          | = 2.3<br>- 1.5          | 4.1<br>1.9              | - 5 6<br>- 1 8                   | - 8.2                    | 5.4<br>2.4           | = 3.3                   |           |
| April to September, inclusive                        | _                  | 2. 0                      | - 2.5                   | - 2.8                   | - 3.1                            | - 4.0                    | - 4.2                | 4.4                     |           |
| October to March, inclusive                          | _                  | - 2.8                     | - 2.7                   | - 3, 0                  | - 4.2                            | - 4.0                    | - 5,9                | - 0.0                   |           |
| Year   | _                  | - 2.4                     | - 2.6                   | - 2.9                   | - 3.7                            | - 4.4                    | - 5.1                | - 5.5                   |           |
|  |                    |                           |                         | 2.0                     |                                  |                          |                      |                         |           |
|  |                    |                           |                         |                         |                                  |                          |                      |                         |           |
| löttingen civil time                                 |                    | Nh.                       | gh.                     | 10h                     | 116                              | Noon.                    | 13                   | 14b                     | 15        |
| "glaamie civil time                                  |                    | 900 t 53m 6               | 91h53m.it.              | 99h ; 53m,6.            | 93h.i.53m.6.                     | 0h +53m.6.               | 1h.4-53m.6.          | 2h+53m,6.               | 35 t 53 m |
|  |                    |                           | 21   00 101             | 88   100                | 20 1                             | . ,                      |                      |                         |           |
| 1862.  |                    |                           | 1                       |                         |                                  |                          |                      |                         |           |
| September<br>Setober                                 |                    | - 4.3<br>- 8.6            | - 5.3<br>- 7.0<br>- 7.8 | - 2.6                   | - 2.1<br>- 1.4                   | + 1.8<br>+ 4.0           | + 3.1<br>+ 6.8       | + 3.6                   |           |
| (ovember   |                    | - 8.6<br>-17.8<br>- 7.5   | - 7.8<br>- 6.2          | - 2.3<br>- 7.5<br>- 3.6 | - 1. 0<br>- 3. 3                 | + 1.0<br>+ 1.5           | + 3.5                | +17.4<br>+ 5.9          | 1.2       |
| recember   |                    | - 7                       | 0. 2                    |                         | - 3. 11                          | - - 1. O                 | 7 0.0                | 7 0.0                   | 1         |
| 1883.<br>January                                     |                    | - 2.6<br>- 7.4            | - 3.4                   | 4.1                     | - 4.7                            | - 2.9                    | - 0.2                | + 4.2                   | +         |
| Schroury   |                    | 13.8                      | 6.7                     | - 6. 1<br>-10. 3        | - 6.0<br>- 5.8                   | - 2.7<br>+ 2.0<br>+ 0.4  | + 1.6                | + 5.1<br>+10.2          | +1        |
| April  |                    | - 6.0<br>- 5.1            | - 5.5<br>- 3.8<br>- 3.9 | - 3. 9<br>- 4. 0        | - 2.2<br>- 2.4                   | - 0.4<br>- 1.5           | + 2.9<br>+ 4.1       | + 5.4<br>+ 6.5          | T         |
| January (265). Schroury (44). April (44). June (45). |                    | - 5.5                     | — h. 9                  | - 1.3                   | 0.4                              | + 1.8                    | + 3.0                | - 4.7                   | +         |
| July   |                    | - 5. 0<br>- 3. 2          | $\frac{-5.4}{-2.7}$     | $\frac{4.2}{-2.5}$      | - 1.6<br>1.2                     | + 1.3<br>- 0.5           | + 2 3                | + 4.5                   | +         |
| April to September, Laclusive                        |                    | - 4.9                     | - 4.6                   | - 3.2                   | - 1.6                            | + 1.0                    | 4- 2.8               | 4.5                     |           |
| betober to March, inclasive                          |                    | - 9, 6                    | - 7.2                   | - 5.6                   | - 3.7                            | + 0.6                    | + 3.9                | -1- 8 6                 |           |
| Year   |                    | - 7.3                     | - 5, 9                  | - 4.4                   | - 2.7                            | 0.9                      | + 3, 4               | + 6.6                   |           |
| =  |                    |                           |                         |                         |                                  |                          | -                    |                         |           |
| löttingen civil timo                                 | 16h                | 17h                       | 18h                     | 19h                     | 20h                              | 21h                      | 22h                  | 23h                     | k or sea  |
| rattingen eivn timo                                  | 10                 | 11"                       | 10"                     | 10"                     | 20"                              | 41" ,                    | 22"                  | 20"                     | velue is  |
| 'glaamie civil time                                  | 4h+53m,6.          | 5h+50m.6.                 | 6h+53m,6.               | 7b.+.53m.6              | 8h.+53m,6,                       | 9h + 53m.6.              | 10h (-53m,6,         | $11^{h} + 58^{m}.6.$    | B1 (0) (  |
|  |                    |                           |                         | -                       |                                  |                          |                      |                         |           |
| September  | + 6.4              | + 6.6                     | + 4.4                   | + 2.4<br>+ 2.8          | + 0.2<br>+ 4.7                   | - 0 7                    | - 1,0                | - 0.6                   |           |
| Sovember   | + 9.6<br>+24.5     | + 9.5<br>+ 30.2           | +5.6 + 18.0             | +12.2 :                 | + 4.7  <br>+13.3                 | 0. 3<br>+ 0. 8           | - 1.0<br>± 7.8       | $\frac{-1.5}{-6.9}$     | 1         |
| becember   | + 5.7              | + 6.7                     | + 5.6                   | + 2.4                   | + 0 2                            | - 0.6                    | $^{+\ 7.8}_{-\ 2.2}$ | - 1.4                   | 1         |
| 1883,  |                    |                           |                         |                         |                                  |                          |                      |                         |           |
| annary Schmary March April 4 ov                      | - 6, 1<br>-, 10, 1 | + 5.3<br>+ 9.5            | i 4.7                   | + 3.0<br>- 8.0          | + 1.5<br>+ 0.1<br>+ 3.2<br>+ 5.4 | - 1.7                    | - 3.0<br>+ 0.2       | - 2. d<br>- 2. d        | 1         |
| datch  | + 14.5 1           | 14.1                      | 7 12. 2<br>8. 6         | 8.3<br>7.7              | 3 2                              | - 0.1<br>+ 3 6           | 0.3                  | - 1. d<br>+ 0 6         | !         |
| 111  | + 9.1              | . 5 1                     | , 6.5                   | 3.3                     | r 0, 3 :                         | - 1.6                    | 2 -: -               | - 3.4                   |           |
| uly  | + 7.8              | 1 8 6                     | 1 7.7                   | 4. 6<br>6. 8            | 4.7                              | - 1.4                    | 0.0                  | - 3.0<br>- 1.1          | 1         |
| Angust   | 5, 2               | 1.48                      | + 4 4                   | + 3.4                   | 1 1 6                            | : 0.3                    | - 0.5                | - 0.3                   | 1         |
| April to September, inclusive.                       | + 7.2              | 7. 6                      | 4 6.7                   | 4.4.7                   | + 2.2                            | ÷ 0.4                    | 0.7                  | - 1.3                   | 1         |
| etober to March, inclusive                           | a 11.8             | a 12.5                    | + 9.2                   | + 6 1                   | + 4.3                            | - 0.3                    | t- 0, <u>9</u>       | - 2.0                   | 1         |
| Year   | -y - 0, 5          | -(10.1                    | -1- 5, ()               | -1 5.4                  | + 3 2                            | + 0.1                    | - 0.2                | - 1.9                   | 1         |
|  |                    |                           |                         |                         | and senters                      |                          |                      |                         |           |

#### TEMPERATURE COEFFICIENT.

There were no special observations made to determine the effect of change of temperature on the magnetic moment of the balance magnet. The instrument was mechanically compensated as near as could be judged, and it only remains to determine the outstanding effect by means of the ordinary readings. There was no thermometer in the case of the balance magnetometer, but the same temperature record as was given for the bifilar magnetometer answers, since the readings of the two thermometers—one with the unifilar, the other with the bifilar—rarely differ more than half a degree and less than 0°.1 Fahr., in the monthly means. Applying the same process as in the case of the bifilar, we find—

|                | Change. | Change<br>corresponds<br>to | Consequent<br>change for<br>1° Fahr. |
|----------------|---------|-----------------------------|--------------------------------------|
| 1682.          | 1       |                             | 4                                    |
| October 14-15  | 11      | : 10.9                      | -1.0                                 |
| October 30-31  | 17      | + 13 I                      | -1.11                                |
| November 1-2   | 411     | -14.2                       | 1 0                                  |
| November 10-11 | +17     | - 8.0                       | 2.1                                  |
| November 23-24 | -10     | - 7.0                       | 11.4                                 |
| December 1-2   | -10.5   | - 7.3                       | 41.4                                 |
| December 14-15 | 4-9     | + 11.0                      | .0.8                                 |
| December 15-16 | -16     | -10.3                       | + 1.5                                |
| 1883.          |         |                             |                                      |
| January 1-2    | -13     | . 12. 7                     | -1.0                                 |
| January 22-23  | - 7     | + 7.5                       | -0.9                                 |
| February 9-10  | + 5     | - 7.4                       | -0.7                                 |
| March 1-2      |         | -12.7                       | 0.9                                  |
| March 11-12    | -10     | -1 6.8                      | -1.5                                 |
| March 24-25    | -34     | + 12. 2                     | -2.8                                 |
| April 19-20    | 11      | - 8.3                       | -1.3                                 |
| July 19-20     | + 9     | - 8 3                       | -t.1                                 |
| August 7-8     | - 7     | + 8.9                       | -0.8                                 |
| Mean           |         | ,                           | _0.66 - 0.2                          |

It is proposed to adopt for the present value the value— $0^{4}.7\pm0.2$ , which is equivalent to a decrease of  $0.7\times.0001584$  (0.7 time the average value for 1 division) or .000111 part of the vertical force for an increase of temperature of 1° Faur.

Solar-diurnal variation of the vertical force, inclusive of disturbances, and expressed in parts of the force; Uglaumie, 1882-'83.

| civil  | civil  | sun ator.  | ths, sun<br>equator.  |   | Temper  | ature di  | ference.   | Solar c  | liurnal vat  | intion.  |
|--|--|--|---|---|---|---|--|--|--|--|
| Göttingen<br>time.   | Uglaamie<br>time.  | Six months, sun<br>north of equator.   | Six months,<br>south of equ   | Whole year.   | t-35°.8<br>⊙ N.   | t−2°.1<br>⊙ S.  | t-19°.0<br>year.   | Half year,<br>sunnerth<br>of equa-   | Half year,<br>sun south<br>of equa-  | Whole year.  |
| 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>Noon<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22<br>23 | Noon   +53,6   14   +55,0   15   +55,0   16   +55,0   16   +55,0   17   +55,0   18   +55,0   19   +55,6   22   +55,6   22   +55,6   23   +53,6   1   +53,6   2   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   +53,6   1   1   1   +53,6   1   1   1   +53,6   1   1   1   1   1   1   1   1   1 | - 00035 - 00044 - 00040 - 00054 - 00074 - 00077 - 00077 - 00084 - 00086 - 00088 - 00088 - 00198 - 00199 - 00128 - 00128 - 00128 - 00138 - 00138 - 00138 - 00138 - 00138 - 00138 - 00138 - 00138 - 00148 - 00089 - 0008 | - 00039<br>- 00038<br>- 00042<br>- 00059<br>- 00089<br>- 00083<br>- 00123<br>- 00105<br>- 00105<br>- 00055<br>- 01165<br>- 01165<br>- 01165<br>- 01165<br>- 01165<br>- 00086<br>- 0008 | - 00038<br>- 00041<br>- 00046<br>- 00080<br>- 00080<br>- 00087<br>- 00117<br>- 00117<br>- 00133<br>- 00054<br>- 00133<br>- 00169<br>- 00126<br>- 00126<br>- 00126<br>- 00126<br>- 00083<br>- 00186<br>- 0018 | 0 +3.1 +3.6 +4.2 +3.8 +4.0 +3.4 +2.8 +1.6 +0.6 +0.4 +2.1 -2.2 +3.6 -3.6 -3.6 -3.4 +2.2 +2.6 +2.2 +2.2 +2.2 +2.2 +2.2 +2.2 | 0<br>+0.7<br>+1.3<br>+1.7<br>-1.8<br>+2.3<br>+2.1<br>+1.9<br>+1.5<br>-0.4<br>-1.0<br>-1.3<br>-1.2<br>-1.3<br>-1.4<br>-1.5<br>-1.4<br>-1.5<br>-1.3<br>-1.2<br>-1.3<br>-1.4<br>-1.0<br>-1.3<br>-1.2<br>-1.3<br>-1.3<br>-1.3<br>-1.3<br>-1.3<br>-1.3<br>-1.3<br>-1.3 | 0 +1.8 +2.4 +2.9 +2.8 +3.1 +2.7 +2.3 +1.5 +0.4 -1.2 -1.8 -2.0 -2.5 -2.6 -2.4 +1.5 -1.0 4 +0.4 +1.3 | - 00001 - 00:94 - 00:02 - 00012 - 0002 - 00036 - 00068 - 00079 - 00085 - 00071 - 00015 - 00010 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00085 - 00086 | - 00031<br>- 00023<br>- 00039<br>- 00039<br>- 00043<br>- 00069<br>- 00106<br>- 00105<br>- 00090<br>- 00133<br>- 00133<br>- 00140<br>- 00141<br>- 00141<br>- 00142<br>- 00051<br>- 00001<br>- 00001 | - 0001 - 0001 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 |

H. Ex. 44----67

in scale divisions

18h (-53m.6, 10 - 75-1)

- 6.6 - 5.5

146

F 53™. €.

+ 4.5 + 8.6 + 6.6

231

- 1.9

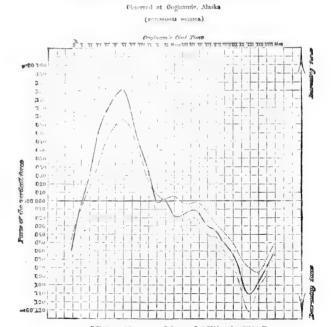
15

The numbers contained in the last three columns of this table were plotted on the accompanying diagram, which shows the vertical force to be in excess of its average value in the (local) morning hours maximum about 6 a. m., and in deficiency in the (local) afternoon hours minimum about 9 p. m. Compared with the variation of the vertical force at more southern stations, there appears to be a complete inversion of the hours of greater and of less intensity, which may be due to the action of disturbances; or, if regular, it may be somehow connected with the circumstance that Ughaumie is near the central zone of maximum auroral display, and a little to the north of it. We note the apparent greater range of the diurnal variation in the half year including the winter than in the other six months, which is also an anomalous phenomenon.

The breakage of the magnetic and electric equilibrium in this auroral zone, resulting in an outburst of disturbances, probably occurs more frequently in this beit than outside of it, and possibly sudden changes of temperature may be favorable circumstances of disruption. The belt of maximum auroral development seems to be subject to fluctuations in position, and in studying the supposed connection of auroras with terrestrial magnetism, attention should be directed to the direction in which the aurora appears at a station, i.e., at Ughamie, whether to the south or to the north of the zenith.

The increased dip and total intensity in the Uglaamie morning hours, as contrasted with the diminished dip and intensity of the total force in the afternoon, is corroborated by the observations made in the first year by means of the dip circle and deflecting weight.

SOLAR DICRNAL VARIATION OF THE MAGNETIC VERTICAL FORCE



Solar diurnal variations in the magnetic dip and in the total magnetic intensity.

These variations are readily obtained from the variations in the horizontal and in the vertical components of the force; if F = total force, H and V its horizontal and vertical components, then

on the accome in the (local) ours minimum stations, there ch may be due e circumstance he north of it, ing the winter

esulting in an of it, and pos. The belt of a studying the cted to the diouth or to the

sted with the observations

the vertical

onents, then

from the fundamental relations  $H=F\cos\theta$  and  $V=F\sin\theta$  we find by differentiation and elimination, the variation in the dip  $\Delta\theta$  and the variation in the total force (in parts of the force)  $\frac{\Delta F}{F}$ , viz:

Solar-diurnal variations in the magnetic dip and in the total magnetic intensity, inclusive of disturbances; annual mean values 1882-283.

| Uglaamie<br>civil time.   | ΔΠ<br>H  | V.  | Δθ   | F   | Uglaamie<br>civil time.  | ΔH<br>H  | $\frac{\Delta V}{V}$  | Δθ   | ΔF<br>F  |
|---|--|---|--|---|--|--|---|--|--|
| h. m.<br>0 53.6<br>1 53.6<br>2 53.6<br>3 53.6<br>1 53.6<br>5 53.6<br>6 53.6<br>6 53.6<br>8 53.6<br>9 53.6<br>10 53.6<br>11 53.6 | - 0e136<br>0e240<br>0e333<br>0e339<br>0e339<br>0e434<br>(e677<br>0e638<br>0e589<br>0e474<br>0e274<br>0e076 | + 00009<br>+ 00028<br>- 00076<br>- 00104<br>- 00121<br>- 00132<br>- 00107<br>- 00068<br>+ 00039<br>- 00006<br>+ 00001 | +0.65<br>+1.41<br>+2.39<br>+2.51<br>+2.82<br>+3.61<br>+3.78<br>+3.34<br>+2.61<br>+1.38<br>+0.79<br>-0.56 | 00012<br>+- 00021<br>+- 00005<br>+- 00008<br>+- 00108<br>+- 00116<br>+- 00011<br>+- 00027<br>00008<br>00014 | A. m.<br>Noon 53.6<br>13 +53.6<br>14 +53.6<br>15 +53.6<br>16 +53.6<br>17 +53.6<br>18 +53.6<br>19 +53.6<br>20 +53.6<br>21 +53.6<br>22 +53.6<br>23 +53.5 | +, 02214<br>, 00276<br>, 00346<br>, 00488<br>, 00503<br>, 00601<br>, 00601<br>, 00360<br>, 00250<br>+, 00022 | 80018<br>00014<br>00014<br>00027<br>00035<br>00050<br>00050<br>00111<br>00090<br>00111<br>00092 | -1. 18<br>-1. 48<br>-1. 83<br>-2. 02<br>-3. 20<br>-3. 25<br>-3. 37<br>-2. 93<br>-2. 40<br>-1. 77<br>-0. 53<br>+0. 19 | 00013<br>. 00008<br>. 00000<br>. 00015<br>. 00021<br>. 00047<br>. 00077<br>. 00101<br>. 00080<br>. 00064 |

In presenting the foregoing results of the three variation instruments I had two objects in view, viz, to be in a position to form a close estimate of the character and value of the whole series of observations preparatory to their full analysis and discussion, and, secondly, to give at once, but preliminarily, such leading results as could be deduced without waiting for the publication of the results of the conference for the uniform treatment of the magnetic work at the international Polar stations. What has been presented will, in general, enable the reader to form a judgment of the magnetic outfit of the Ughamie station, and of the value of the work done.

As has been already pointed out, there were no well-adapted magnetic variation instruments available in the first year; the range of the collimator scale was very limited, and the declinometer had frequently to be turned in azimuth in order to secure readings on days of disturbance; besides, the great changes in the torsion of the suspension renders it impossible to produce a uniform series at the respect to a fixed direction. The record of the biflar magnetometer has not yet been sufficiently examined to form an opinion as to its value, and at present I am still waiting for notes bearing on the edjustment and scale value of the instrument.\* There was then no vertical force magnetometer, but hourly observations were made with a dipping needle deflected by a constant weight; corresponding values for the true dip or deflections by the same needle were only made on two or three days each month, so that the value of this series, as a differential measure of the total force, may be regarded as small. It has, however, enabled me independently to verify the fact brought out by the balance magnetometer of the greater total intensity during the morning than in the afternoon hours. There is no record of the effect of temperature changes on the angle of deflection of the loaded needle.

In the year 1881-'82 there were but few stations with which to compare results, and to publish the above-mentioned records in extenso would seem to me an expenditure of time and labor hardly to be recommended, and probably not warranted by the meager results the series may be capable of yielding. If this early record is to be published at all I would propose to set down the mean of the 10 readings (5 with scale extreme left and 5 with scale extreme right) for each instrument, viz. the declinometer and bifilar, and the mean of the 10 readings of the dipping needle (5 for south and 5 for north end); for each observing hour and during term days it would suffice to give only the mean of the two extreme scale readings. But on these and other points the result of the deliberations at Vienna may be awaited.

I conclude this report with a table of frequency of the aurora as seen and recorded in connection with the magnetic work at Ughamie.

<sup>&</sup>quot;No further information could be obtained. May, 177 a

Table of frequency of the aurora as observed at Uglaamie, Alaska, between October, 1881, and August, 1883.

{The hours are local mean time hours at Ughamie, and the numbers indicate the number of days in each month when autoris were seen at each of the hours indicated: Observations began October 17, 1881; end, August 27, 1883. The presence or absence of an aurors was noted a few minutes before each full hour.}

|  | 04  | 11                      | 3,      | gh  | 41  | 8h  | 61   | 70  | gh   | 84   | 10h                                     | 111                        | Song.           | 135                                     | 14h                                     | 154                 | 161                                     | 17h  | 150  | 10%                                       | 30  | 31   | 1921   | 251  | Total nam-<br>ber of hours.                                     |
|--|---|-------------------------|---------|---|---|---|--|---|--|--|---|----------------------------|-----------------|---|---|---------------------|---|--|--|---|---|--|--|--|---|
| 1881. September  | 2<br>13<br>17   | 2<br>15<br>10           | 15      | 2<br>13<br>17   | 1<br>14<br>14   | 0<br>12<br>14   | 0<br>5<br>9                                | 0<br>8<br>7   | 0<br>2<br>8                                    | 0 0  | 0 0                                     | 0 0                        | 8<br>6<br>0     | 0 0                                     | 0 0                                     | 0 1 0               | 0<br>2<br>1                             | 0 2 3  | 1<br>4<br>17   | 1<br>6<br>12                              | 1 0   | 19<br>19<br>15                                     | 3<br>14<br>15  | 12<br>13   | 21<br>154<br>207  |
| February   | 11<br>17<br>17<br>7<br>0<br>0<br>0<br>0<br>2<br>7<br>14<br>24 | 0                       | 0 0 2 6 | 9<br>12<br>10<br>0<br>0<br>0<br>0<br>0<br>0<br>12<br>24 | 7<br>14<br>3<br>0<br>0<br>0<br>0<br>0<br>0<br>7<br>12 | 3<br>11<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>12<br>21 | 1<br>0<br>0<br>0<br>0<br>0<br>1<br>1<br>11 | 2<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>9 | 2<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 1<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 0 | 0 0 0 0 0 0 0 0 0          | 0 0 0 0 0 0 0 0 | 0 | 0 | 0 0 0 0 0 0 0 0 0 0 | 0 | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>4 | 8<br>6<br>0<br>0<br>0<br>0<br>0<br>0<br>2<br>5<br>13 | 7<br>9<br>0<br>0<br>0<br>0<br>0<br>0<br>7 | 9<br>16<br>2<br>0<br>0<br>0<br>0<br>0<br>1<br>8<br>12<br>19 | 11<br>13<br>6<br>0<br>0<br>0<br>0<br>0<br>12<br>24 | 10<br>17<br>17<br>1<br>0<br>0<br>0<br>1<br>5<br>10<br>16<br>25 | 10<br>20<br>21<br>8<br>0<br>0<br>0<br>7<br>9<br>19<br>25 | 123<br>163<br>167<br>21<br>60<br>0<br>0<br>0<br>0<br>173<br>173 |
| January February Match April May June June July August | 0<br>0<br>0<br>0  | 12<br>18<br>5<br>0<br>0 |         | 20<br>18<br>18<br>0<br>0<br>0<br>0                      | 19<br>14<br>15<br>0<br>0<br>0<br>0                    | 10<br>13<br>5<br>0<br>0<br>0<br>0                           | 17<br>12<br>1<br>0<br>0<br>0<br>0          | 18<br>3<br>0<br>0<br>0<br>0<br>0                    | 12<br>1<br>0<br>0<br>0<br>0<br>0               | 2<br>0<br>0<br>0<br>0<br>0                     | 0<br>0<br>0<br>0<br>0<br>0              | 0<br>0<br>0<br>0<br>0<br>0 | 0 0 0 0 0       | 0 0 0 0 0 0 0                           | 0<br>9<br>5<br>0                        | 0 0 0 0 0 0 0 0 0   | 0 0 0 0 0 0 0                           | 10<br>0<br>0<br>0<br>0<br>0                    | 0 0 0 0  | 11<br>8<br>7<br>0<br>0<br>0<br>0          | 17<br>11<br>14<br>0<br>0<br>0<br>0                          | 20<br>  12<br>  18<br>  3<br>  0<br>  0<br>  0     | 11<br>21<br>3<br>0<br>0  | 21<br>15<br>20<br>7<br>6<br>0<br>0                       | 283<br>159<br>177<br>27<br>0<br>0                               |
| Sums: October, 1881,<br>to August, 1882; 10½<br>months | -   |                         | -       | 63  | 53<br>  | 40  | 16   | 12  | 28   | 5  | 0                                       | 0                          | 0               | 0                                       | 0                                       | 1 0                 | 3                                       | 6  | 36   | 85  | 51  | 60   | . 77   | 114  | 708   |

The total number of days when auroras were visible in the first  $10\frac{1}{2}$  months (1881-'82), was 145, hence the average duration,  $5\frac{1}{2}$  hours nearly: total number of days when auroras were seen in the year ending August, 1883, was 169, hence the average duration,  $7\frac{1}{4}$  hours nearly.

In the tabulation and preparation of the manuscript record for the printer I had the assistance of Sergeant J. E. Maxfield and Private G. W. Knopf, who performed their task with much zeal and commendable industry; they have also prepared a complete duplicate of the records of the report.

#### PART IV.—SEMI-MONTHLY TERM-DAYAND TERM-HOUROBSERVATIONS.

OBSERVATIONS OF THE VARIATION IN DECLINATION, IN HORIZONTAL AND IN VERTICAL FORCE, READINGS OF THE DECLINOMETER ON TERM DAYS AT UGLAAMIE, ALASKA, SEPTEMBER 15, 1882, TO AUGUST 15, 1883.

[For scale values and other information see preceding part, III. Göttingen time is employed.]

Term-day readings of the Brooke declinometer, September 15, 1882.

|     |      |     |       |     |     |     |     |       |     | 1   |     |     |      |     | 1   | 1   |     |     |     |     |     |              |       |      |
|-----|------|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|--------------|-------|------|
|     | 0h   | 1h  | 2h    | 3h  | 4h  | 5h  | 6h  | 7h    | Sh  | 9h  | 10h | 11h | Noun | 13h | 14h | 15h | 16h | 17h | 18h | 19h | 20h | $20^{\circ}$ | 22h   | 23h  |
|     |      |     |       |     |     |     |     |       |     |     |     |     |      |     |     |     |     |     |     |     | 1   |              |       |      |
| 0m  | 524  | 525 | 519   | 526 | 521 | 517 | 522 | 537   | 563 | 578 | 510 | 538 | 531  | 520 | 547 | 550 | 551 | 541 | 542 | 541 | 541 | 547          | 543   | 532  |
| 5   | 528  | 523 | 524   | 513 | 521 | 523 | 517 | 536   | 561 | 594 | 518 | 544 | 572  | 519 | 541 | 543 | 551 | 535 | 544 | 543 | 541 | 54.3         | 542   | 526  |
| 10  | 5.19 | 524 | 516   | 523 | 523 | 528 | 519 | 531   | 533 |     | 519 |     | 538  |     |     | 546 |     | 530 |     | 544 |     | 542          |       | 526  |
| 15  | 531  | 536 | 520   | 523 | 523 | 531 | 524 | 532   | 519 |     |     |     | 578  |     |     | 546 | 547 | 537 | 545 | 543 | 539 | 543          | 541   | 524  |
| 20  | 534  | 523 | 500   |     |     |     |     | 535   | 504 |     |     |     | 574  |     |     | 545 |     | 539 |     |     | 545 | 542          |       | 524  |
| 25  | 531  | 527 | 511   | 524 | 526 | 528 | 524 | 528   | 512 | 538 | 510 | 535 | 531  | 502 | 552 | 545 | 548 | 540 |     | 539 | 539 | 544          | 526   | 528  |
| 80  | 520  | 519 | 512 : |     | 527 |     |     |       |     |     | 496 |     |      | 529 |     |     | 544 | 540 |     | 530 |     | 543          |       | 528  |
| 35  |      | 520 |       |     | 525 |     |     |       |     |     |     |     | 547  |     |     |     |     | 541 |     | 538 | 544 | 543          |       | 5.31 |
| 40  | 520  |     |       |     |     |     |     | 523   |     |     |     |     | 515  |     | 550 |     | 548 |     | 543 | 537 |     | 543          |       | 532  |
| 45  | 515  |     |       |     |     |     |     | . 519 |     |     |     |     | 538  |     | 544 |     | 548 |     | 543 | 5.6 | 517 |              | 5.34  | 532  |
| 50  | 524  | 531 |       |     |     |     |     | 535   |     |     |     |     |      |     |     |     |     |     |     | 537 |     | 545          |       | 532  |
| \$5 | 527  | 513 | 511.  | 523 | 513 | 526 | 540 | 562   | 560 | 531 | 535 | 476 | 535  | 523 | 547 | 556 | 540 | 541 | 539 | 537 | 547 | 541          | 536 ; | 534  |
|     |      |     |       |     |     |     |     |       |     |     |     |     |      |     |     |     |     |     |     |     |     |              | . 1   |      |

Term-day readings of the Brooke declinometer, October 1, 1882.

August, 1883.

4-'82), was were seen assistance the zeal and the report.

VTIONS.

AL FORCE,
ER 15, 1882,

215 226 23h

|   | 00  | 1 <sup>h</sup>   | 94   | 3h  | 4h  | 80   | 62   | Th.  | 81   | 94   | 104  | 111  | #eos.   | 184  | 161  | 184  | 161  | 171   | 150   | 101   | 30,  | 314  | 33+  | 981  |
|---|---|--|--|---|---|--|--|--|--|--|--|--|---|--|--|--|--|---|---|---|--|--|--|--|
| 6m 5 10 15 20 25 30 35 40 45 50 55 55               | 508<br>510<br>519<br>519<br>510<br>515<br>515<br>514<br>513<br>515                      | 518<br>518<br>516<br>516<br>517<br>518<br>518<br>518<br>518<br>518               | 520<br>521<br>521<br>521<br>521<br>518<br>518<br>518<br>516<br>517<br>518<br>520 | 519<br>529<br>529<br>521<br>520<br>520<br>520<br>520<br>521<br>521<br>520<br>521    | 522<br>523<br>520<br>517<br>514<br>516<br>521<br>512<br>516<br>517<br>519               | 519<br>520<br>520<br>519<br>518<br>518<br>516<br>518<br>518<br>518               | 519<br>520<br>520<br>522<br>523<br>524<br>523<br>523<br>523<br>523<br>523        | 823<br>828<br>822<br>822<br>823<br>823<br>823<br>822<br>822<br>822               | 592<br>522<br>515<br>521<br>518<br>520<br>520<br>521<br>521<br>522<br>522        | 821<br>821<br>821<br>821<br>821<br>821<br>820<br>820<br>810<br>818               | 519<br>515<br>515<br>516<br>512<br>517<br>514<br>511<br>522<br>525               | 514<br>499<br>490<br>494<br>518<br>488<br>513<br>490<br>498<br>517<br>538<br>525 | 523<br>524<br>531<br>539<br>528<br>515<br>524<br>527<br>527<br>525<br>525   | 831<br>531<br>529<br>526<br>536<br>527<br>525<br>535<br>527<br>524<br>520<br>530 | 526<br>527<br>522<br>530<br>531<br>520<br>530<br>527<br>528<br>522<br>522<br>522 | 523<br>522<br>532<br>536<br>638<br>649<br>557<br>553<br>548<br>568<br>541<br>540 | 546<br>545<br>538<br>541<br>541<br>543<br>543<br>543<br>546<br>546<br>546        | 549<br>552<br>553<br>550<br>549<br>542<br>539<br>539<br>537<br>537<br>537<br>530<br>525 | 522<br>528<br>530<br>531<br>531<br>531<br>532<br>531<br>530<br>530<br>520<br>5.0<br>541 | 529<br>531<br>532<br>532<br>531<br>530<br>530<br>531<br>529<br>530<br>532         | 532<br>527<br>527<br>527<br>527<br>527<br>527<br>528<br>528<br>528<br>526<br>526<br>520<br>526 | 624<br>527<br>528<br>527<br>528<br>520<br>530<br>528<br>526<br>525<br>524<br>524 | 524<br>524<br>523<br>523<br>521<br>523<br>524<br>524<br>524<br>526<br>524<br>526   | 527<br>523<br>523<br>518<br>518<br>518<br>517<br>516<br>519<br>518<br>520  |
|   |   |  |  | Tern  | r da  | y re   | adin   | gs o   | f the  | e Br   | ooke   | dec  | lino  | met  | er, C  | etol   | ier 1  | 15, 1   | 882   |   |  |  |  |  |
| 0m  | 512<br>512<br>510<br>513<br>520<br>508<br>510<br>510<br>510<br>510<br>510               | 809<br>507<br>508<br>500<br>512<br>500<br>510<br>511<br>510<br>510               | 510<br>502<br>507<br>499<br>511<br>506<br>510<br>505<br>511<br>519<br>520<br>520 | 506<br>508<br>512<br>515<br>484<br>529<br>500<br>485<br>480<br>486<br>488           | 500<br>515<br>519<br>512<br>510<br>510<br>510<br>505<br>500<br>501<br>517               | 512<br>522<br>516<br>523<br>528<br>535<br>538<br>540<br>533<br>535<br>535<br>535 | 528<br>525<br>528<br>531<br>532<br>524<br>521<br>520<br>514<br>508<br>505        | 495<br>500<br>492<br>493<br>516<br>578<br>664<br>562<br>530<br>493<br>503<br>4e3 | 580<br>423<br>460<br>410<br>505<br>499<br>476<br>510<br>550<br>505<br>532<br>510 | 532<br>510<br>512<br>493<br>484<br>480<br>482<br>493<br>475<br>465<br>401<br>525 | 469<br>471<br>522<br>528<br>514<br>485<br>482<br>474<br>496<br>500<br>481<br>495 | 500<br>495<br>521<br>488<br>520<br>450<br>487<br>496<br>521<br>453<br>400<br>484 | 518<br>533<br>490<br>515<br>555<br>545<br>560<br>530<br>531<br>534          | 550<br>451<br>569<br>499<br>544<br>510<br>473<br>482<br>550<br>553<br>537<br>503 | 529<br>516<br>556<br>570<br>570<br>519<br>552<br>550<br>572<br>550<br>581<br>465 | 425<br>805<br>881<br>555<br>692<br>587<br>560<br>533<br>506<br>522<br>535<br>652 | 529<br>527<br>536<br>534<br>543<br>563<br>568<br>569<br>572<br>570<br>591        | 534<br>572<br>569<br>510<br>480<br>592<br>516<br>503<br>517<br>5 8<br>551<br>490        | 500<br>520<br>520<br>534<br>539<br>546<br>525<br>526<br>519<br>514<br>511               | 522<br>530<br>519<br>505<br>192<br>500<br>495<br>496<br>496<br>49.5<br>505<br>501 | 500<br>504<br>506<br>515<br>514<br>510<br>517<br>530<br>520<br>517<br>516<br>508               | 506<br>498<br>510<br>512<br>509<br>519<br>515<br>500<br>510<br>518<br>504        | 500<br>512<br>511<br>510<br>511<br>510<br>513<br>510<br>511<br>511<br>515<br>504   | 51a<br>520<br>519<br>515<br>499<br>503<br>500<br>499<br>408<br>502<br>510  |
|   | and this  |  | 7  | l'erm   | -daz  | rea  | din  | (18 0)   | f the  | Br   | ooke   | dec  | lino  | nete   | r, N   | orei   | nber   | ٠1,   | 1882  | :.<br>  |  |  |  |  |
| 0m 5 10 10 15 20 25 35 40 45 55 55                  | 501<br>508<br>517<br>520<br>513<br>517<br>510<br>517<br>517<br>517<br>518<br>518<br>518 | 517<br>510<br>508<br>515<br>515<br>518<br>518<br>522<br>507<br>500<br>518        | 524<br>525<br>523<br>522<br>522<br>526<br>524<br>524<br>523<br>519<br>524        | 525<br>525<br>525<br>526<br>526<br>526<br>520<br>520<br>520<br>520<br>520<br>520    | 518<br>520<br>521<br>523<br>526<br>526<br>523<br>518<br>518<br>518<br>525<br>525<br>522 | 524<br>523<br>525<br>523<br>524<br>525<br>525<br>525<br>522<br>522<br>528<br>520 | 522<br>527<br>522<br>520<br>520<br>521<br>520<br>524<br>527<br>520<br>519<br>520 | 530<br>520<br>520<br>520<br>520<br>518<br>518<br>520<br>520<br>525<br>525<br>523 | 525<br>528<br>527<br>532<br>526<br>531<br>522<br>520<br>518<br>520<br>518        | 519<br>517<br>520<br>522<br>522<br>518<br>521<br>517<br>518<br>526<br>519<br>521 | 559<br>568<br>552<br>465<br>483<br>522<br>445<br>423<br>432<br>415<br>495<br>478 | 475<br>511<br>582<br>577<br>542<br>481<br>492<br>502<br>530<br>537<br>531<br>495 | 518<br>520<br>532<br>535<br>513<br>509<br>525<br>514<br>508<br>520<br>530   | 532<br>535<br>540<br>531<br>533<br>532<br>534<br>542<br>538<br>540               | 537<br>545<br>543<br>564<br>570<br>586<br>503<br>529<br>540<br>525<br>550<br>542 | 534<br>535<br>550<br>668<br>610<br>570<br>542<br>544<br>560<br>472<br>548<br>588 | 501<br>578<br>569<br>542<br>526<br>524<br>529<br>528<br>527                      | 511<br>513<br>522<br>534<br>530<br>532<br>524<br>520<br>519<br>524<br>525               | 523<br>520<br>528<br>529<br>530<br>531<br>531<br>533<br>533<br>538<br>544               | 515<br>542<br>549<br>525<br>539<br>520<br>542<br>517<br>526<br>532<br>518         | 531<br>554<br>508<br>517<br>522<br>500<br>409<br>510<br>510<br>490                             | 500<br>506<br>515<br>519<br>512<br>505<br>500<br>499<br>503<br>501<br>500        | 502<br>454<br>498<br>498<br>496<br>197<br>496<br>493<br>198<br>495<br>509  | 498<br>504<br>500<br>500<br>500<br>500<br>500<br>504<br>502<br>498   |
|   |   |  | 7  | 'erm  | -day  | rea  | ding   | gs 0)  | the  | Bre  | ooke   | dec  | ino   | nete   | r, N   | over   | nber   | 15,   | 188   | 2.  | fan-   | ı  |  | -  |
| 0m 5<br>5 10<br>15 20<br>25 30<br>35 40<br>40 45 50 | 503<br>607<br>595<br>552<br>569<br>450<br>414<br>435<br>467<br>450<br>471<br>437        | 478<br>485<br>498<br>495<br>486<br>503<br>556<br>542<br>602<br>574<br>543<br>520 | 462<br>472<br>449<br>478<br>515<br>510<br>501<br>401<br>548<br>534<br>527        | 520<br>527<br>540<br>480<br>500<br>510<br>532<br>543<br>467<br>489<br>518<br>507    | 473<br>470<br>505<br>525<br>511<br>509<br>498<br>476<br>505<br>504<br>500<br>522        | 497<br>450<br>466<br>416<br>510<br>492<br>500<br>420<br>396<br>405<br>450        | 446<br>440<br>489<br>492<br>507<br>497<br>502<br>482<br>485<br>491<br>500<br>470 | 480<br>486<br>463<br>444<br>446<br>476<br>490<br>485<br>480<br>419<br>427        | 444<br>463<br>450<br>441<br>419<br>351<br>374<br>367<br>595<br>548<br>355<br>342 | 490<br>450<br>461<br>325<br>372<br>400<br>478<br>418<br>435<br>415<br>384<br>390 | 412<br>394<br>440<br>418<br>440<br>465<br>480<br>476<br>465<br>462<br>475        | 503<br>502<br>494<br>498<br>479<br>471<br>486<br>454<br>380<br>365<br>395<br>416 | 438<br>417<br>458<br>467<br>436<br>495<br>584<br>482<br>579<br>519<br>559   | 556<br>526<br>542<br>514<br>525<br>540<br>433<br>410<br>445<br>385<br>461<br>464 | 493<br>470<br>500<br>486<br>517<br>490<br>492<br>487<br>492<br>481               | 502<br>467<br>507<br>504<br>497<br>510<br>501<br>500<br>4×7<br>505<br>490        | 485<br>502<br>484<br>402<br>486<br>494<br>491<br>472<br>486<br>470<br>491        | 476<br>472<br>470<br>482<br>463<br>496<br>502<br>505<br>497<br>463<br>476<br>464        | 492<br>483<br>512<br>537<br>533<br>542<br>503<br>498<br>516<br>523                      | 528<br>540<br>540<br>540<br>540<br>529<br>533<br>490<br>491<br>400<br>492         | 500<br>507<br>506<br>500<br>490<br>491<br>490<br>495<br>495<br>486                             | 470 475 475 475 475 475 475 475 475 475 475                                      | 1-2-7-0<br>1-2-1<br>1-2-1<br>1-2-1<br>1-2-1<br>1-2-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3-1<br>1-3- | \$80<br>491<br>491<br>197<br>176<br>186<br>186<br>186<br>186   |
|   |   |  | 7  | erm   | -daį  | j rec  | din  | gs o   | f the  | Br   | ooke   | dec  | lino  | met  | cr, $A$  | )ece   | mbe  | r 1,  | 188   | 2.  |  |  |  |  |
| 0m  | 469<br>491<br>464<br>498<br>406<br>481<br>482<br>475<br>469<br>484<br>471               | 469<br>478<br>487<br>480<br>488<br>483<br>475<br>486<br>478<br>485<br>486        | 484<br>476<br>477<br>486<br>490<br>495<br>486<br>478<br>470<br>473<br>477        | 482<br>478<br>482<br>1 484<br>491<br>478<br>1 483<br>1 484<br>1 484<br>1 493<br>490 | 483<br>484<br>480<br>485<br>479<br>487<br>483<br>485<br>489<br>491<br>486               | 487<br>473<br>462<br>451<br>453<br>473<br>483<br>483<br>474<br>478<br>476<br>475 | 474<br>476<br>481<br>490<br>491<br>498<br>503<br>502<br>494<br>484<br>467        | 476<br>477<br>481<br>473<br>489<br>484<br>487<br>485<br>480<br>482               | 490<br>487<br>483<br>486<br>487<br>500<br>490<br>491<br>495<br>496<br>491        | 488<br>487<br>486<br>483<br>486<br>488<br>487<br>487<br>487<br>487<br>480        | 483<br>482<br>485<br>486<br>488<br>492<br>490<br>491<br>486<br>489<br>489        | 486<br>485<br>485<br>484<br>481<br>486<br>486<br>486<br>487<br>479               | 481<br>482<br>490<br>492<br>485<br>482<br>459<br>453<br>472<br>454<br>542   | 510<br>517<br>478<br>509<br>533<br>515<br>501<br>429<br>470<br>458<br>455<br>474 | 487<br>493<br>509<br>464<br>491<br>495<br>474<br>480<br>484<br>508<br>484<br>489 | 492<br>500<br>482<br>500<br>507<br>522<br>520<br>486<br>531<br>578<br>525<br>531 | 455<br>496<br>571<br>566<br>496<br>471<br>478<br>476<br>463<br>463<br>470<br>462 | 474<br>475<br>479<br>474<br>492<br>480<br>478<br>486<br>491<br>488<br>492               | 490<br>479<br>497<br>491<br>497<br>503<br>498<br>492<br>494<br>494<br>492<br>503        | 514<br>500<br>400<br>483<br>482<br>490<br>500<br>493<br>493<br>492<br>502         | 500<br>487<br>484<br>483<br>480<br>488<br>493<br>492<br>493<br>496                             | 495<br>502<br>504<br>506<br>515<br>512<br>504<br>493<br>495<br>495               | 198<br>198<br>198<br>5 61<br>199<br>188<br>183<br>183<br>183<br>183<br>183<br>183  | 503<br>51<br>494<br>500<br>513<br>501<br>485<br>490<br>510<br>510<br>510<br>510<br>510<br>510<br>510<br>510<br>510<br>51 |
|   |   |  | T  | erm   | -day  | rea  | ding   | js oj  | the  | Bre  | ooke   | dec  | ino   | nete   | r, I   | <br>Pecer  | uber   | 15,   | 188   | 2.  |  |  | -  |  |
| 0m  | 498<br>483<br>483<br>483<br>483<br>483<br>483<br>483<br>482<br>483<br>482<br>483<br>483 | 483<br>484<br>484<br>484<br>484<br>481<br>483<br>484<br>483                      | 484<br>485<br>484<br>481<br>483<br>485<br>486<br>486<br>486<br>490               | 484<br>488<br>488<br>487<br>486<br>486<br>486<br>486<br>486<br>486                  | 485<br>484<br>484<br>484<br>484<br>485<br>486<br>486<br>483                             | 488<br>485<br>485<br>486<br>486<br>486<br>486<br>487<br>488<br>488               | 488<br>484<br>489<br>488<br>488<br>488<br>488<br>488<br>487<br>487               | 486<br>490<br>488<br>488<br>488<br>488<br>488<br>488<br>488<br>488               | 484<br>485<br>487<br>488<br>490<br>480<br>491<br>1 488<br>488<br>486             | 487<br>488<br>488<br>488<br>487<br>487<br>487<br>486<br>485<br>485               | 483<br>484<br>484<br>485<br>485<br>485<br>486<br>486<br>484<br>[ 485             | 479<br>477<br>474<br>473<br>470<br>467<br>469<br>475<br>480<br>471<br>476<br>467 | 468<br>475<br>484<br>483<br>484<br>475<br>476<br>4 483<br>481<br>475<br>486 | 489<br>487<br>481<br>481<br>479<br>484<br>487<br>491<br>492<br>497<br>500        | 493<br>495<br>496<br>560<br>495<br>495<br>496<br>487<br>497<br>498<br>501        | 499<br>497<br>495<br>498<br>496<br>494<br>493<br>494<br>495<br>498<br>498        | 493<br>492<br>494<br>496<br>496<br>496<br>497<br>494<br>492<br>494<br>488        | 497<br>485<br>490<br>497<br>499<br>502<br>496<br>504<br>498<br>408                      | 564<br>767<br>569<br>505<br>507<br>505<br>504<br>562<br>498<br>565<br>501               | 500<br>500<br>525<br>524<br>536<br>5 5<br>505<br>520<br>520<br>534<br>546         | 510<br>505<br>514<br>500<br>502<br>516<br>509<br>519<br>523<br>521<br>520                      | 519<br>520<br>519<br>517<br>520<br>527<br>103<br>521<br>536<br>542<br>510        | 495<br>5°1<br>4×4<br>4×4<br>467<br>475<br>4×7<br>490<br>5c1<br>4×4   | 461<br>461<br>451<br>156<br>166<br>451<br>171<br>171<br>442<br>475   |

Term-day readings of the Brooke declinometer, January 2, 1883.

| ***** A -  | (01)  | p   | 21  | gh.   | 46  | āh   | 6h   | 7h   | <b>%</b> 2s  | 9ii   | 10'-  | 11h  | Noon  | 131  | 14h  | 15h  | 16h  | 17h  | 18n  | 191:  | 20h   | 21%  | 221  | •}13 .   |
|--|---|---|---|---|---|--|--|--|--|---|---|--|---|--|--|--|--|--|--|---|---|--|--|--|
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Term-day readings of the Brooke declinometer, April 1, 1883.

| _  |        |   |  |  |  | ?'m-   | uay  | reaa   | ıngs   | oj   | the 1  | Broc  | уке и<br>  | ecu  | нога   | eter,  | Ap   | ru .   | , 10   |  |  |   |  |  |             |
|--|--------|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|-------------|
|  |        | 6.  | . 1h   | 2h   | 311  | , 4h   | , 5h   | 6h   | 7h   | Sh-  | <b>9</b> h   | 10h   | 11h  | Noon.  | 13P  | 14h  | 15h  | 16h  | 17h  | 18h  | 19h  | 20h   | 21h  | 22h  | 231         |
| 0m<br>5<br>10<br>15<br>20<br>25<br>10<br>15<br>10<br>15<br>10<br>15  |        | 464<br>463<br>458<br>455<br>460<br>464<br>465<br>466<br>465<br>465                                | 467<br>467<br>470<br>466<br>470<br>471<br>477<br>481<br>472<br>177<br>465<br>463 | 439<br>475<br>477<br>479<br>467<br>468<br>467<br>470<br>478<br>478<br>488        | 465<br>477<br>448<br>450<br>460<br>460<br>455<br>456<br>461<br>464<br>469<br>470 | 45.9<br>459<br>464<br>462<br>468<br>473<br>472<br>468<br>461<br>462<br>460 | 460<br>468<br>466<br>470<br>469<br>463<br>462<br>469<br>470<br>474               | 470<br>473<br>470<br>463<br>478<br>474<br>479<br>480<br>477<br>473<br>475<br>472 | 470<br>471<br>474<br>480<br>474<br>483<br>492<br>495<br>493<br>482<br>462<br>473 | 478<br>488<br>483<br>477<br>450<br>484<br>483<br>486<br>462<br>469<br>469        | 160<br>449<br>451<br>454<br>460<br>480<br>483<br>179<br>482<br>482<br>463        | 482<br>479<br>481<br>474<br>480<br>486<br>487<br>467<br>486<br>485<br>480 | 473<br>480<br>480<br>487<br>489<br>481<br>474<br>477<br>474<br>479<br>480<br>481 | 478<br>495<br>498<br>498<br>402<br>503<br>498<br>490<br>485<br>145<br>482<br>470 | 482<br>444<br>460<br>455<br>474<br>470<br>467<br>512<br>480<br>491<br>485<br>484 | 476<br>475<br>470<br>473<br>469<br>478<br>485<br>485<br>473<br>479<br>481        | 485<br>485<br>493<br>418<br>479<br>478<br>484<br>473<br>481<br>487<br>476        | 481<br>498<br>483<br>491<br>499<br>197<br>501<br>492<br>499<br>499<br>485<br>495 | 495<br>497<br>500<br>491<br>494<br>507<br>409<br>505<br>500<br>499<br>509        | 515<br>514<br>514<br>510<br>502<br>501<br>409<br>500<br>496<br>505<br>508<br>503 | 501<br>494<br>498<br>486<br>489<br>490<br>495<br>492<br>488<br>486<br>488<br>494 | 483<br>486<br>492<br>491<br>488<br>488<br>485<br>484<br>496<br>501        | 500<br>496<br>492<br>489<br>486<br>488<br>488<br>480<br>474<br>470<br>467<br>464 | 465<br>467<br>468<br>469<br>469<br>468<br>470<br>473<br>473<br>473<br>477        | 4 4 4 4 4 4 |
| -  |        |   |  |  | Ter  | m-d  | ay r   | eadi   | ngs  | of t   | he B   | rool  | ke de  | elin   | ome  | ter,   | Apr  | il 1   | 5, 18  | 883.   |  |   |  |  |             |
| 0.5<br>10.15<br>15.05<br>16.5<br>16.5<br>16.5<br>16.5<br>16.5<br>16.5<br>16.5<br>16.   |        | 474<br>476<br>475<br>475<br>474<br>474<br>474<br>474<br>477<br>477<br>472                         | 173<br>470<br>472<br>471<br>473<br>473<br>473<br>473<br>473<br>472<br>472<br>472 | 472<br>170<br>473<br>473<br>473<br>477<br>477<br>471<br>472<br>471<br>472        | 473<br>473<br>473<br>473<br>473<br>473<br>473<br>473<br>473<br>473               | 474<br>473<br>473<br>475<br>475<br>475<br>474<br>471<br>471<br>471<br>472  | 473<br>474<br>474<br>474<br>475<br>471<br>475<br>475<br>475<br>475               | 472<br>474<br>473<br>474<br>475<br>477<br>475<br>476<br>476<br>477               | 479<br>473<br>473<br>476<br>474<br>476<br>480<br>480<br>478<br>478<br>478        | 478<br>478<br>478<br>478<br>478<br>475<br>475<br>477<br>477<br>477               | 174<br>475<br>173<br>174<br>475<br>476<br>476<br>476<br>476<br>476<br>477<br>474 | 471<br>470<br>473<br>470<br>475<br>472<br>471<br>470<br>470<br>469<br>470 | 470<br>479<br>482<br>478<br>475<br>479<br>492<br>510<br>512<br>514<br>491<br>463 | 497<br>470<br>470<br>472<br>471<br>464<br>468<br>470<br>472<br>474<br>474<br>474 | 478<br>478<br>470<br>455<br>463<br>480<br>181<br>478<br>470<br>470<br>469<br>475 | 472<br>473<br>478<br>474<br>475<br>475<br>476<br>477<br>477<br>473<br>471<br>480 | 496<br>510<br>527<br>521<br>517<br>509<br>498<br>483<br>489<br>497<br>402        | 495<br>499<br>493<br>498<br>500<br>504<br>527<br>555<br>521<br>531<br>708        | 524<br>591<br>577<br>505<br>510<br>498<br>475<br>486<br>492<br>500<br>499<br>487 | 492<br>497<br>485<br>491<br>497<br>493<br>189<br>494<br>492<br>491<br>503<br>497 | 490<br>494<br>499<br>490<br>193<br>488<br>480<br>482<br>480<br>481<br>484        | 482<br>481<br>483<br>488<br>489<br>484<br>489<br>483<br>486<br>486<br>490 | 486<br>486<br>487<br>488<br>487<br>490<br>489<br>487<br>485<br>480<br>481<br>483 | 478<br>484<br>483<br>483<br>486<br>492<br>495<br>00<br>01<br>499<br>494<br>491   |             |
|  |        |   |  |  | Te   | ·m-0   | lay i  | read   | ings   | of   | the  | Broc  | ke o   | lecti  | nom  | eter.  | Mo   | y 1,   | 188  | 33.  |  |   |  |  |             |
| 0.5 0.5 0.5 0.5 0.5 0.5 0.5  |        | 457<br>461<br>463<br>454<br>460<br>464<br>462<br>464<br>463<br>464<br>464                         | 166<br>167<br>176<br>471<br>460<br>461<br>461<br>461<br>451<br>470               | 470<br>408<br>465<br>453<br>467<br>473<br>468<br>466<br>466                      | 40 4<br>465<br>47 4<br>466<br>464<br>464<br>464<br>464<br>465<br>455             | 452<br>478<br>459<br>469<br>471<br>473<br>472<br>469<br>457<br>456         | 465<br>467<br>463<br>456<br>451<br>473<br>462<br>463<br>464<br>461               | 452<br>446<br>443<br>437<br>450<br>445<br>454<br>453<br>463<br>464<br>464<br>459 | 452<br>456<br>447<br>447<br>450<br>467<br>464<br>480<br>487<br>485<br>470<br>470 | 142<br>105<br>441<br>449<br>445<br>459<br>153<br>471<br>477<br>175<br>474<br>472 | 482<br>167<br>486<br>468<br>471<br>473<br>477<br>469<br>469<br>457<br>453        | 453<br>455<br>487<br>462<br>450<br>465<br>464<br>475<br>476<br>470<br>402 | 475<br>476<br>470<br>471<br>475<br>464<br>168<br>472<br>465<br>440<br>520        | 459<br>465<br>480<br>544<br>529<br>483<br>444<br>484<br>497<br>509<br>495<br>450 | 159<br>466<br>453<br>449<br>456<br>460<br>490<br>465<br>475<br>174<br>492        | 475<br>476<br>476<br>481<br>472<br>498<br>481<br>485<br>470<br>479<br>479        | 480<br>488<br>481<br>479<br>489<br>483<br>493<br>493<br>488<br>182<br>486<br>471 | 477<br>484<br>485<br>496<br>497<br>497<br>497<br>497                             | 492<br>503<br>512<br>514<br>505<br>569<br>514<br>512<br>525<br>516<br>516<br>535 | 558<br>572<br>543<br>496<br>542<br>521<br>530<br>513<br>516<br>509<br>511<br>518 | 521<br>513<br>512<br>505<br>511<br>519<br>516<br>509<br>539<br>493<br>531        | 593<br>506<br>532<br>528<br>564<br>542<br>528<br>514<br>507<br>485<br>470 | 488<br>495<br>499<br>492<br>500<br>502<br>497<br>499<br>496<br>499<br>500        | 492<br>492<br>500<br>506<br>198<br>478<br>481<br>493<br>496<br>477<br>473<br>461 |             |
|  |        |   |  |  | Te   | rm-6   | lay  | read   | ings   | 0/1  | the i  | Broo  | ke a   | lectii   | uom  | eter.  | Ma   | y 17   | , 18   | 83.  | -  | !   |  |  | 1           |
| 0 %<br>5 # 5 # 5 # 5 # 6 5 |        | 10 1<br>10 1<br>10 1<br>10 1<br>10 0<br>4 0<br>10 2<br>16 1<br>16 0<br>16 1<br>4 0<br>16 1<br>4 0 | 10 1<br>16 1<br>16 1<br>16 1<br>16 1<br>16 1<br>16 1<br>16 1                     | 163<br>163<br>163<br>163<br>163<br>163<br>163<br>164<br>165<br>165               | 466<br>465<br>465<br>465<br>463<br>463<br>463<br>463                             | 106<br>163<br>160<br>159<br>158<br>165<br>167<br>168<br>179<br>463         | 465<br>468<br>470<br>470<br>470<br>470<br>468<br>463<br>460<br>462               | 470<br>467<br>468<br>468<br>463<br>160<br>455<br>457<br>459<br>462<br>467        | 467<br>467<br>468<br>465<br>465<br>465<br>465<br>465<br>465<br>466<br>467        | 467<br>470<br>463<br>468<br>465<br>467<br>472<br>473<br>483<br>485               | 483<br>521<br>497<br>458<br>459<br>468<br>469<br>469<br>466                      | 465<br>466<br>463<br>170<br>184<br>489<br>187<br>476<br>488<br>454<br>458 | 451<br>157<br>154<br>451<br>470<br>127<br>432<br>478<br>477<br>447<br>452<br>457 | 459<br>460<br>471<br>456<br>469<br>468<br>461<br>459<br>460<br>452<br>441<br>466 | 482<br>417<br>488<br>467<br>479<br>477<br>486<br>467<br>485<br>480<br>481        | 481<br>483<br>481<br>481<br>482<br>483<br>483<br>479<br>484<br>486<br>486        | 481<br>485<br>484<br>484<br>188<br>193<br>485<br>484<br>490<br>485<br>487<br>492 | 498<br>199<br>4.8<br>494<br>502<br>519<br>519<br>501<br>498<br>497               | 495<br>498<br>501<br>504<br>500<br>499<br>514<br>519<br>524<br>544               | 514<br>530<br>523<br>511<br>568<br>517<br>533<br>530<br>526<br>530<br>515        | 509<br>5.6<br>505<br>500<br>499<br>495<br>491<br>486<br>485<br>485               | 488<br>482<br>481<br>490<br>487<br>491<br>491<br>494<br>462<br>462        | 461<br>463<br>462<br>563<br>463<br>464<br>464<br>464<br>465<br>466               | 466<br>466<br>467<br>467<br>467<br>466<br>467<br>469<br>469<br>469<br>470        |             |
|  | ****** |   |  |  | Te   | 1*111-6  | lay  | read   | ings   | of'  | the  | Bro   | oke i  | decli  | non  | eter   | $, j_u$  | ne 1   | , 18   | 83.  |  |   |  |  |             |
| 0 5 0 5 0 5 0 5 0 5 0 5  |        | \$67<br>\$69<br>\$66<br>\$64<br>\$61<br>\$77<br>\$77<br>\$77<br>\$71<br>\$70                      | 460<br>161<br>467<br>471<br>470<br>472<br>475<br>176<br>162<br>477<br>473<br>465 | 465<br>160<br>161<br>158<br>458<br>466<br>464<br>477<br>462<br>153<br>157<br>461 | 450<br>457<br>454<br>454<br>450<br>460<br>478<br>460<br>460                      | 459<br>176<br>1 7<br>1 4 9<br>167<br>161<br>457<br>455<br>161<br>161       | 459<br>465<br>4 1<br>161<br>461<br>471<br>473<br>472<br>468                      | 473<br>474<br>478<br>462<br>459<br>473<br>475<br>169<br>457<br>166<br>477<br>484 | 435<br>486<br>491<br>490<br>492<br>478<br>439<br>486<br>486<br>484<br>490        | 485<br>486<br>482<br>479<br>478<br>477<br>476<br>476<br>475<br>475<br>475        | 174<br>173<br>173<br>173<br>473<br>473<br>471<br>470<br>469<br>468<br>466<br>163 | 404<br>461<br>461<br>465<br>476<br>466<br>466<br>466<br>463<br>454<br>154 | 447<br>148<br>152<br>119<br>151<br>453<br>451<br>136<br>429<br>431<br>148<br>465 | 446<br>141<br>438<br>416<br>153<br>458<br>400<br>410<br>153<br>456<br>171<br>463 | 462<br>462<br>469<br>468<br>467<br>475<br>478<br>150<br>475<br>479<br>482<br>481 | 483<br>478<br>489<br>495<br>407<br>480<br>486<br>482<br>483<br>476<br>489        | 476<br>471<br>472<br>472<br>472<br>477<br>478<br>478<br>488<br>596<br>520        | 517<br>508<br>515<br>485<br>491<br>512<br>524<br>529<br>514<br>192<br>194<br>506 | 519 503 531 535 505 496 500 506 520 549 539                                      | 499<br>486<br>497<br>484<br>521<br>530<br>548<br>544<br>547<br>549<br>524        | 527<br>544<br>552<br>569<br>564<br>588<br>549<br>552<br>563<br>554               | 555<br>520<br>542<br>521<br>528<br>514<br>515<br>512<br>504<br>514<br>528 | 525<br>524<br>526<br>484<br>479<br>470<br>487<br>480<br>471<br>473<br>478        | 473<br>473<br>466<br>466<br>470<br>466<br>477<br>469<br>459<br>460<br>166        |             |
|  |        |   |  |  | Ter  | rm-a   | lay 1  | read   | ings   | of.  | the.   | Broc  | ike o  | lecti.   | nom  | cter.  | Ju   | ne 1   | 5, 18  | 883.   |  |   |  |  | •           |
| 05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05<br>05   |        | 469<br>470<br>481<br>476<br>467<br>470<br>467<br>470<br>461<br>458                                | 458<br>459<br>459<br>459<br>457<br>461<br>462<br>167<br>165<br>468<br>469        | 472<br>469<br>177<br>469<br>467<br>473<br>475<br>465<br>169<br>165<br>171        | 171<br>473<br>467<br>463<br>469<br>469<br>470<br>474<br>170<br>1 1               | 472<br>465<br>468<br>166<br>164<br>163<br>163<br>163<br>163<br>163<br>163  | 468<br>467<br>469<br>471<br>471<br>470<br>470<br>470<br>470<br>470<br>470<br>471 | 170<br>174<br>471<br>473<br>1 474<br>1 474<br>1 474<br>1 474<br>1 175<br>1 175   | 476<br>475<br>475<br>476<br>476<br>475<br>475<br>475<br>475<br>474<br>474<br>471 | 474<br>473<br>474<br>473<br>473<br>472<br>466<br>472<br>474<br>474<br>474<br>473 | 177<br>477<br>476<br>476<br>476<br>476<br>477<br>175<br>476<br>177<br>177        | 174<br>470<br>477<br>476<br>476<br>474<br>474<br>474<br>171<br>175        | 475<br>472<br>473<br>473<br>472<br>472<br>473<br>473<br>473<br>170<br>171        | 475<br>478<br>478<br>476<br>476<br>477<br>475<br>477<br>477                      | 476<br>476<br>476<br>476<br>478<br>477<br>473<br>473<br>474<br>470<br>473        | 474<br>473<br>473<br>475<br>476<br>476<br>477<br>481<br>479<br>478               | 183<br>484<br>483<br>483<br>484<br>478<br>478<br>181<br>481<br>481<br>481        | 483<br>490<br>489<br>490<br>483<br>482<br>484<br>486<br>486<br>494<br>486        | 185<br>482<br>485<br>190<br>500<br>501<br>488<br>486<br>486<br>192               | 194<br>494<br>496<br>427, 95<br>481<br>482<br>481<br>482<br>500<br>508           | 510<br>504<br>492<br>194<br>191<br>, 480<br>482<br>484<br>496<br>496<br>707      | 516<br>514<br>517<br>512<br>496<br>4-8<br>484<br>484<br>484<br>481<br>491 | 495<br>495<br>484<br>472<br>470<br>468<br>471<br>470<br>169<br>472<br>179        | 471<br>172<br>173<br>173<br>173<br>174<br>174<br>174<br>173<br>173<br>171<br>179 |             |

Term-day readings of the Brooke declinometer, July 1, 1883.

|    | 0 <sub>p</sub>   | 1h   | 2h  | 8,   | 4h  | 20   | 6,   | 7h   | Sh   | gh   | 101  | 115   | Noon.   | 18h   | 14h  | 15h  | 16h   | 17h   | 18h  | 19h  | 30p  | 31,   | 22₺  | 231  |
|----|--|--|---|--|---|--|--|--|--|--|--|---|---|---|--|--|---|---|--|--|--|---|--|--|
| 0m | 481<br>498<br>494<br>484<br>496<br>483<br>484<br>469<br>474<br>464<br>484<br>477 | 483<br>507<br>512<br>523<br>485<br>450<br>494<br>500<br>498<br>490<br>518<br>460 | 481<br>515<br>490<br>489<br>511<br>506<br>463<br>496<br>474<br>434<br>447 | 476<br>476<br>477<br>484<br>497<br>465<br>463<br>465<br>472<br>471<br>489<br>481 | 469<br>447<br>472<br>470<br>466<br>467<br>467<br>485<br>466<br>457<br>463 | 474<br>466<br>452<br>443<br>420<br>418<br>457<br>472<br>446<br>449<br>460<br>448 | 449<br>457<br>484<br>505<br>500<br>494<br>490<br>491<br>493<br>478<br>469<br>479 | 469<br>471<br>473<br>477<br>481<br>462<br>457<br>439<br>427<br>410<br>392<br>389 | 386<br>379<br>394<br>408<br>417<br>419<br>420<br>422<br>419<br>424<br>423<br>441 | 437<br>429<br>437<br>437<br>430<br>426<br>421<br>425<br>417<br>431<br>421<br>464 | 473<br>452<br>461<br>471<br>462<br>487<br>458<br>453<br>436<br>415<br>434<br>415 | 436<br>467<br>452<br>478<br>460<br>468<br>482<br>456<br>435<br>427<br>447 | 493<br>462<br>479<br>477<br>442<br>438<br>428<br>399<br>834<br>418<br>447 | 432<br>416<br>440<br>454<br>428<br>430<br>425<br>442<br>450<br>468<br>458 | 454<br>451<br>449<br>409<br>477<br>489<br>590<br>584<br>529<br>498<br>432<br>433 | 443<br>436<br>428<br>489<br>488<br>466<br>470<br>484<br>564<br>482<br>525<br>528 | 494<br>507<br>502<br>506<br>501<br>503<br>491<br>463<br>460<br>477<br>481 | 463<br>463<br>500<br>504<br>503<br>518<br>562<br>519<br>527<br>542<br>555 | 583<br>525<br>570<br>558<br>583<br>700<br>570<br>538<br>566<br>631<br>592<br>603 | 531<br>547<br>610<br>549<br>563<br>572<br>515<br>559<br>630<br>655<br>602<br>600 | 576<br>554<br>607<br>506<br>532<br>602<br>635<br>509<br>514<br>481<br>482<br>504 | 509<br>499<br>527<br>509<br>529<br>502<br>483<br>468<br>467<br>473<br>474 | 473<br>485<br>483<br>472<br>464<br>469<br>456<br>454<br>450<br>484<br>508<br>507 | 49<br>48<br>48<br>47<br>45<br>46<br>47<br>47<br>49<br>50<br>48<br>52 |

Term-day readings of the Brooke declinometer, July 15, 1883.

| _   |         |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |       |     |     |     |     |     |     |       |      |
|-----|---------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|-------|------|
| 0:  | n       | 466  | 465 | 467 | 470 | 469 | 469 | 469 | 475 | 466 | 483 |     |     | 473 | 474 |     |       |     | 509 | 433 | 560 | 478 | 496 | 468   | 527  |
| - 5 |         | 457  | 464 | 466 | 471 | 465 | 471 | 469 | 471 | 472 | 474 | 474 | 479 | 476 | 475 | 481 | 466   | 456 | 539 | 674 | 414 | 446 | 496 | 465   | 5.3  |
| 10  |         | 467  | 464 | 465 | 468 | 466 | 470 | 473 | 467 | 475 | 477 | 476 | 479 | 475 | 473 | 478 | 470   | 476 | 558 | 682 | 510 | 423 | 483 | 462 . | 527  |
| 15  |         | 467  | 471 | 467 | 467 | 466 | 468 | 472 | 467 | 476 | 474 | 473 | 475 | 474 | 468 | 479 | 468   | 482 | 523 | 571 | 582 | 427 | 467 | 476   | 512  |
| 20  |         | 467  | 463 | 467 | 468 | 467 | 467 | 472 | 468 | 474 | 472 | 470 | 469 | 476 | 470 | 478 | 463   | 476 | 542 | 544 | 525 | 436 | 447 | 500   | 509  |
| 25  |         | 466  | 460 | 465 | 465 | 468 | 463 | 470 | 466 | 470 | 471 | 468 | 468 | 473 | 475 | 482 | 454   | 482 | 535 | 573 | 559 | 426 | 444 | 531 - | 514  |
| 30  |         | 465  | 463 | 465 | 463 | 469 | 468 | 467 | 465 | 466 | 470 | 479 | 470 | 476 | 476 | 477 | 449   | 495 | 490 | 648 | 550 | 454 | 445 | 5:22  | 504  |
| 35  |         | 465  | 447 | 465 | 464 | 474 | 467 | 470 | 467 | 463 | 471 | 481 | 471 | 476 | 474 | 484 | . 441 | 495 | 570 | 712 | 555 | 471 | 449 | 513   | 472  |
| 40  |         | 465  | 460 | 463 | 465 | 467 | 468 | 472 | 460 | 466 | 477 | 479 | 471 | 475 | 478 | 486 | 459   | 486 | 482 | 695 | 499 | 404 | 452 |       | 460  |
| 45  |         | 463  | 463 | 464 | 463 | 467 | 469 | 475 | 467 | 471 | 477 | 475 | 473 | 473 | 477 | 485 | 478   | 510 | 519 | 670 | 495 | 49) | 456 | 512   | 446  |
| 50  |         | 466  | 465 | 465 | 464 | 469 | 468 | 474 | 459 | 473 | 473 | 470 | 471 | 473 | 476 | 481 | 473   | 510 | 548 | 584 | 450 | 495 | 460 | 524   | 424  |
| 53  | ******* | 4417 |     | 466 |     |     |     |     | 458 |     |     |     |     | 475 |     |     |       |     | 505 |     |     | 497 | 462 | 511   | 446  |
|     |         |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |       |     |     |     |     |     |     |       | **** |

Term-day readings of the Brooke declinometer, August 1, 1883.

|    |         |     | 1   |     |     |     | ~~ - |       | ***** |     |     |     | or the second | -   |     |       |     |     |     |     |     |       |       |       |      |
|----|---------|-----|-----|-----|-----|-----|------|-------|-------|-----|-----|-----|---------------|-----|-----|-------|-----|-----|-----|-----|-----|-------|-------|-------|------|
| 0  | m       | 499 | 472 | 470 | 466 | 440 | 441  | 1 420 | 509   | 498 | 406 | 411 | 484           | 384 | 450 | 444   | 478 | 473 | 518 | 532 | 546 | 463   | 532   | 502   | 498  |
| 5  |         | 501 | 460 | 480 | 471 | 454 | 467  | 422   | 503   | 488 | 377 | 380 | 338           | 390 | 479 | 440   | 475 | 487 | 531 | 552 | 539 | 468   | 534   | 504   | 443  |
| 10 |         |     |     | 465 | 470 |     |      |       | 493   |     | 381 |     |               | 380 |     | 441   |     |     |     |     | 501 | 474   | 511   | 490   | 146  |
| 15 |         |     |     |     | 454 |     |      | 453   | 506   | 484 |     |     |               |     |     | 457   |     |     |     | 550 | 482 | 480   | 502   | 478   | 134  |
| 20 |         |     | 507 |     |     |     | 418  | 452   | 490   | 477 | 367 | 381 |               |     |     | 473   |     |     |     |     | 442 |       |       | 5-07  | 4.53 |
| 25 |         |     |     |     |     |     |      | 473   | 502   | 466 |     | 453 | 449           | 471 | 402 | 489   | 461 | 487 | 474 | 498 | 450 | 470 - | 506   | 512 - | 449  |
|    |         |     |     |     |     |     |      |       |       | 456 |     |     |               |     |     | 514   |     |     |     |     |     | 475   | 485   | 11:6  | 446  |
|    |         |     |     |     |     |     |      |       | 481   |     |     |     | 440           | 432 | 446 | 561   | 473 | 495 | 488 | 483 | 476 | 490   | 475   | 483   | 455  |
|    |         |     |     |     |     |     | 466  | 505   | 490   | 450 | 400 |     |               | 414 |     |       | 470 |     | 522 | 484 | 476 | 519   | 4:3   | 469   | 11.0 |
|    | ******* |     |     |     |     |     | 440  |       | 492   |     | 383 |     |               |     |     | 527   |     |     | 556 | 529 | 471 | 553   | 504.1 | 471   | 465  |
|    | ******* |     |     |     |     |     | 432  |       |       | 426 |     |     |               | 449 |     | . 510 | 450 | 494 | 524 | 562 | 482 | 572   | 515   | 440   | 4.:7 |
| 55 |         | 485 | 431 | 473 | 447 | 429 | 470  | 489   | 497   | 410 | 446 | 371 | 444           | 456 | 458 | 476   | 452 | 500 | 518 | 555 | 474 | 566   | 519   | 418   | 434  |
|    |         |     |     |     |     |     |      |       |       |     |     |     |               |     |     |       |     |     |     |     |     |       |       |       |      |

Term-day readings of the Brooke declinometer, August 15, 1883.

|     |         |      |      |     |     |     | _   |          |         |     |     |           |       |           | -   |     |      |     |     |     |     | 1.00  |
|-----|---------|------|------|-----|-----|-----|-----|----------|---------|-----|-----|-----------|-------|-----------|-----|-----|------|-----|-----|-----|-----|-------|
| 0   |         | 505  | 477  | 464 | 463 | 464 | 462 | 468 47   |         | 462 | 465 | 477 . 475 | 470 . | 483 · 486 | 491 | 497 | 491  | 480 | 472 | 466 | 465 | 466   |
| 5   |         | 548  | 468  | 462 | 464 | 461 | 461 | 469 47   |         | 462 | 467 | 473 474   |       |           | 490 | 499 | 491  |     | 465 | 466 | 467 | 466   |
| 10  |         | 511  | 464  | 471 | 456 |     | 468 | 457 47   |         | 463 | 467 |           |       | 481 484   | 486 | 498 | 492  | 462 | 477 | 469 | 472 | 468   |
| 1.5 |         | 467  | 470  | 465 | 470 |     | 470 | 454 47   |         | 463 | 466 |           | 474   | 482 - 484 | 491 | 495 | 401  | 483 | 476 | 471 | 468 | 468   |
| 50  |         | 458  | 443  | 469 |     |     | 475 | 453 + 47 |         | 464 | 461 |           | 473   | 481 483   | 490 | 488 | 488  | 481 | 473 | 469 | 465 | 468   |
|     |         | 451  | 447  | 464 |     |     |     |          | 0 475   | 465 |     |           |       | 485 + 482 |     | 486 |      | 478 | 471 | 470 | 466 | 469   |
| 30  |         | 471  | 465  | 463 |     |     | 472 | 466 40   |         | 465 | 483 | 474 473   |       | 480 478   | 495 | 4×6 | 484  | 478 | 471 | 466 | 470 | 468   |
| 35  |         | 418  | 442  | 468 | 462 |     | 465 | 464 40   |         | 468 | 438 | 482   464 |       |           | 495 | 483 | 4843 | 478 | 469 | 469 | 465 | \$654 |
| 4() |         | 463  | 456  | 465 |     |     | 465 | 469 4    |         | 468 | 461 | 477 475   |       |           |     | 426 | 486  | 4.6 | 473 | 467 | 471 | 41.4  |
| 45  | ******  | 168  | 4.10 | 458 |     |     | 454 | 466 46   |         | 471 | 400 | 483   482 |       | 486 485   | 492 | 488 | 45:3 | 476 | 477 | 471 | 467 | 461   |
| 50  |         | 4×.) | 444  | 463 |     |     | 464 | 464 4    |         | 470 | 477 | 477 481   | 482   | 486 400   | 495 | 489 | 484  | 475 | 477 | 470 | 469 | 170   |
| 55  | ******* | 179  | 453  | 457 | 465 | 470 | 463 | 467 47   | 2   463 | 467 | 471 | 477 480   | 483   | 487 492   | 495 | 488 | 485  | 473 | 472 | 472 | 469 | 471   |

# READINGS OF THE BIFILAR MAGNETOMETER ON TERM-DAYS, UGLAAMIE, ALASKA, SEPTEMBER, 1882, TO AUGUST, 1883.

Term-day readings of the Brooke bifilar magnetometer, September 15, 1882.

[Göttingen time is employed.]

|    |      |      |     |     |         |     |             |            |     |     |     |     |                 |       | -   |     |     |       |     |   |       |              |     |       | -   |
|----|------|------|-----|-----|---------|-----|-------------|------------|-----|-----|-----|-----|-----------------|-------|-----|-----|-----|-------|-----|---|-------|--------------|-----|-------|-----|
|    | 0    | b    | jh. | 2h  | 3h      | 4h  | $5^{\rm h}$ | <b>6</b> h | 7h  | Sh. | 9h  | 10h | 11 <sup>k</sup> | Noon. | 185 | 14h | 15h | 16h   | 17h | 18h                                     | 19h   | $20^{\rm h}$ | 214 | 221   | 235 |
|    |      |      |     | 040 |         |     |             |            |     |     |     |     |                 |       |     |     |     |       |     | , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |       |              |     |       |     |
| 0m | 8    |      | 807 | 812 | 838     | 818 | 853         | 892        | 844 | 670 | 763 | 030 | 846             | 716   | 700 | 745 | 713 | 768   | 790 | 832                                     | 792   | 850          | 834 | 824   | 988 |
| 5  | 81   | 15   | 815 | 828 | . 841 . | 815 | 835         | 905        | 844 | 768 | 747 | 875 | 815             | 620   | 770 | 747 | 745 | 758   | 819 | 828                                     | 796   | 850          | 836 | 828   | 860 |
| 10 | 8    | 11 ' | 805 | 831 | 834     | 805 | 830         | 913        | 855 | 760 | 695 | 870 | 842             | 678   | 750 | 766 | 755 | 753   | 814 | . 828                                   | 792   | 851          | 838 | 830 - | 862 |
| 15 | - 81 |      | 787 | 850 | 837     | 795 | 834         | 913        | 853 | 845 | 435 | 945 | 851             | 625   | 762 | 775 | 737 | 759   | 807 | 824                                     | 795   | 855          | 841 | 835   | 857 |
| 20 | 81   | 12   | 817 | 890 | 815     | 806 | 848         | 900        | 833 | 825 | 781 | 995 | 837             | 610   | 690 | 711 | 736 | 764   | 808 | F21                                     | 799   | 8.51         | 840 | 010   | 859 |
| 25 | 8    | 19   | 793 | 862 | 798     | 793 | 862         | 878        | 822 | 810 | 825 | 882 | 794             | 733   | 711 | 702 | 742 | 737   | 821 | 822                                     | 805   | 850          | 838 | 849   | 861 |
| 30 | 80   | 14   | 812 | 856 | 792     | 827 | 852         | 853        | 822 | 723 | 860 | 890 | 682             | 755   | 733 | 693 | 711 | . 735 | 822 | 814                                     | 812   | 846          | 836 | N59   | 864 |
| 35 | 81   | 16   | 800 | 833 | 802     | 826 | 850         | 803        | 818 | 778 | 826 | 875 | 673             | 762   | 760 | 696 | 793 | 726   | 828 | 812                                     | 822   | 835          | 835 | 865   | 867 |
| 40 | 81   | 16   | 803 | 838 | 810     | 827 | 853         | 781        | 762 | 661 | 865 | 843 | 707             | 794   | 763 | 680 | 734 | 748   | 824 | 808                                     | 835   | 838          | 833 | 559   | 862 |
| 45 | 78   | 88   | 764 | 809 | 828     | 838 | 850         | 860        | 700 | 895 | 839 | 792 | 633             | 789   | 739 | 727 | 742 | 720   | 827 | 807                                     | . 843 | 832          | 830 | 856   | 864 |
| 50 | 80   | 02   | 820 | 817 | 829     | 850 | 869         | 855        | 650 | 874 | 873 | 805 | 669             | 727   | 716 | 731 | 741 | 796   | 880 | 805                                     | 847   | 825          | 828 | 855   | 865 |
| 55 | 8    | 10   | 841 | 848 | 832     | 863 | 871         | 870        | 752 | 898 | 850 | 830 | 629             | 725   | 753 | 746 | 756 | 7/4   | 833 | 801                                     | 852   | 822          | 826 | 855   | 866 |
|    | -1   | _ i  |     |     |         |     |             |            | 1   |     |     | 1   | 1               |       |     | 1   |     |       |     | }                                       |       |              |     |       |     |

Term day readings of the Brooke bifilar magnetometer, October 1, 1882.

| _  |         |     | 1     |     |     |     |     |     |     |     |     |     |       |     |      |     |       | 1   |     |     |              |     |       |       |
|----|---------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|------|-----|-------|-----|-----|-----|--------------|-----|-------|-------|
|    | 0 h     | gh  | 2h    | gh  | 4h  | 5h  | 6h  | 7h  | 8h  | 9h  | 10h | 11h | Noon. | 13h | 1.4h | 15h | 16h   | 17h | 18h | 19h | $20^{\rm h}$ | 21h | 22h   | 234   |
| -  | <br>    |     |       |     |     | _   |     |     |     |     |     |     |       |     |      |     |       |     | -   |     |              |     |       |       |
| 0- | <br>555 | 578 | 594   | 601 | 592 | 565 | 600 | 602 | 605 | 606 | 615 | 551 | 621   | 602 | 610  | 615 | 515   | 580 | 604 | 618 | 619          | 625 | 800   | 617   |
| 5  | <br>555 | 578 | 596   | 598 | 592 | 568 | 600 | 603 | 610 | 610 | 621 | 540 | 615   | 581 | 610  | 615 | 519   | 583 | 600 | 616 | 620          | 622 | 593   | 611   |
| 10 | <br>554 | 578 | 594   | 598 | 585 | 573 | 598 | 605 | 611 | 611 | 616 | 561 | 603   | 585 | 612  | 612 | 530   | 586 | 593 | 611 | 620          | 620 | 598   | 608   |
| 15 | <br>553 | 580 | 593   | 596 | 579 | 578 | 599 | 604 | 612 | 612 | 592 | 566 | 596   | 611 | 592  | 586 | 532   | 587 | 598 | 610 | 620          | 621 | Eist) | 610   |
| 20 | <br>554 | 581 | 595   | 596 | 553 | 580 | 600 | 603 | 610 | 614 | 599 | 585 | 580   | 578 | 600  | 581 | 532   | 587 | 601 | 613 | 619          | 616 | 610   | 60.5  |
| 25 | <br>559 | 585 | - 602 | 598 | 541 | 585 | 598 | 603 | 610 | 616 | 600 | 569 | 605   | 598 | 609  | 573 | . 541 | 595 | 603 | 615 | 619          | 615 | 616   | 611   |
| 30 | <br>568 | 591 | 602   | 599 | 550 | 586 | 597 | 603 | 596 | 621 | 605 | 560 | 600   | 605 | 604  | 562 | 547   | 610 | 611 | 616 | 618          | 611 | 614   | . 600 |
| 35 | <br>569 | 594 | 604   | 599 | 549 | 588 | 598 | 602 | 598 | 623 | 597 | 569 | 610   | 613 | 605  | 563 | 562   | 604 | 613 | 620 | 620          | 612 | 613   | 588   |
| 40 | <br>571 | 594 | 610   | 595 | 553 | 586 | 598 | 602 | 600 | 622 | 562 | 581 | 619   | 611 | 610  | 563 | 571   | 600 | 616 | 623 | 620          | 615 | 614   | 585   |
| 45 | <br>575 | 594 | 605   | 594 | 559 | 592 | 598 | 601 | 602 | 622 | 451 | 580 | 628   | 613 | 610  | 504 | 584   | 598 | 619 | 622 | 620          | 613 | 614   | 583   |
| 50 | <br>576 | 597 | 602   | 595 | 560 | 595 | 601 | 605 | 603 | 619 | 550 | 594 | 620   | 601 | 615  | 501 | 569   | 615 | 618 | 619 | 619          | 608 | 612   | 590   |
| 55 | <br>577 | 594 | 601   | 596 | 565 | 600 | 604 | 605 | 605 | 617 | 509 | 600 | 610   | 604 | 619  | 515 | 572   | 609 | 617 | 618 | 622          | 609 | 614   | 593   |
|    |         |     | 1     |     |     | 1   |     |     |     |     |     |     |       |     |      |     |       |     |     |     |              |     |       |       |

Term-day readings of the Brooke bifilar magnetometer, October 15, 1882.

|                      | 0h 1h                         | 2h                       | 36                       | 4h                       | 5h                       | 6b 7   | h     | 8h 9h  | 105        | 11h                            | Noon.                    | 13h                      | 14h                      | 15h                      | 16h                      | 17h                      | 18h                  | 19h                      | 20h                      | 21h                      | 221                        | 234                      |
|----------------------|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|-------|--|------------|--------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------|--------------------------|--------------------------|--------------------------|----------------------------|--------------------------|
|                      | 470 : 493                     | 533                      | 542                      | 544                      | 544                      | 489 4  |       | 628 329  |            | 350                            | 267                      | 255                      | 359                      | 401                      | 363                      | 260                      | 419                  | 458                      | 464                      | 483                      | 479                        | 171                      |
| 15                   |                               | 536<br>558<br>595<br>568 | 542<br>555<br>563<br>562 | 528<br>526<br>528<br>531 | 548<br>554<br>548<br>523 | 488   43<br>477   38<br>479   43<br>485   38 | 2   5 | 525   367<br>502   356<br>508   37,<br>450   361 | 285        | 347<br>340<br>271<br>305       | 298<br>270<br>308<br>337 | 369<br>344<br>331<br>319 | 328<br>232<br>210<br>180 | 300<br>180<br>190<br>150 | 360<br>304<br>240<br>102 | 123<br>272<br>302<br>540 | 378<br>374<br>366    | 429<br>442<br>450<br>475 | 463<br>458<br>461<br>449 | 480<br>463<br>462<br>465 | 491<br>493<br>503  <br>497 | 475<br>477<br>449<br>452 |
|                      | 463 513<br>466 522            | 554<br>560<br>540        | 547<br>560<br>578        | 544<br>557<br>562        | 500<br>482<br>481        | 486 3<br>501 3<br>512 4                      | 2 4   | 424 - 363<br>418 - 363<br>340 - 243              | 368<br>360 | 273<br>475<br>421              | 270<br>314<br>251        | 351<br>376<br>389        | 298<br>261<br>245        | 172<br>157<br>335        | 186<br>267               | 330<br>- 410<br>- 466    | 385<br>438<br>431    | 465<br>482               | 430                      | 470<br>452<br>456        | 46 s<br>480 l<br>502 l     | 445<br>449<br>460        |
| 40<br>45<br>50<br>55 | 481 512<br>495 528<br>502 532 | 547<br>551<br>551<br>565 | 574<br>576<br>573<br>500 | 570<br>563<br>558<br>550 | 472<br>473<br>500<br>480 | 524   5:<br>529   5:<br>532   5:<br>511   5  | 5 :   | 215 353<br>80 343<br>230 286<br>290 145          | 287<br>305 | 446<br>  278<br>  120<br>  317 | 350<br>365<br>398<br>282 | 297<br>298<br>324<br>342 | 302<br>250<br>125<br>332 | 385<br>342<br>316<br>334 | 231<br>418<br>230<br>45  | 459<br>435<br>370<br>473 | 4449<br>444<br>461 1 | 479<br>472<br>474<br>466 | 419<br>418<br>441        | 486<br>474<br>475<br>482 | 494<br>487<br>500<br>491   | 175<br>182<br>183<br>493 |

Term-day readings of the Brooke bifilar magnetometer, November 1, 1882.

| _  | 0 h       | 1h  | 2h   | 34    | 4h  | 5h  | 6h  | 7 h  | 8p  | 9h   | 10h | 11h | Noor | 13h | <b>14</b> b | 15h     | 16 <sup>b</sup> | 17h  | 186  | 19h | 20h  | 21h  | 225   | 235  |
|----|-----------|-----|------|-------|-----|-----|-----|------|-----|------|-----|-----|------|-----|-------------|---------|-----------------|------|------|-----|------|------|-------|------|
|    |           |     |      |       | !   | -   |     |      |     |      |     |     | -    | -   | -           |         |                 | - '  |      |     |      |      |       | -    |
| 07 | <br>398   | 408 | 429  | 432   | 475 | 430 | 452 | 438  | 460 | 469  | 290 | 479 | 440  | 405 | 411         | 10      | 120             | 392  | 376  | 292 | 320  | 1406 | 398   | 399  |
| 5  | <br>4(11) | 408 | 431  | 424   | 459 | 462 | 415 | 4-3  | 450 | 450  | 327 | 409 | 400  | 413 | 407         | (-40-1) | (-10 - ?)       | 390  | 384  | 382 | 280  | 370  | 374   | 39.3 |
| 10 | <br>401   | 411 | 430  | 424   | 450 | 445 | 479 | 44.5 | 455 | 458  | 314 | 374 | 384  | 424 | 352         | (1041)  | 170             | 1355 | 368  | 335 | 356  | .366 | 402   | 393  |
| 15 | <br>401   | 435 | 429  | + 423 | 454 | 440 | 450 | 445  | 459 | .457 | 349 | 375 | 385  | 419 | 308         | (-40-l) | 298             | 324  | 392  | 280 | 371  | 372  | 387   | 397  |
| 20 | <br>400   | 435 | 1432 | 423   | 452 | 436 | 459 | 455  | 462 | 447  | 390 | 426 | 405  | 422 | 95          | (-40-7) | 314             | 325  | 376  | 278 | 317  | 359  |       | 404  |
| 25 | <br>402   |     |      | 428   | 455 | 423 | 455 | 463  |     | 438  |     |     |      |     |             | (-40-7) |                 | 320  |      |     |      |      |       | 407  |
| 30 | <br>412   | 430 | 432  | 1.440 | 462 | 424 | 440 | 457  | 469 | 140  | 348 | 350 | 318  | 417 |             | (-40-7) |                 | 329  | 376  | 288 | 380  | 402  | 409   | 402  |
| 35 | <br>410   | 425 | 410  | 438   | 462 | 436 |     | 445  |     |      |     |     |      | 418 |             | (-40-l) |                 | 332  |      |     |      |      |       | 4(4) |
| 40 | <br>405   | 443 | 425  | . 444 | 445 | 450 | 460 | 148  |     |      |     |     |      |     |             | (-40-1) |                 | .340 |      |     |      |      |       | 390  |
| 45 | <br>411   | 443 | 433  | 423   | 434 | 456 | 452 | 445  | 455 | 373  | 424 | 422 | 397  | 406 | 5           | 180     | 405             | 365  | '346 | 342 | 416  | 402  | 31905 | 393  |
| 50 | <br>415   | 433 | 426  | 485   | 440 | 463 | 455 | 453  | 467 | 395  | 381 | 384 | 408  | 414 | 20          | (-40-l) | 396             | 363  | 274  | 315 | 'a90 | 4111 | 391   | 400  |
| 55 | <br>412   | 425 | 431  | 476   | 434 | 455 | 449 | 462  | 472 | 399  | 442 | 461 | 402  | 412 | (-40-1)     | 90      | 385             | 380  | 300  | 312 | 405  | 404  | 390   | 394  |
|    |           |     |      |       |     |     |     |      |     | 1    |     |     |      |     |             | 6       |                 |      |      |     | 1    |      |       |      |

H. Ex. 44-68

221

Term-day readings of the Brooke bifilar magnetometer, November 15, 1882.

| -   |   |   |   |  |  |   |   |   |   |   |  |   |  |  |  |   |  |  |  |   |  |  |  | -   |  |
|---|---|---|---|--|--|---|---|---|---|---|--|---|--|--|--|---|--|--|--|---|--|--|--|---|--|
|   |   | <b>0</b> 1-   | P                                       | 25   | 31:  | £ 2-  | £111  | (51:  | 71-   | Nº  | 9h   | 105   | 111  | Noon   | 181  | 14h   | 15h  | 16h  | 17h  | 18h   | 19h  | 26 <sup>h</sup>  | 215  | 221   | 233  |
| 5<br>10<br>15<br>20<br>25<br>30<br>35<br>40<br>45<br>50 | 7 | 307<br>285<br>340<br>531<br>655<br>655<br>655<br>665<br>665 | 100000000000000000000000000000000000000 | 646<br>646<br>625<br>628<br>550<br>566<br>605<br>617 | 773<br>765<br>840<br>770<br>842<br>839<br>757<br>883<br>762<br>763 | 750<br>830<br>970<br>791<br>715<br>823<br>860<br>855<br>910<br>1035 | 985<br>942<br>963<br>942<br>960<br>900<br>920<br>924<br>983 | 754<br>763<br>652<br>652<br>671<br>671<br>665<br>640<br>656 | 614<br>672<br>710<br>714<br>687<br>674<br>697 | 42   428   430   490   158   150   256   21 | 675<br>430<br>648<br>680<br>825<br>698<br>83:<br>731 | 748<br>595<br>522<br>604<br>521<br>537<br>610<br>560<br>563 | 420<br>410<br>485<br>494<br>494<br>530<br>500<br>491<br>541<br>505 | 436<br>401<br>120<br>395<br>335<br>168<br>117<br>250<br>1 331<br>293 | 393<br>415<br>410<br>355<br>413<br>456<br>390<br>432<br>560<br>277 | 330<br>529<br>463<br>445<br>423<br>486<br>465<br>434<br>450 | 430<br>404<br>371<br>444<br>438<br>470<br>419<br>109 | 382<br>444<br>147<br>443<br>126<br>430<br>434<br>461<br>425<br>309 | 430<br>335<br>344<br>350<br>253<br>225<br>315<br>327<br>444<br>350 | 183<br>- 56<br>- 64<br>- 95<br>- 163<br>- 236<br>- 319<br>- 384<br>- 449<br>- 379 | 285<br>322<br>319<br>398<br>342<br>351<br>447<br>452<br>443<br>398 | 396<br>390<br>425<br>456<br>436<br>465<br>478<br>490<br>494<br>479 | 478<br>472<br>463<br>489<br>489<br>499<br>502<br>514<br>489<br>490 | 442<br>198<br>490<br>465<br>468<br>482<br>504<br>510<br>498 | 510<br>463<br>- 2<br>410<br>474<br>579<br>450<br>601<br>490<br>504<br>473<br>498 |
|   |   |   |   |  |  |   |   |   |   |   |  | 1   |  |  |  |   |  |  |  |   |  |  |  |   |  |

Term-day readings of the Brooke bifilar magnetometer, December 1, 1882.

| -   |   |  | -  |   |  |  |   |  |                                      |   |   |   |  |  |  |  |
|---|---|--|--|---|--|--|---|--|--------------------------------------|---|---|---|--|--|--|--|
|   | 0,  | 15 25  | *3 1-  | $ \Phi\rangle = 5^\circ$  | <b>65</b> li li                                  | 1.5%   | $\partial_P=\{0\}_F$  | 11h - 2  | Soon 12                              | b 14h   | 15% 1   | 65 175  | 185 19   | 20%  | 215 2  | 235  |
| -   |   |  |  |   |  |  |   |  |                                      |   |   |   |  |  |  |  |
| 5<br>10<br>15<br>20<br>25<br>30<br>35<br>40 | 9 559 481 545 446 546 531 531 575 579 589 | 194 471<br>133 506<br>513 456<br>518 175<br>516 486<br>574 488 | 489<br>503<br>484<br>489<br>509<br>521<br>521<br>503 | 501 503<br>510 533<br>478 553<br>197 556<br>490 549<br>500 518<br>492 522 | 465 : 518<br>465 - 521<br>444 - 509<br>440 - 496 | 475<br>489<br>481<br>473<br>468<br>455<br>453<br>453 | 460 461<br>463 466<br>470 457<br>164 449<br>466 447<br>477 446<br>478 447 | 450<br>448<br>447<br>436<br>445<br>439<br>440<br>452 | 452 38<br>450 33<br>449 21<br>451 25 | 0 290<br>17 215<br>15 247<br>19 337<br>10 346<br>18 368<br>18 382<br>13 283 | 362 2<br>301 1<br>246 2<br>391 3<br>825 4<br>263 4<br>222 4 | 70 465<br>153 470<br>48 472<br>152 452<br>101 460<br>105 458<br>134 : 470<br>165 458<br>161 502 | 455 33<br>463 39<br>438 41<br>446 43<br>427 41<br>406 46<br>416 46<br>415 46<br>414 39 | 9 404<br>9 413<br>2 419<br>0 418<br>7 401<br>4 415<br>5 400<br>6 101 | 390 364<br>388 351<br>372 359<br>355 354<br>326 354<br>325 397<br>342 394<br>379 400<br>386 418<br>372 422 | 356<br>354<br>350<br>350<br>330<br>367<br>440<br>436 |
| 50<br>55                                    | 565<br>564                                | 182 566<br>478 554   |  | 500 500<br>521 490  |  | 453  | 476 451<br>469 457  |  | 456 35<br>55 + 37                    | 1 393   | . 55  | 59   471<br> 85   467   | 376 33<br>364 36   | 2 389  | 357 378<br>362 383   | 162<br>350   |

Term-day readings of the Brooke bifilar magnetometer, December 15, 1882.

|     |    | 0.0 | 45   | 211   | 30     | 41    | 5ъ     | 61   | 7 b   | bg 25 | $\mathfrak{g}_{\mu}$ | 10 h  | 115 | No no | <b>\$</b> \$\$ 5 | 14h | 15 <sup>h</sup> | $6^{\rm h}$ | 87 h | $18^{\rm h}$ | 19%   | $20^{\rm b}$ | 21h  | 225   | 23     |
|-----|----|-----|------|-------|--------|-------|--------|------|-------|-------|----------------------|-------|-----|-------|------------------|-----|-----------------|-------------|------|--------------|-------|--------------|------|-------|--------|
| -   |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  |     |                 |             |      |              |       |              |      |       |        |
| ()* | 11 | 503 | 567  | 50.4  | 504    | 510   | 199    | 490  | \$106 | 502   | 482                  | 180   | 450 | 499 . | 440              | 468 | 445             | 473         | 441  | 412          | 360   | 114.4        | 306  | 180   | 598    |
|     |    |     |      |       |        |       |        |      |       |       |                      |       |     | 489   |                  |     |                 |             |      | 410          | 359   | 363          | 297  | 219   | 4:21   |
|     |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  |     |                 |             | 456  | 398          | 215   | 345          | 288  | 255   | 4.19   |
| 15  |    | 501 | 5:06 | 500   | 50.5   | 5(16) | 495    | 485  | 483   | 500   | 482                  | 475   | 474 | 503   | 473              | 436 | 455             | 469         | 447  | 410          | 299   | 390          | 281  | 279   | 462    |
|     |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  |     |                 |             |      | 393          |       | 386          | 240  | 320   | 1510   |
|     |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  | 445 | 456             | 441         | 417  | : 94         | 294   | 359          | 111  | .534  | 178    |
|     |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  | 434 | 168             |             |      |              | 302   | 371          | 170  | 354   | 1-8    |
| 35  |    | 505 | 102  | 504   | 4.1-   |       |        |      |       |       |                      |       |     |       |                  | 490 | 467             |             | 112  |              | 3339  |              | 1.59 | 366   | \$4+\$ |
| 40  |    |     |      |       |        |       |        |      |       |       |                      |       |     | 475   |                  |     |                 |             |      |              |       |              | 112  | 376 ! | 487    |
| 4.5 |    |     |      |       |        |       |        |      |       |       |                      |       |     |       |                  |     |                 |             |      |              |       |              | 125  | 353   | 455    |
| 20  |    | 501 | 1174 | 2(11) | \$12.5 | 12.4  | \$1901 | 1-1- | 492   | 486   | 183                  | 17.4  |     | 436   | 463              | 431 | 455             | 441         | 436  | 374          | . 340 | 330          |      | 367   | 450    |
| 7.1 |    | 504 | 504  | 3(4)  | 605    | 16.11 | 1×ti   | 4-7  | 458   | 475   | 180                  | \$114 | 505 | 438   | 464              | 437 | 483             | 456         | 423  | 360          | 350   | 322          | 92   | 396   | 442    |

Term-day readings of the Brooke bifilar magnetometer, January 2, 1885.

|                                       | <br>   |  |   |   |   |  |   |   |   |   |  |   |   |   |   |   |   |   |   |                        | -  |
|---------------------------------------|--|--|---|---|---|--|---|---|---|---|--|---|---|---|---|---|---|---|---|------------------------|--|
|                                       | $\Theta_{P}$   | 1h                                     | $2^{\rm h}$                                   | 35  | 4h  | $5^{\rm h}$                            | (B)   | 7 h   | 8h  | 8 <sub>p</sub>                                | $10^{\rm h} \pm 11^{\rm h}$                      | Noon.   | 135   | 14h   | 15h   | 16h   | 17h   | 1.1%  | $19^{\rm h} \simeq 20^{\rm h}$                                | $24^{h} \pm 22^{h}$    | 231  |
| -                                     |  |  |   |   |   |  |   |   |   |   |  |   |   |   |   |   |   |   |   |                        |  |
| 5<br>10<br>15<br>20<br>25<br>30<br>35 | <br>. 416<br>. 999<br>. 457<br>. 418<br>.: 417<br>. 409<br>. 127 | 454<br>457<br>458<br>459<br>455<br>420 | 433<br>146<br>421<br>111<br>421<br>129<br>429 | 482<br>150<br>431<br>429<br>433<br>473<br>442 | 433<br>418<br>109<br>417<br>407<br>412<br>536 | 455<br>428<br>426<br>389<br>418<br>420 | 129<br>138<br>129<br>411<br>428<br>126<br>424 | 443<br>387<br>403<br>413<br>405<br>415<br>415 | 433<br>424<br>431<br>423<br>431<br>418<br>420 | 421<br>422<br>422<br>430<br>425<br>410<br>426 | 438   430<br>425   423<br>435   422<br>436   426 | 403<br>404<br>402<br>399<br>409<br>263<br>358 1 | 326<br>140<br>353<br>255<br>398<br>452<br>417 | 456<br>358<br>301<br>316<br>300<br>273<br>175 | 220<br>206<br>213<br>268<br>257<br>242<br>292 | . 201<br>262<br>241<br>331<br>375<br>371<br>370 | 392<br>355<br>357<br>349<br>347<br>345<br>360 | 246<br>250<br>248<br>234<br>206<br>189<br>188 | 165   214<br>179   254<br>160   332<br>182   329<br>210   321 | 352 371                | 384<br>70<br>375<br>372<br>367<br>356<br>376 |
| 45<br>50                              | <br>4429   | 115                                    | 421<br>420                                    | 429   | 411   | 435<br>426                             | 421<br>420                                    | 414<br>426                                    | 419   | 429<br>435                                    | 481 427  | 92<br>295                                       | 278<br>359                                    | 60  | 228<br>219                                    | 343<br>376                                      | 335   | 197   | 249   296   | 380 ± 392<br>412 ± 379 | 378  |

#### Term-day readings of the Brooke bifilar magnetometer, January 15, 1883.

201 211 221 231

| 300 | 364 | 356 | 388 | 351 | 359 | 359 | 359 | 355 | 354 | 325 | 325 | 397 | 309 | 342 | 394 | 394 | 394 | 394 | 394 | 394 | 394 | 395 | 396 | 348 | 448 | 448 | 456 | 372 | 422 | 411 | 357 | 378 | 336 | 338 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358 | 358

306 | 180 | 297 | 219 | 288 | 255 | 281 | 279 | 240 | 320 | 114 | 334 | 170 | 354 | 159 | 366 | 125 | 353 | 72 | 367 | 92 | 396

21h 22- 23h

| 4.0                     |                                 |   | *****   |   |  |  | -   |   | -   |   |   |  |   |   |   |  |  | ,   |  |  |  |  |  | ****  |
|-------------------------|---------------------------------|---|---|---|--|--|---|---|---|---|---|--|---|---|---|--|--|---|--|--|--|--|--|---|
|                         | 0 <sup>h</sup>                  | 1h  | 2h  | 3h  | 4h   | 5h   | $6^{\rm h}$   | 7h  | Nis   | 9h  | 10h   | 11h  | Noon.   | 13h   | 14h   | 12p  | 16h  | 17h   | 18h  | 19h  | 20h  | 215  | 22h  | 23h   |
| 6° 50 10 15 10 45 50 55 | 467<br>462<br>464<br>470<br>467 | 467<br>463<br>467<br>468<br>459<br>461<br>466<br>468<br>468<br>467<br>467 | 470 (<br>473 )<br>473 )<br>457 (<br>458 )<br>458 )<br>468 )<br>468 )<br>468 )<br>468 )<br>468 ) | 462<br>460<br>469<br>453<br>460<br>458<br>448<br>448<br>457<br>456<br>463 | 165<br>464<br>459<br>174<br>479<br>473<br>460<br>461<br>450<br>462<br>469<br>478 | 464<br>465<br>461<br>450<br>466<br>473<br>465<br>465<br>468<br>481<br>458<br>434 | 456<br>452<br>448<br>446<br>450<br>451<br>447<br>420<br>456<br>446<br>442 | 428<br>440<br>449<br>446<br>453<br>458<br>454<br>454<br>455<br>457<br>453 | 454<br>455<br>454<br>451<br>456<br>460<br>459<br>454<br>453<br>455<br>454 | 460<br>453<br>457<br>459<br>452<br>454<br>452<br>456<br>454<br>458<br>468 | 461<br>469<br>462<br>465<br>461<br>463<br>465<br>470<br>465<br>462<br>462 | 459<br>457<br>458<br>466<br>473<br>434<br>438<br>397<br>416<br>444<br>480<br>461 | 540<br>496<br>473<br>459<br>447<br>427<br>427<br>427<br>390<br>388<br>303<br>288<br>327 | 282<br>287<br>264<br>338<br>825<br>234<br>341<br>140<br>316<br>816<br>210 | 61<br>154<br>235<br>410<br>449<br>375<br>413<br>400<br>420<br>438<br>430<br>439 | 450<br>437<br>459<br>454<br>420<br>394<br>383<br>400<br>395<br>401<br>366<br>358 | 400<br>430<br>424<br>429<br>416<br>419<br>414<br>413<br>394<br>370<br>355<br>349 | 367<br>368<br>350<br>344<br>338<br>341<br>311<br>319<br>254<br>180<br>102 | 203<br>140<br>164<br>153<br>186<br>226<br>219<br>243<br>289<br>316<br>330<br>316 | 299<br>275<br>260<br>257<br>266<br>217<br>220<br>182<br>292<br>280<br>320<br>373 | 375<br>347<br>312<br>359<br>361<br>343<br>334<br>374<br>402<br>455<br>423<br>416 | 424<br>441<br>390<br>382<br>410<br>875<br>888<br>355<br>372<br>378<br>439<br>472 | 431<br>408<br>428<br>405<br>418<br>416<br>459<br>410<br>434<br>482<br>455<br>468 | 465<br>480<br>447<br>443<br>455<br>466<br>521<br>469<br>436<br>442<br>452 |
|                         |                                 |   |   |   |  |  |   |   |   |   |   |  |   |   |   |  |  |   |  |  |  |  | 1  | -   |

#### Term-day readings of the Brooke bifilar magnetometer, February 1, 1883.

|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      | -   |     |      | 1    |      |          |         | -,-  |                 |         |         |         |
|-----|----|-----------|-------|-------|-----|-------|-------------|-----|------|------|-------|-----|-----|------|-----|-----|------|------|------|----------|---------|------|-----------------|---------|---------|---------|
|     |    | 0.        | 1     | *11.  | 3   | 13    | $5^{\circ}$ | 65  | 71   | 47   | 13%   | 10° | 115 | Noon | 13h | 14b | 155  | 165  | \$7h | 48h      | 19h     | - 1  | 20 <sup>h</sup> | 21b     | 221     | 23'     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      | 1        | 1       |      |                 |         |         |         |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      | 1        |         |      |                 |         |         |         |
|     | 0, | <br>175   | 111   | 1.31. | 147 | 110   | 2017        | 445 | 128  | 1001 | 1,3,3 | 445 | 150 | 111  | 312 | 398 | 4::1 | 3.37 | 37.3 | 233      | (40     |      |                 | (10')   |         | (-40-!) |
|     | 5  | <br>441,  | 470   | 1.14  | 134 | 4 - 6 | 416         | 1.3 | 110  | 415  | 130   | 117 | 119 | 1000 | 249 | 398 | 418  | 35-  | 350  | 259      | -10-40- | 13   | 401             | (-40-?) | (-40-?) | 30      |
| 1   | 0  | <br>. 477 | 171   | 443   | 126 | 182   | 476         | 440 | 443  | 457  | 134   | 446 | 117 | 385  | 366 | 427 | 400  | 404  | 366  | 296      | :-40-   | 3.   | 467             | -20     | (-40-1) | 272     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      |          | -40-    | 2) 1 | 417             | (-40-!) | (-4(!!) | 320     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      |          | (-40-   | ?)   | 432             |         | (-40-') | 183     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      |          |         | 2 !  | 264             |         | (-40-!) | 271     |
|     | () | <br>484   | \$3.5 | 100   | 453 | 469   | 435         | 436 | 133  | 431  | 431   | 440 | 325 | 1402 | 372 | 427 | 382  | 389  | 257  | 242      |         | 8 .  | 64              | : 215   | (-40-9) | 210     |
| - 3 | 5  | <br>491   | 11.54 | 410   | 456 | 489   | TE          | 136 | 328  | 400  | 425   | 436 | 313 | 407  | 380 | 426 | 377  | 393  | 242  | 234      | 25      | 2    | 19              | 282     | (-40-9) | 311     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      | 144      |         | 5 6  | -40!)           |         | (-40-?) | 452     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      | (-40-7)  |         |      | -40-7)          |         | (-40-?) | 510     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      | (-40-?)  |         | 5 (  | -40-?)          | (-40-!) | 5       | 355     |
| - 5 | 5  | <br>.475  | 436   | 443   | 476 | 497   | 432         | 420 | .426 | 426  | 439   | 423 | 413 | 380  | 391 | 434 | 366  | 378  | 222  | 1(-40-?) | 34      | 6 (  | -40-?)          | (-40?)  | (-40-9) | 500     |
|     |    |           |       |       |     |       |             |     |      |      |       |     |     |      |     |     |      |      |      |          |         |      |                 |         |         |         |

#### Term-day readings of the Brooke bifilar magnetometer, February 15, 1883.

|     | 0,      | $\Gamma$ | 21: | 34  | 45  | 5 h   | Въ  | ĩ.  | Nh  | 9ъ  | 10% | 11h | Noon. 13h | 14h | 15h | 16 <sup>b</sup> | 17 <sup>b</sup> | 18h | $19^{\rm h}$ | $20^{\mathrm{h}}$ | $21^{\rm h}$ | $22^{\rm h}$ | 234 |
|-----|---------|----------|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----------|-----|-----|-----------------|-----------------|-----|--------------|-------------------|--------------|--------------|-----|
|     |         |          |     |     |     |       |     |     |     |     | -   |     | -         |     |     |                 | -               |     |              |                   |              |              |     |
| 0   | <br>411 | 126      | 443 | 132 | 418 | 119   | 433 | 407 |     | 404 |     |     | 331 370   | 321 | 365 | 368             | 360             | 356 | 375          |                   | 379          |              | 376 |
| 5   | <br>408 | 423      | 426 | 483 | 422 | 407   | 419 | 440 | 415 | 402 | 402 |     |           |     |     | 370             |                 |     |              | 368               | 0.50         | 386          | 3×0 |
| 10  | <br>407 | 444      | 445 | 478 | 418 | . 422 | 417 | 418 | 426 | 396 | 403 | 379 | 360 350   | 862 | 347 | 375             |                 | 368 |              | 372               | 3.           | 356          | 378 |
|     |         |          |     |     |     |       | 413 |     |     |     | 396 |     | 349 376   |     | 358 | . 371           |                 | 379 |              | 366               | 386          | 383          | 363 |
| 2.1 | <br>427 | 415      | 438 | 463 | 419 | 422   | 413 | 428 | 425 | 395 | 392 | 372 | 346 360   | 370 | 368 | 364             | 344             | 378 | 366          | 372               | 380          | 3388         | 356 |
| 25  | <br>417 | 398      | 436 | 474 | 421 | 418   | 413 | 434 | 418 | 394 | 394 | 283 | 340 364   | 358 | 364 | 368             | 342             | 374 | 371          | 383               | 376          | 385          | 358 |
|     |         |          |     |     |     |       | 410 |     |     |     | 395 | 327 | 316 351   | 354 | 356 | 368             | 333             | 366 | 368          | 379               | 362          | 381          | 373 |
| 35  | <br>400 | · 378 :  |     | 168 | 424 | 424   | 415 | 434 | 418 | 402 | 391 | 333 | 308 333   | 362 | 360 |                 | 319             | 367 | 379          |                   |              |              | 362 |
| 40  | <br>385 | . 408    | 432 | 459 | 421 | 428   | 408 | 435 | 414 |     | 388 | 344 | 320 . 343 | 370 | 364 | 371             | 349             | 375 | 377          | 376               | 374          | 381          | 360 |
| 4.5 | <br>414 | 412      | 433 | 453 |     | 418   | 409 | 435 |     | 401 | 386 | 361 |           |     | 368 |                 | 329             | 378 |              |                   |              | 379          | 365 |
| 50  | <br>411 | 431      | 452 | 428 | 423 | 422   | 397 | 434 | 406 | 405 | 390 | 332 | 364 350   | 350 | 361 | 365             | 322             | 376 | 360          | 357               | 383          | 377          | 362 |
| 55  | <br>356 | 426      | 450 | 412 | 429 | 432   | 423 | 434 | 419 | 408 | 389 | 321 | 375 334   | 354 | 359 | 364             | 347             | 372 | 364          | 358               | 382          | 380          | 360 |

#### Term-day readings of the Brooke bifilar magnetometer, March 1, 1883.

|       |   | O h | 18   | 2h  | 34  | 4h [   | 5h ' | $6^{\rm h}$ | 7 h | §h : | 95  | 10b | $11^{\rm h}$ | Noon.   | 155  | 114 | 15 <sup>b</sup> | 16 <sup>b</sup> | 17h | 15h | 19 <sup>b</sup> | 20h     | $21^{\circ}$ | $22 \cdot$ | $23^{\rm h}$ |
|-------|---|-----|------|-----|-----|--------|------|-------------|-----|------|-----|-----|--------------|---------|------|-----|-----------------|-----------------|-----|-----|-----------------|---------|--------------|------------|--------------|
|       | - |     |      |     |     |        | -    |             |     |      |     |     |              |         |      |     |                 |                 | 1   | 1   |                 |         |              |            |              |
| {, as |   | 578 | 1-11 | 515 | 626 | 619    | 616  | 528.        | 486 | 489  | 380 | 395 | 440          | 441     | 332  | 80  | 422             | 104             | 40  | 500 | 116             | (-40-?) | 120          | 516        | 178          |
| 5     |   |     |      |     |     | 574    | 618  | 530         | 550 | 485  | 389 | 415 | 441          | 441     | 402  | 15  | 373             | 178             | 60  | 479 | 170             | (-40-1) | 255          | 11117      | 537          |
|       |   |     |      |     |     |        |      |             |     |      |     |     |              |         |      |     | 288             | 213             |     | 466 |                 | (40-!)  |              |            |              |
| 1.5   |   | 603 | 1:15 | 512 | 578 | 574    | 683  | 561         | 450 | 479  | 402 | 442 | 441          | 441     | 240  | 7.5 | 387             | 160             | 210 | 413 | (-40-7)         | (-40?)  | 380          | 353        | 518          |
| *11   |   | 460 | 496  | 543 |     | 576    |      |             |     |      |     |     |              |         |      |     |                 | (-40-7)         |     |     |                 | (-401)  |              |            |              |
| 2 3   |   | 433 | Con  | 566 | 578 |        |      |             |     |      |     | 440 |              |         |      |     | 610             | 5               |     |     |                 | (10!)   |              |            |              |
| 19    |   | 403 |      | 356 |     |        |      |             |     |      |     |     |              |         |      |     | 440             | 64              |     |     |                 | (-40!)  |              |            |              |
| .55   |   | 499 | 503  | 590 |     |        |      |             |     |      |     | 440 |              |         |      |     | 339             | 179             |     |     |                 | 161     |              |            |              |
| 10    |   |     | 520  |     | 631 |        |      |             |     |      |     |     |              |         |      |     | 224             |                 |     |     |                 | 76      |              |            |              |
| 4.5   |   |     | 538  | 626 | 642 |        |      |             |     |      |     |     |              | (40?)   |      |     | 210             |                 |     |     |                 | 98      |              |            |              |
| ã0    |   | 602 | 527  | 675 | 616 | (1,1,2 | 642  | 65:         | 482 | 451  | 318 | 440 | 441          | (-40-2) | 135, | 431 | 190-            |                 |     |     |                 | (10*)   | 565          | 571        | 572          |
| 55    |   | 527 | 543  | 650 | 607 | 564    | 580  | 580         | 477 | 432  | 279 | 440 | 441          | 250     | 143  | 430 | 80:             | 299             | 509 | 170 | 65              | . 198   | 510;         | 611        | 495          |
|       | 1 |     |      |     | 1   |        |      |             |     |      |     |     |              |         | !    |     |                 |                 |     |     |                 |         |              |            |              |

#### Term-day readings of the Brooks bifilar magnetometer, March 15, 1883.

|         | Oh   | 14  | 2h   | gh.  | 41   | 5 <sup>h</sup>   | 6h   | Th   | 8h   | gh   | 104  | 11h   | Noon.  | 131  | 144  | 15h  | 16h  | 174  | 184  | 191  | 20h        | 211   | 221  | 23*  |
|---------|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|------------|---|--|--|
| 0m 5 10 | 452<br>457<br>432<br>428<br>442<br>444<br>438<br>436 | 435<br>434<br>441<br>443<br>433<br>442<br>430<br>438<br>439<br>441<br>439 | 451<br>448<br>433<br>430<br>453<br>462<br>442<br>447<br>444<br>449<br>436<br>449 | 450<br>450<br>432<br>460<br>553<br>500<br>462<br>489<br>512<br>519<br>479<br>460 | 401<br>438<br>408<br>456<br>478<br>446<br>433<br>430<br>430<br>446<br>475<br>478 | 453<br>472<br>520<br>465<br>496<br>540<br>476<br>517<br>478<br>430<br>485<br>447 | 480<br>429<br>474<br>484<br>480<br>470<br>470<br>471<br>459<br>481<br>463<br>454 | 484<br>498<br>498<br>492<br>476<br>475<br>481<br>496<br>493<br>516<br>499<br>473 | 450<br>464<br>481<br>294<br>338<br>350<br>355<br>604<br>528<br>400<br>450<br>485 | 521<br>496<br>481<br>460<br>458<br>480<br>501<br>492<br>504<br>524<br>507<br>500 | 484<br>491<br>479<br>462<br>419<br>426<br>404<br>807<br>380<br>342<br>377<br>270 | 249<br>220<br>227<br>270<br>847<br>397<br>379<br>(40-†)<br>870<br>296<br>813<br>472 | 888<br>375<br>371<br>892<br>395<br>374<br>458<br>463<br>446<br>437<br>430<br>429 | 412<br>430<br>383<br>384<br>394<br>447<br>368<br>375<br>391<br>879<br>431<br>421 | 434<br>435<br>438<br>468<br>466<br>462<br>460<br>455<br>442<br>456<br>446<br>451 | 455<br>479<br>469<br>462<br>464<br>452<br>440<br>430<br>392<br>386<br>377<br>349 | 377<br>384<br>386<br>390<br>891<br>397<br>415<br>379<br>413<br>395<br>361<br>364 | 381<br>364<br>402<br>422<br>428<br>450<br>440<br>428<br>442<br>440<br>437<br>425 | 427<br>440<br>442<br>412<br>417<br>411<br>409<br>387<br>350<br>306<br>877<br>889 | 412<br>419<br>401<br>413<br>433<br>437<br>442<br>444<br>442<br>453<br>439<br>428 | 434<br>424 | 452<br>443<br>468<br>470<br>460<br>460<br>460<br>460<br>449 | 451<br>452<br>452<br>448<br>444<br>446<br>441<br>446<br>446<br>446 | 436<br>140<br>443<br>440<br>4 7<br>4 150<br>426<br>402 |

#### Term-day readings of the Brooke bifilar magnetometer, April 1, 1883.

|    | Oh   | 1ª   | 24  | Зъ   | 4h   | 5 h   | 6h   | 7h   | 8h  | 9ъ  | 10h  | 11h  | Noon.   | 135   | 14h  | 15h  | 16h  | 17h  | 18h  | 19h  | 20h  | 214   | 22  | 234                                      |
|----|--|--|---|--|--|---|--|--|---|---|--|--|---|---|--|--|--|--|--|--|--|---|---|--|
| 0m | 420<br>421<br>415<br>409<br>394<br>405<br>382<br>380<br>394<br>402<br>400<br>407 | 308<br>303<br>415<br>407<br>401<br>395<br>401<br>386<br>387<br>386<br>399<br>426 | 428<br>414<br>417<br>430<br>435<br>459<br>454<br>442<br>433<br>420<br>419 | 406<br>550<br>506<br>492<br>498<br>501<br>514<br>501<br>486<br>477<br>440<br>447 | 474<br>489<br>489<br>474<br>448<br>423<br>417<br>421<br>449<br>482<br>494<br>495 | 482<br>472<br>434<br>440<br>458<br>469<br>482<br>472<br>442<br>441<br>431 | 437<br>449<br>465<br>470<br>482<br>440<br>437<br>442<br>451<br>468<br>470<br>485 | 518<br>520<br>552<br>562<br>511<br>519<br>529<br>504<br>518<br>570<br>563<br>559 | 590<br>567<br>574<br>614<br>592<br>552<br>572<br>570<br>543<br>587<br>571 | 579<br>570<br>560<br>528<br>502<br>474<br>463<br>476<br>475<br>454<br>454 | 447<br>408<br>388<br>421<br>450<br>403<br>395<br>396<br>435<br>385<br>380<br>337 | 346<br>395<br>373<br>360<br>341<br>340<br>361<br>338<br>371<br>230<br>250<br>240 | 324<br>320<br>286<br>302<br>(-40-!)<br>(-40-!)<br>27<br>145<br>296<br>132<br>64<br>81 | 93<br>220<br>180<br>279<br>260<br>255<br>225<br>313<br>222<br>271<br>303<br>309 | 329<br>314<br>326<br>285<br>336<br>360<br>339<br>333<br>372<br>359<br>876<br>364 | 398<br>376<br>392<br>401<br>362<br>436<br>396<br>400<br>384<br>425<br>370<br>355 | 350<br>370<br>350<br>372<br>371<br>348<br>343<br>309<br>323<br>428<br>428<br>439 | 33 )<br>348<br>363<br>369<br>320<br>263<br>299<br>279<br>244<br>258<br>240 | 226<br>242<br>244<br>268<br>302<br>3.9<br>326<br>324<br>330<br>292<br>327<br>340 | 367<br>388<br>394<br>402<br>401<br>387<br>400<br>411<br>427<br>430<br>432<br>428 | 416<br>421<br>419<br>421<br>416<br>379,<br>371 | 386<br>394<br>400<br>404<br>591<br>588<br>411<br>432<br>438 | 426<br>421<br>118<br>467<br>464<br>469<br>364 | 4 88 87 88 88 88 88 88 88 88 88 88 88 88 |

#### Term-day readings of the Brooke bifilar magnetometer, April 15, 1883.

| stat stat and |
|---------------|
| 215 225 235   |
| -             |
| 387 352 345   |
| 386 375 350   |
| 380 378 349   |
| 378 361 345   |
| 377 363 348   |
| 372 313 345   |
| 374 338 342   |
| 376 319 043   |
| 382 329 338   |
| 390 331 336   |
| 385: 335 ::47 |
| 387 342 343   |
|               |
| 26164149226   |

#### Term-day readings of the Brooke bifilar magnetometer, May 1, 1883.

| term - |       |     | 1   |     | -   |     |     |     |     |     |     |     |     |            |     |      |      |     |            |         |      |                 |     |     | -     |
|--------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|-----|------|------|-----|------------|---------|------|-----------------|-----|-----|-------|
|        | i     | 0h  | 1h  | 2h  | 34  | 4h  | 5h  | 6h  | 75  | 5,0 | 9h  | 10h | 11h | Noon.      | 13h | 111h | 15h  | 16h | 17h        | 18h     | 191: | 20 <sup>b</sup> | 21  | 22  | 235   |
| _      |       |     |     |     | -   |     |     |     |     |     |     | i   |     |            |     | 1    | 1    |     |            |         |      |                 |     |     |       |
| 02     |       | 393 | 340 | 325 | 356 | 433 | 474 | 577 | 488 | 420 | 500 | 437 | 369 | 252        | 280 | 332  | 328  | 305 | 983        | (-40-2) | 83   | 109             | 916 | 237 | 1118  |
| 5      |       | 387 | 353 | 332 | 358 | 443 | 452 | 619 | 467 | 486 | 483 | 381 | 383 | 304        |     |      |      | 300 |            | (-40-1) |      |                 |     | 210 |       |
|        |       |     |     |     |     |     |     |     | 442 |     |     |     | 374 |            | 322 |      |      |     | 217        | 44      |      |                 |     | 216 |       |
|        |       |     |     |     |     |     |     |     |     |     |     | 381 |     | 185        | 372 |      |      | 271 | 198<br>216 |         | 154  | - 48<br>- 30    |     | 179 |       |
| 25     |       |     |     |     |     |     |     |     |     |     |     | 383 |     | 183        | 280 |      |      |     | 192        |         |      | - 29            |     |     | 10.00 |
| 30     |       |     |     |     | 374 |     | 554 |     |     | 506 |     |     | 340 |            |     |      | 306  |     | 130        |         | 160  |                 |     | 210 |       |
|        |       |     |     |     |     |     | 490 |     |     |     |     | 362 |     |            |     |      | -310 |     | 69         |         | 159  |                 |     | 194 |       |
|        | ***** |     |     |     |     | 403 |     |     |     | 474 |     |     |     |            | 300 |      |      |     | 42         |         | 112  |                 |     | 189 |       |
|        |       |     |     |     | 420 | 453 | 515 |     |     |     |     |     | 158 | 239<br>198 | 354 |      | 316  |     | 23         |         | 100  | 245             |     | 223 |       |
| 55     |       |     |     |     | 433 |     | 548 |     |     |     |     |     |     | 1.51       |     |      | 321  |     | - 20       | 74      | 130  |                 |     | 206 |       |
|        |       |     |     |     |     |     |     |     |     |     |     |     |     |            |     |      |      |     |            |         |      |                 |     |     |       |

Term-day readings of the Brooke bifiler magnetometer, May 15, 1883.

20h 21h 22h 23h

|    |     | 0 p | 13  | 2h  | 3h  | 45  | 5ª  | 6,  | 3.9 | 51  | 91   | 10h  | 11) | Noon | P.225 | 145 | 15%     | 165   | 17"  | 185  | 195    | 20°   | 211   | 225   | 23   |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|------|-------|-----|---------|-------|------|------|--------|-------|-------|-------|------|
|    |     |     |     |     |     |     |     | _   | -   | -   | -    |      |     |      |       |     |         |       |      |      |        |       |       |       |      |
| Om |     | 376 | 368 | 364 | 364 | 361 | 400 | 449 | 432 | 407 | 350  | 470  | 363 | 365  | 332   | 357 | (\$945) | 273   | 303  | 140  | 22.6   | 348   | 446   | 400   | 3    |
| 5  |     | 376 | 372 | 366 | 362 | 394 | 384 | 434 | 410 | 407 | 275  | 440  | 395 | 325  | 324   | 346 | 340     | 2-11  | 2.13 | 138  | 250    | 356   | \$14  | 339.3 | :.   |
| 0  |     | 377 | 367 | 372 | 358 | 399 | 371 | 411 | 424 | 400 | 436  | 427  | 364 | 370  | 297   | 369 | 30 63   | 282   | 290  | 144  | 310    | 356   | 435   | 191   | 13   |
| 5  |     | 376 | 373 | 373 | 855 | 417 | 389 | 411 | 427 | 405 | 424  | 435  | 350 | 37.8 | 313   | 376 | 357     | 312   | 260  | 158  | 107    | 314.1 | 432   | 501   | 31   |
| 0  |     | 377 | 309 | 372 | 351 | 418 | 380 | 427 | 427 | 394 | 392  | 385  | 405 | 398  | 307   | 381 | 349     | 211   | 265  | 1,50 | 328    | 351   | 42.9  | 25:0  |      |
| 5  | - 1 | 380 | 302 | 376 | 350 | 408 | 393 | 437 | 424 | 404 | 407  | 405  | 465 | 381  | 338   | 385 | 340     | 11175 | 250  | 168  | 1 15:3 | 353   | 433   | 35-14 | 16   |
| 0  |     | 382 | 370 | 370 | 345 | 384 | 410 | 442 | 429 | 428 | 415  | 412  | 424 | 365  | 355   | 388 | 333     | 215   | 230  | 179  | 33.1.1 | 328   | 428   | 240.0 | 16   |
| 5  |     | 378 | 370 | 370 | 349 | 374 | 418 | 456 | 426 | 432 | 410  | 403  | 336 | 346  | 039   | 382 | 351     | 231   | 199  | 181  | 334    | 324   | 419   | 2005  | - 11 |
| 0  |     | 377 | 370 | 368 | 362 | 300 | 428 | 467 | 425 | 440 | 411  | 410  | 310 | 322  | 350   | 394 | 341     | 136   | 170  | 211  | 343    | 312   | 405 : | 385   |      |
|    |     | 380 | 369 | 367 | 384 | 397 | 430 | 456 | 400 | 423 | 458  | 415  | 411 | 354  | 329   | 391 | 850     | 200   | 172  | 906  | 350    | 404   | 300   | 381   |      |
|    |     | 879 | 363 | 366 | 380 | 407 | 439 | 443 | 421 | 405 | 437  | 331  | 360 | 358  | 334   | 367 | 330     | 280   | 160  | 234  | 355    | 445   | 200   | 376   | - 3  |
|    |     | 373 | 368 | 363 | 361 | 403 | 452 | 439 | 415 | 359 | 4118 | 9.45 | 378 | 350  | 259   | 391 | 252     | 955   | 132  | 1.55 | 259    | 151   | 40.2  | 375   | - 3  |

Term-day readings of the Brooke bifilar magnetometer, June 1, 1883.

|  | 0h   | 1h  | 2 h | 3h   | 4h  | 5 <sup>b</sup> | 61  | 711  | 56    | gh  | 10½   | 11h | Noca | 125   | 111  | 15 <sup>h</sup> | 165  | 175 | 186  | 16.5     | $20^{\rm b}$ | 21    | 22:   | 2. |
|--|------|-----|-----|------|-----|----------------|-----|------|-------|-----|-------|-----|------|-------|------|-----------------|------|-----|------|----------|--------------|-------|-------|----|
|  |      |     |     |      |     |                |     |      |       |     |       |     |      |       |      |                 |      |     |      |          | *            |       |       |    |
|  |      |     |     |      | 490 |                |     |      | 359   | 379 | 430   | 470 | 333  | 387   | 386  | 359             | 277  | 228 | 145  | 27       | (-40-7)      | 59    | 2.33  |    |
|  |      |     |     | 4:17 | 496 | 41'            | 438 | 440  | 353   | 391 | 418   | 466 | 360  | 405   | 379  | 363             | 21h  | 130 | 128  | 12       | (-40-7)      | 110   | 2.16  | :  |
|  | 395  | 394 | 379 | 429  | 481 | 430            | 481 | 417  | 369   | 356 | 410   | 454 | 384  | 420   | 37.2 | 364             | 170  | 132 | 8.2  | 15       | ( (1) 1)     | 117   | 249   |    |
|  | 385  | 388 | 397 | 427  | 493 | 420            | 528 | 392  | 360   | 379 | 425   | 476 | 359  | 439   | .365 | 364             | 220  | 128 | 127  | 17       | -21          | 160   | 250   |    |
|  | 410  | 395 | 403 | 453  | 500 | 430            | 513 | 392  | 369   | 290 | 402   | 483 | 384  | 4317  | 364  | 345             | 196  | 227 | >45  | 3.5      | -12          | ({},) | 267   |    |
|  | 415/ | 398 | 369 | 454  | 464 | 433            | 548 | 37.3 | 374   | 387 | . 425 | 480 | 275  | 412   | 3342 | 345             | 179  | 240 | 63   | (401)    | 56           | 2.9   | 220   |    |
|  |      |     |     |      |     |                |     |      | 375   | 384 | 409   | 470 | 398  | 426   | 366  | 338             | 130  | 2:0 | 32   | (n-{ti() | 25           | 215   | 241   |    |
|  |      |     |     |      | 447 |                |     |      | 377   | 391 | . 410 | 472 | 318  | 419   | 281  | 327             | 172  | 179 | 11   | ( (' ')  | 67           | 269   | 1.196 |    |
|  |      |     |     | 418  | 462 | 443            | 500 | 368  | 371   | 400 | 436   | 451 | 274  | 421   | 382  | 1,96            | 1,35 | 152 | - 08 | (101)    | 7.2          | 213   | 234   |    |
|  |      |     | 421 | 413  | 400 | 444            | 480 | 358  | 376   | 405 | 455   | 401 | 255  | 18100 | 370  | 25-1            | 192  | 7:3 | - 17 | (-40-2)  | CS.          | 211   | 246   |    |
|  |      |     | 427 | 444  | 440 | 430            | 484 |      | 382   |     |       |     |      |       |      |                 |      |     |      | (-40-2)  |              | 228   | 203   |    |
|  |      |     |     | 466  | 431 | 430            | 460 | 346  | 11941 | 414 | 161   | 297 | 311  | 381   | 366  | 190             | 151  | 115 | 20   | (-40-1)  |              |       | 142   |    |
|  |      |     |     |      |     |                |     |      |       |     |       |     |      |       |      |                 |      |     |      |          |              |       |       |    |

Term-day readings of the Brooke bifilar magnetometer, June 15, 1883.

|    |         |                    |     |       |     |     |       |        |       |           |         |              | -     |       |              |      |              |       |     |      |     |              |              |       |        |
|----|---------|--------------------|-----|-------|-----|-----|-------|--------|-------|-----------|---------|--------------|-------|-------|--------------|------|--------------|-------|-----|------|-----|--------------|--------------|-------|--------|
|    |         | $\mathbf{O}^{t_1}$ | f h | 2 h   | 36  | 15  | ãh    | (§h    | 7 h   | $S^{\pm}$ | $g_{k}$ | $10^{\rm h}$ | 10    | Som   | $13^{\rm b}$ | 115  | $15^{\rm h}$ | 165   | 175 | 1%   | 195 | $20^{\rm h}$ | $24^{\rm h}$ | 22:   | 236    |
|    |         | 1                  |     | !     |     |     |       |        | ,     |           |         |              |       |       |              |      |              |       |     |      |     |              |              |       |        |
| 6" |         | 371                | 353 | 319   | 335 | 367 | 333   | 332    | 311   | 372       | 394     | 406          | 412   | 389   | 398          | 401  | 380          | 370   | 410 | 395  | 337 | 238          | 366          | 353   | 327    |
| 5  |         | 374                | 354 | 330   | 316 | 351 | 339   | 33(3)3 | 340   | 364       | 388     | 3n4          | 4ii   | iteti | 404          | 401  | 374          | 373   | 418 | 3540 | 366 | 261          | 370          | 1553  | 319    |
| 10 |         | 371                | 354 | 343   | 342 | 351 | 327   | 333    | , 342 | 371       | 368     | 396          | 411   | 389   | 404          | 469  | 371          | 370   | 414 | 391  | 389 | 286          | 379          | 352   | 337    |
|    |         |                    | 349 | 336   | 352 | 362 | 325   | 331    | 349   | 365       | 401     | 402          | 418   | 35-13 | 406          | 40.1 | 371          | 11743 | 402 | 386  | 378 | 301          | 400          | 351   | 329    |
| 20 |         | 376                | 350 | 331   | 341 | 353 | 321   | 334    | 346   | 370       | 398     | 405          | 416   | 385   | 406          | 396  | 371          | 395   | 384 | 390  | 302 | 18 846       | 320          | 311   | 332    |
| 25 | ******* | 376                | 333 | 312   | 348 | 354 | 330   | 396    | 345   | 346       | 392     | 410          | 411   | 385   | 404          | 356  | 378          | 3398  | 388 | 0.5  | 368 | 356          | 3-9          | 3 .03 | 326    |
| 30 |         |                    |     | 313   | 349 | 357 | . 328 | 334    | 342   | 335       | 309     | 411          | 411   | 383   | 100          | 4) 2 | 35-4         | 3398  | 395 | 3~9  | 362 | 350          | 3-4          | 346   | 330    |
| 35 |         |                    |     |       | 358 | 361 | 328   | 334    | 345   | 370       | 392     | 411          | 398   | 381   | 398          | 394  | 390          | 405   | 409 | 354  | 347 | 319          | 380          | 3.57  | 303    |
| 40 |         | 368                | 328 | 316   | 366 | 377 | 335   | 337    | 3.53  | 376       | 3594    | 412          | 404   | 384   | 398          | 379  | 392          | 388   | 412 | 361  | 202 | 324          | 376          | 3331  | 318    |
| 45 |         |                    | 327 | 1 316 | 375 | 372 | 329   | 341    | 357   | 380       | 302     | 412          | 1.369 | 390 : | 402          | 354  | 382          | 266   | 409 | 344  | 282 | 21.73        | 3:6          | 335   | 13 108 |
| 50 |         | 372                | 316 | 311   | 373 | 363 | 327   | - 339  | 1.362 | 379       | 103     | 413          | 390   | 397   | 415          | 374  | 383          | 462   | 403 | 328  | 261 | 246          | 362          | 339   | 340    |
| 55 |         | 360                | 319 | 336   | 376 | 351 | 325   | 338    | 375   | , 382     | 406     | 409          | 386   | 400   | 410          | 375  | 389          | 384   | 392 | 327  | 254 | 340          | 354          | 321   | 3.4    |
|    |         |                    |     | 1     |     | 1   |       |        |       |           |         |              |       |       |              |      |              |       |     |      |     |              |              |       |        |

Term-day readings of the Brooke bifilar magnetometer, July 1, 1883.

|     | $\theta_{P}$ | 14  | 2h  | 3h  | 4h  | 5 <sup>b</sup> | Br  | 7 h | Sh. | $9^{\rm h}$ | $10^{\rm h}$ | 11h       | Noon | <b>1</b> 35 | 144 | 15h     | 16h     | 17h    | 1%b       | $10^{\rm h}$ | 20h     | $2i^{\rm h}$ | $22^{\rm h}$ | 23h |
|-----|--------------|-----|-----|-----|-----|----------------|-----|-----|-----|-------------|--------------|-----------|------|-------------|-----|---------|---------|--------|-----------|--------------|---------|--------------|--------------|-----|
| _   |              |     |     |     | -   |                |     |     |     |             |              |           |      |             |     |         |         | -      |           | • -          |         |              |              |     |
| 6m  |              |     |     |     |     |                |     |     |     |             | 160          |           |      | 279         | 463 | 389     | (-40-?) | 140    | . (-40-?) | (40!)        | (-40-?) | 44           | 241          | 294 |
| - 5 |              |     |     |     |     |                |     |     |     |             | 207          |           |      | 346         |     | 401     | (-40-!) |        | 1 (-40-?) |              |         |              |              |     |
| 10  |              |     |     |     |     |                |     |     |     |             | 143          |           |      | 338         | 551 | 423     | (-40-!) |        | ! (-40-1) |              |         |              |              |     |
| 15  |              |     |     |     |     |                |     |     |     |             | 189          |           |      | 349         | 518 | 267     | - 28    |        | (-40?)    |              |         |              |              |     |
| 20  |              |     |     |     |     |                |     |     |     |             | 226          |           |      | 420         | 362 | 402     | 30      |        | , (-40-7) |              |         |              |              |     |
| 25  |              |     |     |     |     |                |     |     |     |             | 296          |           | 450  |             | 308 | 450     | - G0    |        | (4112)    |              |         |              |              |     |
| 30  |              |     |     |     |     |                |     |     |     |             |              | (-40-1)   |      |             |     |         | 02      |        | (-40-!)   |              |         |              |              |     |
| 35  |              |     |     |     |     |                |     |     |     |             | 282          |           | 317  |             | 72  | 380     | F4.     |        | (-40-4)   |              |         |              |              |     |
|     |              |     |     |     |     |                |     |     |     |             | 245          |           | 342  |             | 160 | 58      | 90      |        | (-40-1)   |              |         |              |              |     |
| 45  |              |     |     |     |     |                |     |     |     |             | 320          |           | 330  |             |     | (-40-?) |         |        | (-41!)    |              |         |              |              |     |
| 50  |              |     |     |     |     |                |     |     |     |             |              | (-40-?)   |      |             |     | (10-!)  |         |        | (4(1()    |              |         |              |              |     |
| 55  | <br>388,     | 543 | 720 | 418 | 679 | 632            | 420 | 588 | 410 | 303         | 341          | (-40 - 1) | 168  | 454         | 402 | (       | 179     | (-40-1 | (-40-4)   | (-4c-')      | 16      | 250          | 268          | 350 |
| -   | <br>_        |     |     | _   |     | 1              | ļ   | 1   |     |             |              |           |      |             |     |         |         |        |           |              |         |              |              |     |

Term day readings of the Brooke bifilar magnetometer, July 15, 1883.

|   | <br>   |   | _  |  |   |  |  |   |  |   |   |  |   |   |                                 |  | *** |  |                    |     |                   |  | wheeper  |      |
|---|--|---|--|--|---|--|--|---|--|---|---|--|---|---|---------------------------------|--|-----|--|--------------------|-----|-------------------|--|--|------|
|   | 0h   | 15  | 25   | ijh  | 45  | 5h   | 631  | 7h  | 8h   | $9^{\rm h}$   | 10h   | 11h  | Noon  | 131   | 14h                             | 15h                                    | 16½ | 171  | 194                | 19* | 201               | 211  | 22%  | 33*  |
| 5<br>10<br>15<br>20<br>25<br>80<br>85<br>40 | 374<br>366<br>864<br>366<br>362<br>373<br>368<br>365<br>357<br>360 | 34e<br>349<br>366<br>319<br>320<br>321<br>34e<br>351<br>341 | 926<br>916<br>950<br>955<br>957<br>951<br>951<br>951 | 846<br>846<br>846<br>846<br>846<br>846<br>846<br>846<br>847<br>847 | 310<br>310<br>310<br>350<br>343<br>350<br>362<br>268<br>367 | 37<br>158<br>180<br>180<br>180<br>180<br>180<br>180<br>180<br>180<br>180<br>18 | 368<br>371<br>376<br>179<br>374<br>3.3<br>254<br>366<br>483<br>330 | 403<br>420<br>437<br>435<br>452<br>457<br>468<br>485,<br>457<br>449 | 460<br>451<br>459<br>474<br>456<br>500<br>470<br>471<br>459<br>451 | 444<br>439<br>431<br>426<br>418<br>409<br>400<br>406<br>406 | 394<br>406<br>406<br>416<br>398<br>403<br>422<br>422<br>380 | 431<br>430<br>433<br>425<br>430<br>432<br>427<br>423<br>411<br>418 | 410<br>422<br>411<br>403<br>405<br>412<br>413<br>418<br>424 | 417<br>421<br>413<br>409<br>401<br>403<br>391<br>384<br>410 | 397<br>410<br>389<br>383<br>375 | 420<br>432<br>457<br>468<br>405<br>397 |     | - 15<br>10<br>- 27<br>- 12<br>33<br>(-4'!)<br>(-40')<br>(-40') | (-40-?)<br>(-40-?) |     | 344<br>442<br>426 | 305<br>320<br>362<br>412<br>423<br>452<br>420<br>439<br>418<br>426<br>411<br>398 | 362<br>370<br>366<br>321<br>214<br>165<br>188<br>236<br>250<br>260<br>263<br>270 | 1:00 |

Term divergadings of the Brooke bifile : magnet we for, lugust 1, 1883.

|                           | <br>-                                       |   |                          |   |  |                                 |            |                   |                                 |     |     |                   |   |   |                                 |                          |                          |                          |                                 |                          |                 |                   |   |                          |
|---------------------------|---|---|--------------------------|---|--|---------------------------------|------------|-------------------|---------------------------------|-----|-----|-------------------|---|---|---------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|--------------------------|-----------------|-------------------|---|--------------------------|
|                           | 01-   | 11                                      | 2.                       | 33%                                     | I.b.                                   | 51                              | 6h         | 7h                | Sh ;                            | 9h  | 10h | $10^{\rm h}$      | 1000                                    | 5.10  | 1 %                             | 15h                      | 16h                      | 17h                      | 18h                             | 19h                      | 30 <sup>p</sup> | 211               | 22h   | 231                      |
| -                         |   |   |                          |   |  |                                 |            |                   |                                 |     |     |                   | -                                       |   |                                 | -                        |                          |                          |                                 |                          |                 | -                 |   |                          |
| 5<br>10<br>15<br>20<br>25 | <br>3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - | 35 1<br>35 1<br>4 2 3<br>4 2 3<br>7 3 6 | 393<br>4 6<br>415<br>1 0 | 127<br>118<br>1 2 3<br>1 3 3<br>1 4 3 3 | 164<br>158<br>153<br>153<br>153<br>153 | 570<br>570<br>673<br>672<br>675 | 603<br>507 | 465<br>417<br>410 | 369<br>390<br>340<br>403<br>415 | 510 |     | 150<br>268<br>60  | 370<br>  431<br>  430<br>  312<br>  247 | 524<br>524<br>512<br>512<br>564<br>571<br>591 | 482<br>487<br>471<br>470<br>443 | 453<br>449<br>447<br>473 | 455<br>433<br>411<br>469 | 282<br>310<br>261<br>350 | 205<br>190<br>204<br>265<br>246 | 337<br>371<br>386<br>383 | 484             |                   | 159<br>189<br>210<br>132<br>164<br>204<br>241 | 390<br>371<br>374<br>106 |
| 35<br>40<br>45<br>50      | 1.7<br>170<br>116<br>281                    | 351<br>277<br>156<br>313                | 370<br>316<br>382<br>351 | 480<br>480<br>465<br>160                | 1.7<br>1.5<br>570<br>1.5               | 7.14<br>712<br>615<br>761       | 5.6        | 420<br>418<br>438 | 415<br>466<br>183               | 397 | 244 | 224<br>254<br>610 |   | 503<br>448<br>459                             | 331<br>414<br>318               | 524<br>544<br>558        | 426<br>453<br>109        | 408<br>387<br>301        | 219<br>210                      | 452<br>443<br>442        | 176<br>115      | 280<br>199<br>202 | 238<br>306<br>272<br>361<br>415               | 1.84<br>592              |

Term-day readings of the Brooke bifilar magnetometer, August 15, 1883.

| No. 1 |   |             |       |     |      |       |     |                |             |        | -   |     |     |      |     |     |                 | 1   | -            |       |       |     |           |       |
|-------|---|-------------|-------|-----|------|-------|-----|----------------|-------------|--------|-----|-----|-----|------|-----|-----|-----------------|-----|--------------|-------|-------|-----|-----------|-------|
|       |   | $0^{\rm h}$ | 1h    | 25  | 23 h | 41-   | 5 n | $\Theta_{P-1}$ | $7^{\rm h}$ | Sh     | ga. | 10h | 11h | Noon | 13h | 14h | 15 <sup>h</sup> | 165 | $17^{\rm h}$ | 151   | 196 ' | 30° | 24h   22h | 235   |
|       | - |             |       |     |      |       |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       | i   |           |       |
| 0 m   |   | 711         | 716   | 770 | 741  | 701   | 770 | 700            | 688         | 7:22 1 | 717 | 715 | 769 | 749  | 750 | 731 | 738             | 705 | 707          | 699   | 703.1 | 688 | 700 702   | * C+9 |
| 5     |   | 603         | 774   | 763 | 663  | 742 1 | 780 | 742 ,          | 698         | 700    | 723 | 723 | 739 | 752  | 765 | 788 | 721             | 720 | 703          | 700   | 705   | 708 | 668   702 | 7:0   |
|       |   |             |       |     |      | 717 1 |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       | 705 | 708 . 708 | 7411  |
| 15    |   |             |       |     |      |       |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       |     | 704   700 |       |
| 20    |   |             |       |     |      | 811   |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       |     | 703 706   |       |
| 25    |   | 77.6        | 774   | 757 | 70%  | 804 1 | 724 | 744 -          | 712         | 695 3  | 729 | 748 | 74H | 750  | 734 | 726 | 741             | 709 |              | 711   |       | 700 | 704 700   |       |
|       |   |             |       |     |      |       |     |                |             |        |     |     |     |      |     |     | 743             |     |              | 710   |       | 700 | 706   696 |       |
|       |   |             |       |     |      |       |     |                |             |        |     |     |     |      |     | 732 | 739             |     |              |       | 607   |     |           |       |
|       |   |             |       |     |      |       |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       |     | 704 1 691 |       |
|       |   |             |       |     |      |       |     |                |             |        |     |     |     |      |     |     |                 |     |              |       |       |     | 706   692 |       |
| 50    |   | 772         | 781   | 753 |      |       |     |                |             |        |     |     |     |      |     |     | 728             |     |              | 11 22 |       |     | 692 689   |       |
| 20    |   | 754 .       | 751 - | 72× | 699  | 769   | 746 | 715            | 722         | 724    | 718 | 762 | 744 | 775  | 731 | 743 | 728             | 705 | 700          | 600   | 693   | 608 | 683 687   | 653   |
|       |   |             |       |     |      |       |     |                |             | 1      |     | 1   |     | 1    | 1   |     |                 |     |              | 1     | 1     |     |           | 1     |

#### READINGS OF THE BALANCE MAGNETOMETER ON TERM-DAYS AT UGLAAMIE, ALASKA, SEPTEM-BER, 1882, TO AUGUST, 1883.

Term-day readings of the Brooke balance magnetometer, September 15, 1882.

| [Göttin⊾: | n | time | ia | emp | loved. |
|-----------|---|------|----|-----|--------|
|           |   |      |    |     |        |

201 211 221 231

 $\begin{array}{cccc} 502 & 190 \\ 507 & 150 \\ 496 & 209 \\ 480 & 249 \\ 484 & 283 \\ 485 & 202 \\ 448 & 840 \\ 370 & 309 \\ 322 & 280 \\ 176 & 199 \\ 115 & 202 \\ 95 & 152 \\ \end{array}$ 

|    | ()h | 1      | 2h  | 3h  | 44  | 15 h | (jh | į.h. | 8h  | 9h  | 10% | 114 | Noon. | 13 <sup>h</sup> | 14% | 15h | 16h | 17h | 1Rh | 19h | 20h | 214 | 33,   | 231 |
|----|-----|--------|-----|-----|-----|------|-----|------|-----|-----|-----|-----|-------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|
| Om | 404 |        | 407 | 407 | 407 | 407  | 409 | 400  | 898 | 388 | 891 | 393 | 40i   | 398             | 407 | 406 | 406 | 403 | 404 | 404 | 404 | 402 | 401   | 39  |
| 5  | 403 | 405    | 406 | 40" | 406 | 407  | 409 | 400  | 404 | 380 | 390 | 392 | 895   | 400             | 406 | 407 | 405 | 404 | 403 | 404 | 404 | 402 | 400   | 39  |
| 0  | 404 | 9 7    | 407 | 401 | 406 | 408  | 408 | 401  | 395 | 386 | 891 | 804 | 394   | 401             | 406 | 407 | 405 | 403 | 403 | 405 | 404 | 402 | 400   | 39  |
| 5  | 404 | auto 1 | 407 | 407 | 407 | 409  | 408 | 401  | 893 | 365 | 393 | 394 | 393   | 403             | 405 | 407 | 405 | 404 | 403 | 405 | 404 | 402 | 400   | 36  |
| 1) | 404 | 106    | 406 | 407 | 407 | 409  | 406 | 402  | 392 | 390 | 390 | 394 | 392   | 403             | 405 | 407 | 405 | 404 | 403 | 405 | 404 | 403 | 400   | 39  |
|    | 404 | 406    | 407 | 407 | 407 | 409  | 406 | 400  | 392 | 392 | 390 | 396 | 395   | 402             | 405 | 407 | 405 | 404 | 403 | 405 | 403 | 402 | 1 400 | 39  |
| 1  | 401 | 406    | 406 | 407 | 407 | 40:  | 402 | 1.12 | 392 | 393 | 892 | 394 | 396   | 406             | 406 | 407 | 405 | 404 | 403 | 405 | 403 | 402 | 400   | 30  |
| 5  | 405 | 406    | 406 | 117 | 407 | 405  | 403 | 402  | 393 | 390 | 394 | 394 | 396   | 409             | 405 | 407 | 404 | 404 | 403 | 404 | 403 | 401 | 400   | 30  |
| 0  | 405 | 406    | 406 | 407 | 408 | 400  | 402 | 402  | 390 | 391 | 394 | 396 | 394   | 407             | 404 | 407 | 405 | 404 | 403 | 404 | 403 | 401 | 400   | 35  |
| 5  | 404 | 408    | 406 | 407 | 407 | 409  | 403 | 400  | 390 | 389 | 392 | 396 | 395   | 404             | 405 | 407 | 405 | 404 | 403 | 404 | 403 | 401 | 399   | 31  |
|    | 405 | 407    | 406 | 407 | 407 | 409  | 402 | 398  | 391 | 390 | 395 | 394 | 395   | 402             | 405 | 408 | 405 | 404 | 403 | 404 | 402 | 401 | 399   | 3   |
| 5  | 405 | 407    | 406 | 407 | 407 | 409  | 401 | 400  | 889 | 392 | 394 | 397 | 395   | 407             | 406 | 406 | 403 | 403 | 404 | 404 | 402 | 400 | 390   | 3   |

#### Term-day readings of the Brooke balance magnetometer, October 1, 1882.

| -    | was distributed |     |     |     | -   |     |     | _   | -   | -   |     | alternative processing |     |     |     | -   |     |     |     |     |     |     |       |       | -   |
|------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|
|      |                 |     |     |     |     |     |     |     |     |     |     |                        |     |     |     |     |     |     |     | 1   | 1   |     |       |       |     |
|      |                 |     |     |     |     |     |     |     |     |     |     | 408                    | 401 | 101 | 405 | 406 | 407 | 413 | 405 | 403 | 403 | 403 | 40°   |       | 401 |
|      |                 |     |     |     |     |     |     | 412 |     |     |     |                        |     |     | 404 | 400 | 407 | 413 | 405 |     | 403 | 403 | 41.   | 402   |     |
| 10   |                 | 414 | 414 |     |     |     |     |     |     | 410 |     |                        | 402 | 404 | 404 | 407 | 407 | 413 | 404 | 402 | 403 | 403 | 400   | 102   | - 4 |
| 15   |                 |     |     |     |     |     |     | 412 |     |     |     |                        |     |     | 404 | 407 | 407 | 413 | 404 |     | 403 | 403 | 11/2  | i02   |     |
| 20   |                 |     |     |     |     |     |     |     |     |     |     |                        |     |     |     | 407 | 407 | 412 |     |     |     |     |       | 402   |     |
| 95   |                 |     |     |     |     |     |     | 412 |     |     |     |                        |     |     | 406 |     |     | 412 |     |     |     | 403 |       | 403   |     |
| 100  |                 |     |     |     |     |     |     |     |     |     |     | 408                    | 401 |     | 406 | 406 |     | 411 |     |     | 403 |     | 4.00  | 102 1 | 101 |
| 13.3 |                 |     |     |     | 412 |     | 413 |     |     | 410 |     | 408                    | 462 |     |     | 406 |     | 410 |     |     |     |     | *02.  |       | 401 |
|      |                 |     |     |     | 412 |     |     | 411 |     |     |     |                        |     |     |     |     |     |     |     |     |     |     | 5 3 1 |       | 401 |
|      |                 |     |     |     |     |     | 413 |     |     |     |     |                        |     |     |     |     | 410 |     | 403 | 403 |     |     | 4 '   |       | 401 |
| 50   |                 | 414 | 413 |     |     |     |     | 411 |     |     |     |                        | 403 |     |     | 407 |     | 407 | 403 |     |     |     | 40.   |       | 401 |
| Dō   |                 | 414 | 413 | 412 | 412 | 412 | 413 | 411 | 410 | 410 | 408 | 403                    | 403 | 405 | 406 | 407 | 413 | 405 | 403 | 403 | 403 | 402 | 40    | 401   | 401 |
|      |                 |     |     |     |     |     |     |     |     |     |     |                        |     |     |     |     |     |     |     |     |     |     |       |       |     |

#### Term-day readings of the Brooke balance magnetometer, October 15, 1882.

| 0=   | <br>455 | 457   45   | 5 450   | 444   | 443 | 444 | 440 | 430 | 437 | 434 | 454 | 454 | 445 | 464 | 465 | 469   | 465  | 456 | 444 | 445 | 444   | 443 | 444 |
|------|---------|------------|---------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|-----|-----|-----|-------|-----|-----|
| - 5  |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     | 414 |
| 10   | <br>452 | 1 455 ; 45 | 5 + 450 | 444   | 447 | 444 | 440 | 425 | 435 | 436 | 415 | 455 | 461 | 462 | 456 | 468 . | 466  | 453 | 444 | 445 | 444   | 444 | 444 |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     | 414 |
| 20   | <br>457 | 475 40     | 4   447 | 445   | 447 | 144 | 412 | 433 | 438 | 436 | 450 | 455 | 466 | 465 | 455 | 472 ( | 472  | 449 | 446 | 444 | 443 ; | 444 | 443 |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |
|      |         |            |         |       |     |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |
| E(1) | <br>458 | 455 1 48   | 2 443   | 144   | 444 |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     | 411 |
| 55   | <br>457 | 455 : 40   | 1 + 444 | 1 444 | 444 | 442 | 428 | 433 | 436 | 450 | 452 | 445 | 464 | 460 | 468 | 466   | 4.56 | 446 | 445 | 443 | 443   | 444 | 411 |
|      |         |            |         |       | ė.  |     |     |     |     |     |     |     |     |     |     |       |      |     |     |     |       |     |     |

#### Term-day readings of the Brooke balance magnetometer, November 1, 1882.

| -  |          |              |         |             |             |     |           |          | 1     |     |     |          |         | 1 .   |     |      |               |       | -   |
|----|----------|--------------|---------|-------------|-------------|-----|-----------|----------|-------|-----|-----|----------|---------|-------|-----|------|---------------|-------|-----|
| 0  | n        | 436 43       | 5 431   | 131 430     | 431 430     | 431 | 430 1 426 | 424 425  | 2 423 | 430 | 433 | 455 44   | 6 ( 436 | 429   | 418 | 418  | 423   42      | 6 4   | 433 |
| 5  |          | 436 43       | 5 431   | 430   431   | 430 430     | 430 | 430   425 | 420 42   | 420   | 430 | 432 | 457   44 | 4   434 | 4.7   | 420 | 418  | 422   42      | 7 0   | 433 |
| 10 |          | 436   43     | 5 - 431 | 1 430   431 | 481 - 431   | 430 | 431 425   | 415 420  | 8 424 | 430 | 432 | 453   44 | 4   434 | 427   | 419 | 418  | $422 \mid 42$ | 8 .   | 432 |
|    |          |              |         |             | 431 . 430   |     |           |          |       |     |     |          |         |       |     |      |               |       | 432 |
| 20 |          | 435   435    | 5 , 4:0 | 430   431   | 1 431 + 431 | 430 | 431   424 | 420 410  | 6 425 | 430 | 436 | 449   44 |         |       |     |      |               |       | 432 |
|    |          |              |         |             | 431 431     |     |           |          |       |     |     |          |         |       |     |      |               |       | 433 |
| 30 |          | $436 \pm 43$ | 1 130   | 430   431   | 431 431     | 431 | 429   425 | 417 : 42 | 126   | 430 | 451 | 459 44   | 4   433 | . 423 | 418 | 419  | 424 ; 43      | 0   - | 132 |
|    |          |              |         |             | 431 430     |     |           |          |       |     |     |          |         |       |     |      |               |       |     |
|    |          |              |         |             | 430   431   |     |           |          |       |     |     |          |         |       |     |      |               |       |     |
|    |          |              |         |             | 430 - 430   |     |           |          |       |     |     |          |         |       |     |      |               |       |     |
|    |          |              |         |             | 431 431     |     |           |          |       |     |     |          |         |       |     |      |               |       |     |
| Do | ******** | 450 400      | 2 431   | 430 430     | 430 431     | 431 | 120 427   | 421 43   | 430   | 432 | 456 | 441 - 43 | 429     | 4:20  | 418 | 4.00 | 420 . 10      | No.   | 132 |
|    |          |              |         |             |             |     |           |          |       |     |     |          |         |       |     |      |               |       |     |

#### Term-day readings of the Brooke balance magnetometer, November 15, 1882.

| ***  | <br>     |     |     | Section on the |        |       |       |     |     |       | O DESCRIPTION |     | No. of Section 2 |      |     |     |     |        |     |     |        |      | -     |     |
|------|----------|-----|-----|----------------|--------|-------|-------|-----|-----|-------|---------------|-----|------------------|------|-----|-----|-----|--------|-----|-----|--------|------|-------|-----|
|      |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     | 1 .    |     |     |        |      |       |     |
| 0    |          |     |     |                |        |       | 486   |     |     |       |               |     |                  |      |     |     |     |        |     | 503 |        |      |       | 503 |
| - 5  | <br>512  | 500 | 517 | 515 .          | 500 :  | 195   |       |     |     |       |               |     |                  |      |     |     |     |        |     |     |        |      |       | 501 |
| 10   |          |     |     | 514            |        | 1:46  |       |     |     |       |               |     |                  |      |     |     |     | 520    |     |     |        |      |       | 501 |
| 15   |          | 510 |     |                |        |       | 479 . |     |     |       |               |     |                  |      |     |     |     | 519    |     |     |        |      | 500   | 501 |
| 20   |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     | 518    |     |     |        |      |       | 500 |
| 25   |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     | 520    |     |     |        |      |       | 500 |
| 30   |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     | 519    |     |     |        |      | 501   | 499 |
| 11.7 | <br>5.30 | 51- | 513 | 500            | olti ; | 498   | 480   | 482 | 500 | 4.5.3 | 473           | 111 | 510              | 534  | 527 | 523 | 518 | . 521  | 513 | 198 | 502    | 499  | 501 - | 501 |
| 41)  |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     |        |     |     |        |      | 501   |     |
| 45   | <br>520  | 518 | 513 | 504            | 507    | 4 -13 | 183   | 471 | 484 | 454   | 478           | 497 | 500              | 5338 | 526 | 5.2 | 519 | 520    | 511 | 500 | 501    | 501. | 502 . | 500 |
| 50   |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     | 520    |     |     |        |      |       | 500 |
| 55   | <br>518  | 520 | 515 | 500            | 508    | 488   | 178   | 174 | 494 | 461   | 184           | 501 | 625              | 538  | 525 | 521 | 521 | 1.918. | 505 | 500 | 5.01 : | 50), | 102   | 500 |
|      |          |     |     |                |        |       |       |     |     |       |               | 1   |                  |      |     |     | F   | 1      |     |     |        |      |       |     |
|      |          |     |     |                |        |       |       |     |     |       |               |     |                  |      |     |     |     |        |     |     |        |      |       |     |

Term-day readings of the Brooke balance magnetometer, December 1, 1882.

|         | <b>O</b> h | £h . | 2h    | ijh | #b    | 3h  | Bli | 7h  | Nh.   | 1011 | 10h | 111 | Noun | 131 | 14h   | 13h  | 16h  | 17h   | gNh  | 19h  | 20h  | 21h  | 224  |
|---------|------------|------|-------|-----|-------|-----|-----|-----|-------|------|-----|-----|------|-----|-------|------|------|-------|------|------|------|------|------|
|         |            | -    |       | 1   |       |     | 1   |     |       | 1    |     | -   | 1    |     |       |      |      |       |      | -    |      | -    |      |
|         | 512        | 511  | 514   | 514 | 515   | 512 | 513 | 511 | 516   | 519  | 518 | 521 | 594  | 526 | 593   | 533  | 541  | 502   | 530  | 532  | 531  | 539  | 501  |
|         | 511        | 514  | 512   | 516 | 514   | 511 | 510 | 513 | 516   | 517  | 518 | 521 | 525  | 525 | 520   | 533  | 537  | 530   | 531  | 532  | 531  | 533  | 5.0  |
|         | 510        | 515  | 513   | 516 | 511   | 514 | 511 | 513 | 517   | 517  | 510 | 521 | 520  | 529 | 527   | 531  | 535  | 530   | 532  | 532  | 5332 | 531  | 5.11 |
|         | 510        | 514  | 513   | 510 | 513   | 516 | 511 | 513 | 517   | 517  | 519 | 521 | 525  | 528 | 531 . | 534  | 534  | 530   | 532  | 532  | 532  | 532  | 500  |
|         | 510        | 515  | 513   | 518 | 513   | 516 | 511 | 513 | 517   | 517  | 520 | 521 | 525  | 525 | 500   | 5343 | 535  | 5110  | 533  | 55.2 | 532  | 5000 | 5.11 |
| ******* | 510        | 515  | 513   | 516 | 513   | 516 | 511 | 512 | 517   | 517  | 520 | 521 | 525  | 520 | 532   | 500  | 537  | 530   | 532  | 503  | 5003 | 532  | 5 11 |
|         | 511        | 516  | 513   | 510 | 514   | 515 | 511 | 513 | 517   | 517  | 520 | 522 | 5:35 | 517 | 5.11  | 507  | 537  | 530   | 5002 | 500  | 50.0 | 531  | 5.1  |
|         | 510        | 514  | 514   | 516 | 514   | 515 | 511 | 515 | 1.518 | 517  | 521 | 522 | 525  | 517 | 513 1 | 538  | 536  | 530   | 598  | 53.1 | 533  | 531  | 513  |
|         | 510        | 514  | 515   | 510 | 513   | 515 | 512 | 515 | 518   | 517  | 521 | 522 | 5.10 | 516 | 532 ( | 538  | 534  | 530 . | 5333 | 532  | 532  | 531  | 533  |
|         | 510        | 514  | 515   | 515 | 514   | 515 | 513 | 515 | 518   | 517  | 521 | 522 | 534  | 517 | 534   | 536  | 533  | 530   | 533  | 132  | 532  | 531  | 52.4 |
|         | 510        | 514  | . 515 | 510 | 513   | 511 | 510 | 514 | 518   | 517  | 521 | 523 | 530  | 520 | 5314  | 538  | 533  | 530   | 632  | 532  | 532  | 531  | 5.12 |
|         | 511        | 515  | 514   | 515 | 5.513 | 511 | 510 | 516 | 510   | 517  | 521 | 523 | 525  | 523 | 532   | 542  | 5332 | 530   | 53.2 | 531  | 5002 | 531  | 5.12 |

Term-day readings of the Brooke balance magnetometer, December 15, 1882.

|      | 1   |     |      |     | and the same |     |      |     | 1   |     |     |     |     |     |     |      |     |     |     |      |     | -    |     |     |
|------|-----|-----|------|-----|--------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|------|-----|------|-----|-----|
| G:12 | 524 | 523 | 526  | 528 | 531          | 534 | 538  | 538 | 541 | 513 | 543 | 544 | 542 | 543 | 544 | 543  | 542 | 540 | 511 | 535  | 531 | 522  | 516 | 51  |
| 5    | 523 | 525 | 525  | 529 | 530          | 535 | 507  | 540 | 542 | 543 | 511 | 545 | 543 | 543 | 544 | 5433 | 542 | 540 | 540 | 504  | 531 | 522  | 517 | 51  |
| 10   | 523 | 524 | 525  |     |              |     |      |     |     |     |     |     |     | 543 |     |      |     |     |     |      |     |      | 545 | 51  |
| 15   | 523 | 524 | 525  |     |              |     |      |     |     |     |     |     |     | 513 |     |      |     |     |     |      |     |      |     | 51  |
| 20   | 523 | 524 | 56   | 530 | 531          | 5.0 | 538  | 539 | 543 | 543 | 514 | 544 | 541 | 543 | 514 | 542  | 511 | 540 | 529 | 1.14 | 528 | 522  | 517 |     |
| 25   | 523 | 524 | 527  |     |              |     |      |     |     |     |     |     |     | 544 |     |      |     |     |     |      |     |      |     | 31: |
| 30   | 523 | 525 | 5:17 |     |              |     |      |     |     |     |     |     |     | 543 |     |      |     |     |     |      |     | 520  | 518 | 513 |
| 35   | 523 | 525 | 527  |     |              |     |      |     |     |     |     |     |     | 542 |     |      |     |     |     |      |     | 519  |     | 51  |
| 40   | 522 | 525 | 527  | 5.0 | 5.02         | 537 | 5.38 | 540 | 543 | 514 | 544 | 540 | 542 | 542 | 544 | 542  | 511 | 540 | 539 | 531  | 525 | 518  | 516 | 511 |
| 45   | 523 |     |      |     |              |     |      |     |     |     |     |     |     | 543 |     |      |     |     |     |      |     |      |     | 515 |
| 50   | 523 |     | 527  |     |              |     |      |     |     |     |     |     |     | 541 |     |      |     |     |     |      |     |      |     | 511 |
| 55   | 521 | 525 | 527  | 501 | 533          | 538 | 538  | 541 | 543 | 544 | 544 | 541 | 543 | 544 | 543 | 542  | 541 | 540 | 530 | 531  | 522 | 51.3 | 515 | 511 |
|      |     |     |      |     |              |     |      |     |     |     |     |     |     | 1   |     |      | 1   |     |     |      | 1   |      |     |     |

Term-day readings of the Brooke balance magnetometer, January 2, 1883.

|    |   |     |     |     |      |     |     |               |       |     |      | -    |      |     |     |     |     |     |     |       |     | -    |       | -      |
|----|---|-----|-----|-----|------|-----|-----|---------------|-------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-------|-----|------|-------|--------|
| 0  | m | 511 | 511 | 510 | 510  | 509 | 507 | 505   50      |       | 501 |      | 497  |      | 490 |     |     | 499 |     | 494 |       | 488 | 481  | 156   | 1-3    |
|    |   |     |     |     |      |     |     |               |       | 501 |      | 198  |      |     |     |     |     |     |     |       |     | 451  | 4-5   | 4-3    |
|    |   |     |     |     |      |     |     |               |       | 501 |      | 497  |      |     |     |     |     |     |     | 495   |     | 452  | 400   | 4 = 26 |
| 15 |   |     |     |     |      |     |     |               |       |     |      | 497  |      |     |     |     |     |     | 496 |       |     |      | 455   | 8-4    |
| 20 |   |     |     |     |      |     |     |               |       | 504 | -499 |      |      |     | 495 |     |     |     |     | 492   |     | 482  |       | 1-7    |
|    |   |     |     |     |      |     |     |               |       |     |      |      |      | 481 |     |     |     |     |     | 492   | 487 | 482  | 4-1.  | 1-7    |
| 30 |   | 512 |     |     |      |     |     |               |       |     |      | 41/6 |      |     |     |     |     |     | 497 |       |     | 482  | 485   | 4 - 7  |
| 35 |   | 511 |     |     |      |     |     | 505 50        |       |     |      | 496  |      |     |     |     |     |     |     | 492 : |     | 482  | 1-60  | 1-7    |
| 40 |   | 511 |     |     |      |     |     | $-504 \pm 50$ |       |     | 499  |      | 405  |     | 401 | 499 | 495 |     |     | 1 11  |     |      | 157   | 1-7    |
| 45 |   | 511 |     |     | 510  |     |     |               |       |     |      |      |      |     |     |     |     |     | 50H |       |     | 483  | 4-11  | 4>7    |
| 50 |   | 511 |     |     | 50.9 |     | 500 |               |       |     |      |      |      |     |     |     |     |     |     | 489   |     | 41-1 | 4 - 7 | 157    |
| 55 |   | 510 | 510 | 500 | 569  | 507 | 506 | 504   50      | 1 501 | 500 | 498  | 497  | 41-3 | 493 | 498 | 497 | 496 | 494 | 407 | 455   | 482 | 485  | 457   | 157    |
|    |   |     |     |     |      |     |     |               |       |     |      |      |      |     |     |     |     |     |     |       |     |      |       |        |

Term-day readings of the Brooke balance magnetometer, January 15, 1883.

| -  |   |     | -   |       |     |     |     |     |     |     |     |     |     |       |     |     |       | -   |     |     |     |     |     |       |     |
|----|---|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-------|-----|
| 0  | m | 599 | 521 | 590   | 516 | 518 | 518 | 517 | 515 | 516 | 515 | 515 | 515 | 510   | 513 | 519 | 518   | 518 | 518 | 525 | 517 | 514 | 507 | 5- 1  | 108 |
| 5  |   | 522 | 522 | 520   | 515 | 518 | 517 | 516 | 516 | 516 | 515 | 345 | 515 | \$100 | 516 | 523 | . 517 | 518 | 518 | 524 | 516 | 512 | Sun | T     | 703 |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       | 5.4 |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       |     |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     | 520 |     |     |     |     | 111-1 |     |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       | 2.9 |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       | 519 |
|    |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       | 510 |
| 45 |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     |       |     |     |     |     |     |     |       |     |
| 50 |   |     |     |       |     |     |     |     |     |     |     |     |     |       |     |     | 516   |     |     |     |     |     |     |       | 311 |
| 55 |   | 522 | 520 | - 518 | 518 | 518 | 517 | 515 | 516 | 515 | 515 | 515 | 566 | 510   | 510 | 515 | 517   | 517 | 526 | 518 | 514 | 500 | 501 | 1.00  | 311 |

Term-day readings of the Brooke balance magnetometer, February 1, 1883.

|    |         |     |     |     |     |     | 5 8 506   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 10.8 |
|----|---------|-----|-----|-----|-----|-----|-----------|--------|-------|-----|-----|------|-----|-----|-----|--------|------|-----|-----|-----|-----|------|------|
|    |         |     |     |     |     |     | 507 507   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 503  |
| 10 | <br>522 | 519 | 516 | 512 | 511 | 511 | 507 507   | (111.) | 5 (1) | 501 | 459 | 4113 | 508 | 500 | 499 | of the | 5012 | 512 | 520 | 513 | .11 | 5.30 | 5.17 |
|    |         |     |     |     |     |     | 507 507   |        |       |     |     |      |     |     |     |        |      |     |     | 511 |     |      |      |
|    |         |     |     |     |     |     | 507 507   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 41.5 |
|    |         |     |     |     |     |     | 506 507   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 41.1 |
|    |         |     |     |     |     |     | 506 507   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      |      |
|    |         |     |     |     |     |     | 506 506   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      |      |
|    |         |     |     |     |     |     | 506   106 |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 4509 |
|    |         |     |     |     |     |     | 506 5 6   |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      | 401  |
| 50 |         |     |     |     |     |     | 566 . 596 |        |       |     |     |      |     |     |     |        |      |     |     |     |     |      |      |
| 55 | <br>520 | 516 | 513 | 511 | 511 | 208 | 506 5566  | 51.1   | 500   | 500 | 502 | 408  | 502 | 409 | 502 | 502    | 508  | 255 | 514 | 495 | 528 | 50%  | 494  |

| Term-day readings of the Brooke balance magnetometer, Febru |
|---|
|---|

|     | 0 h            | I,  | 21  | Bh. | 41         | 54  | 0,         | Th         | Sh  | ga  | 10h | 11h | Noon. | 181        | 141 | 184 | 161 | 17h  | 151 | 191 | 201 | 215  | 225   | 234  |
|-----|----------------|-----|-----|-----|------------|-----|------------|------------|-----|-----|-----|-----|-------|------------|-----|-----|-----|------|-----|-----|-----|------|-------|------|
| -   | <br>503        | 808 | 500 | 800 |            |     |            | 400        | 400 | 400 | 100 |     | 400   | 400        | 400 | 404 | 400 | Anus | 400 | 404 | 102 | 44.0 | 400   | 444  |
| D-m | <br>503        | 505 | 503 | 503 | 503        | 500 | 500        | 497        | 493 | 490 | 490 | 490 | 402   | 490<br>488 | 490 |     |     | 492  |     | 494 | 495 |      | 495 1 | 411  |
| 10  | <br>diam'r.    |     | 502 | 503 | 501        | 501 |            | 498        |     | 490 | 400 |     | 493   |            | 491 |     |     | 402  |     | 495 |     |      | 495   | 493  |
| 15  |                |     | 502 | 503 | 501        | 501 | 498        | 49H        | 402 | 491 | 490 | 491 | 492   | 490        | 491 |     |     | 492  | 404 | 405 | 495 |      | 495   | 410  |
|     |                |     | 502 | 503 | 500        | 501 | 498        |            | 492 | 491 | 490 |     |       | 489        |     |     |     | 492  | 494 | 195 | 495 |      | 495   | 4114 |
| 2.3 |                |     | 502 | 503 | 500<br>501 | 501 |            | 49H        | 492 | 491 |     |     | 490   |            |     | 402 |     | 492  | 494 | 494 | 495 |      | 495   | 494  |
| 117 | <br>504        |     | 502 | 504 | 501        | 501 |            | 498<br>498 | 491 | 491 |     | 492 |       |            |     | 402 |     |      | 494 |     | 495 |      | 495   | 4114 |
| 41  | <br>501        | 503 | 501 | 504 | 500        | 501 | 498        | 498        | 491 | 401 | 490 | 492 | 486   |            |     | 492 |     | 402  |     | 495 | 495 |      | 495   | 494  |
| 40  |                | 503 | 502 | 504 | 500        | 501 |            | 496        | 491 | 491 | 490 |     | 489   |            |     | 492 | 492 |      | 494 | 495 |     | 495  | 495   | 404  |
| 50  | <br>505<br>505 | 503 | 502 | 503 | 501        | 500 | 498<br>498 | 494        | 491 | 491 | 490 |     | 492   | 489        | 491 | 492 | 492 | 492  | 494 | 495 | 406 |      |       | 494  |

#### Term-day readings of the Brooke balance magnetometer, March 1, 1883.

|      | <br>502   | 502 | 501 | 500  | 498  | 497 | 487 491   | 496 | 494  | 495 484   | 494 | 523 : 509 | 512   | 530 | 520   5    | 15 522       | 522     | 499 | 40.5 | 501  |
|------|-----------|-----|-----|------|------|-----|-----------|-----|------|-----------|-----|-----------|-------|-----|------------|--------------|---------|-----|------|------|
| 5    | <br>5.12  | 502 | 501 | 500  | 497  | 498 | 487 484   | 495 | 496  | 488:481   | 491 | 825   609 | 509   | 533 | 529   6    | 13 522       | 516     | 499 | 400  | 5(0) |
|      |           |     |     |      | 496  |     |           |     |      | 486 486   |     |           |       |     |            |              |         |     |      | 501  |
| 15   | <br>500   | 503 | 503 | 4998 | 4103 | 490 | 487   4HI | 494 | 497  | 481 . 485 | 494 | 528 510   | . 511 | 533 | 530   5    | 47 - 526     | 519 (   | 501 | 493  | 501  |
| :0   | <br>502   | 502 | 502 | 400  | 496  | 498 | 487 · 4H  | 404 | 492  | 484 ( 486 | 496 | 520   512 | 508   | 529 | . 528 c fi | 15 527       | 1.516 1 | 499 | 400  | 502  |
| 25   | <br>502   | 502 | 501 | 4100 | 496  | 495 | 487 41H   | 494 | 494  | 482 486   | 503 | 518 512   | 508   | 529 | 528 1 5    | 16 528       | 514     | 400 | 4170 | 560  |
| 30   | <br>503 ( | 502 | 502 | 490  | 496  | 496 | 487   490 | 494 | 494  | 477   488 | 488 | 514 ( 513 | 1 522 | 530 | 525 1 6    | 15 519       | 514 :   | 406 | 197  | 40.3 |
| 22.5 | <br>5413  | 502 | 502 | 499  | 496  | 494 | 478 1 490 | 494 | 493  | 481 484   | 480 | 514 516   | 524   | 533 | 522 . 5    | 17 - 520     | 513     | 497 | 457  | 400  |
| 40   | <br>500   | 502 | 502 | 499  | 497  | 490 | 481   493 | 494 | 490  | 486   484 | 488 | 513 512   | 524   | 533 | 520 + 5    | 47 - 495     | 511 1   | 490 | 498  | 501  |
| 45   | <br>56.1  | 502 | 503 | 490  | 496  | 489 | 484 : 496 | 494 | 493  | 483 488   | 493 | 515 511   | 525   | 632 | . 519 - 5  | 17 514       | 506     | 498 | 409  | 500  |
| 50   | <br>503   | 502 | 503 | 501  | 497  | 491 | 489 400   | 494 | 49.5 | 489 493   | 513 | 513 511   | 526   | 533 | 518 : 5    | $17 \pm 517$ | 508     | 498 | 501  | 503  |
|      |           |     |     |      |      |     |           |     |      | 485 496   |     |           |       |     |            |              |         |     |      | 502  |

#### Term-day readings of the Brooks balance magnetometer, March, 15, 1883.

| -  |   | -     |          |       |     | -   |     |     |       |     |      | -     |     |       |     |      |     |       |      |      | -    |      |       | -    |
|----|---|-------|----------|-------|-----|-----|-----|-----|-------|-----|------|-------|-----|-------|-----|------|-----|-------|------|------|------|------|-------|------|
| 07 |   | 548 5 | 49 517   | 542   | 524 | 514 | 519 | 520 | 525   | 521 | 524  |       |     | 542   |     |      |     |       | 538  | 537  | 537  | 537  | 538   | 893  |
| 5  |   | 548 5 | 48 548   | 1.541 | 523 | 525 | 518 | 527 | 525   | 500 | 526  | 521   | 543 | 543   | 544 | 539  | 540 | 541   | 539  | 537  | 537  | 537  | 597   | 533  |
| 10 |   | 518 5 | 4h 545   | 541   | 521 | 525 | 522 | 527 | 525 1 | 522 | 520  | 523   | 543 | 544   | 544 | 539  | 541 | 541   | 530  | 537  | 537  | 537  | 537   | 5.3  |
| 15 |   | 548 5 | 48 545   | 541   | 521 | 524 | 523 | 527 | 523   | 523 | 526  | 526   | 543 | 545 . | 543 | 539  | 541 | 540   | 50 h | 537  | 537  | 507  | 537   | 5338 |
| 20 | 1 | 548 5 | 47 545   | 543   | 520 | 524 | 524 | 526 | 520   | 523 | 526  |       |     | 544   |     | 539  | 542 | 540   | 533  | 537  | 537  | 537  | 5 :-  | 508  |
| 25 |   | 548 5 | 47 545   | 541   | 519 | 524 | 525 | 527 | 521 : | 525 | 527  | 529   | 545 | 541   | 543 | 539  | 543 | 540   | 538  | 537  | 537  | 537  | 7.11m | ":7  |
| 30 |   | 548 5 | 47 545   | 530   | 517 | 524 | 525 | 527 | 519   | 525 | 520  | 529   | 544 | 542   | 543 | 530  | 542 | 539   | 538  | 537  | 5.30 | 537  | 50.8  | 537  |
| 35 |   | 549 5 | 47 545   | 535   | 516 | 520 | 526 | 527 | 525   | 524 | 525  | 527   | 542 | 544   | 542 | 539  | 542 | 5.39  | 538  | 5.17 | 5657 | 5.47 | 500%  | 537  |
| 40 |   | 549 5 | 47   545 | 535   | 516 | 517 | 527 | 527 | 510   | 524 | 511  | 524   | 542 | 544   | 541 | 55.9 | 542 | 539   | 537  | 537  | 537  | 537  | 538   | 5.17 |
| 45 |   | 549 5 | 47 545   | 532   | 516 | 516 | 520 | 527 | 518   | 524 | 5.12 | 51250 | 543 | 544   | 541 | 509  | 541 | 539   | 537  | 537  | 537  | 5008 | 5 (8  | 537  |
|    |   |       | 47   544 | 531   | 517 | 517 | 526 | 527 | 520   | 523 | 521  | 530   | 543 | 514   | 540 | 539  | 541 | . 529 | 137  | 537  | 537  | 500  | 501%  | 537  |
| 55 |   | 549 5 | 47 541   | 529   | 517 | 518 | 526 | 525 | 519   | 524 | 521  | 536   | 542 | 544   | 540 | 539  | 541 | 538   | 537  | 537  | 537  | 538  | 508   | 537  |
|    |   |       |          |       |     |     |     |     |       |     |      |       |     |       |     |      |     |       |      |      |      |      |       |      |

#### Term-day readings of the Brooke balance magnetometer, April 1, 1883.

|    | <br>- 400 |     |     |      |     |     |       |     |     |     |     |       |     |     |     | -   | -   |     | -   |       | -     | -   |     | 1 records |
|----|-----------|-----|-----|------|-----|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-----------|
| 0" | <br>414   | 446 | 448 | 448  | 443 | 443 | 443   | 445 | 440 | 435 | 440 | 445   | 456 | 468 | 462 | 459 | 461 | 460 | 459 | 457   | 458   | 457 | 457 | 457       |
| 5  | <br>445   | 446 | 448 | 451  | 444 | 443 | 443   | 445 | 440 | 425 | 440 | 446   | 417 | 468 | 462 | 458 | 462 | 460 | 4£0 | 45G   | 457   | 457 | 457 | 457       |
| 10 | <br>445 . | 447 | 448 | 447  | 444 | 442 | 1 443 | 444 | 438 | 436 | 440 | . 446 | 457 | 468 | 462 | 457 | 462 | 461 | 4€0 | 456   | 458   | 457 | 457 | 456       |
| 15 | <br>415   | 446 | 44H | 448  | 443 | 442 | 443   | 443 | 436 | 437 | 443 | 446   | 457 | 466 | 461 | 456 | 4(2 | 470 | 460 | 456   | 458   | 457 | 457 | 456       |
| 20 | <br>445   | 446 | 448 | 448  | 443 | 443 | 443   | 442 | 434 | 439 | 443 | 447   | 449 | 466 | 461 | 455 | 462 | 459 | 460 | 457   | 458 . | 457 | 457 | 456       |
| 25 | <br>445   | 447 | 448 | 447  | 443 | 443 | 443   | 443 | 435 | 439 | 442 | 447   | 4C0 | 464 | 460 | 456 | 4(2 | 459 | 460 | 457   | 457   | 457 | 457 | 456       |
| 30 | <br>445   | 448 | 448 | 447  | 443 | 443 | 443   | 444 | 436 | 439 | 442 | 447   | 461 | 464 | 459 | 456 | 461 | 459 | 459 | 457   | 458   | 457 | 456 | 456       |
| 35 | <br>445   | 447 | 448 | 446  | 443 | 443 | 443   | 443 | 435 | 440 | 442 | 447   | 464 | 463 | 459 | 456 | 461 | 459 | 458 | 457 - | 457   | 458 | 457 | 456       |
| 40 | <br>445   | 447 | 448 | 446  | 443 | 442 | 443   | 443 | 435 | 440 | 443 | 449   | 467 | 464 | 459 | 457 | 461 | 140 | 458 | 457   | 457   | 458 | 458 | 456       |
| 45 | <br>445   | 447 | 448 | 4-14 | 443 | 442 | 443   | 442 | 435 | 440 | 444 | 447   | 464 | 464 | 459 | 458 | 461 | 459 | 458 | 457   | 457   | 45× | 457 | 450       |
| 50 | <br>445   | 447 | 448 | 443  | 443 | 443 | 444   | 441 | 434 | 440 | 444 | 451   | 466 | 463 | 460 | 458 | 460 | 459 | 457 | 457   | 457   | 478 | 457 | 456       |
| 55 | <br>445   | 448 | 448 | 443  | 443 | 443 | 444   | 441 | 435 | 439 | 443 | 454   | 467 | 463 | 459 | 460 | 460 | 459 | 457 | 457   | 458   | 457 | 457 | 450       |

#### Term day readings of the Brooke balance magnetometer, April 15, 1883.

| -  | <br>    |     |     |     |     | 1 APRIL |     |     | A   |     |     |     |     |     |     |       |     | -   |     | **  |       | -   |     |      |
|----|---------|-----|-----|-----|-----|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-------|-----|-----|------|
| 01 | <br>452 | 451 | 452 | 450 | 449 | 449     | 449 | 448 | 418 | 449 | 448 | 448 | 448 | 448 | 448 | 449   | 452 | 453 | 452 | 454 | 450   | 446 | 442 | 439  |
| 5  | <br>452 | 452 | 450 | 450 | 449 | 449     | 449 | 448 | 449 | 448 | 448 | 448 | 448 | 448 | 448 | 449   | 452 | 452 | 451 | 454 | 449   | 446 | 442 | 439  |
| 10 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 449 | 448 | 448 | 448 | 448 | 448 | 449   | 452 | 452 | 451 | 453 | 449   | 445 | 442 | 438  |
| 15 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 449 | 448 | 448 | 448 | 448 | 449 | 450   | 452 | 452 | 451 | 453 | 449   | 445 | 442 | 438  |
| 20 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 449 | 448 | 448 | 448 | 448 | 449 | 450   | 452 | 452 | 451 | 453 | 448 . | 444 | 442 | 438  |
| 25 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 449 | 448 | 448 | 448 | 448 | 449 | 450   | 453 | 452 | 451 | 453 | 448   | 444 | 411 | 438  |
| 30 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 449 | 449 | 448 | 448 | 448 | 449 | 450 . | 453 | 452 | 451 | 452 | 448   | 444 | 441 | 438  |
| 35 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 448 | 448 | 448 | 448 | 448 | 449 |       | 453 | 452 | 451 | 452 | 448   | 441 | 440 | 437  |
| 40 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 411 | 449 | 448 | 448 | 448 | 418 | 448 | 449 | 451   | 453 | 452 | 451 | 452 | 417   | 444 | 440 | 437  |
| 45 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 448 | 448 | 448 | 448 | 448 | 449 | 451   | 453 | 452 | 450 | 451 | 447   | 443 | 439 | 4.37 |
| 50 | <br>452 | 452 | 450 | 450 | 449 | 449     | 448 | 448 | 449 | 448 | 448 | 448 | 448 | 448 | 449 |       | 453 | 452 | 450 | 451 | 447   | 443 | 439 | 417  |
| 85 | <br>451 | 452 | 450 | 449 | 449 | 449     | 448 | 448 | 449 | 448 | 448 | 418 | 448 | 448 | 449 |       | 453 | 452 | 450 | 450 | 446   | 443 | 439 | +37  |

H. Ex. 44----69

215 225 235

Term-day readings of the Brooke balance magnetometer, May 1, 1883.

|   |  |   |  |  |   |   |   |  |   |   | ,   |  |  |  |   |   |  |   |  |  |  |  |  |   |
|---|--|---|--|--|---|---|---|--|---|---|---|--|--|--|---|---|--|---|--|--|--|--|--|---|
|   | <b>O</b> h   | #h  | 20   | Bis  | 45  | 5h  | 65  | 2h   | <b>%</b> h  | g <sub>h</sub>  | 10%   | 110  | Num  | . ##h  | ; 14h   | 151   | . 16h  | \$Th  | #8h  | 194  | 201  | 216  | 224  | 9%  |
| 0°<br>5<br>10°<br>15°<br>20°<br>23°<br>40°<br>45°<br>50°<br>5°          | <br>529<br>529<br>529<br>530<br>530<br>530<br>530<br>530                         | 580<br>530<br>530<br>530<br>530<br>530<br>530<br>530<br>530<br>530<br>53                | 531<br>531<br>531<br>531<br>531<br>531<br>531<br>531<br>531                    | 531<br>531<br>531<br>531<br>531<br>531<br>531<br>531                             | 531<br>531<br>531<br>531  | 591<br>502<br>502<br>502<br>502<br>502<br>502<br>502<br>502<br>502<br>502 | 501<br>501<br>500<br>500<br>500<br>500<br>500<br>500<br>500<br>500  | 527<br>527<br>527<br>527<br>527<br>527<br>527<br>527<br>527<br>527               | 524<br>526<br>526<br>526<br>526<br>526<br>527<br>527<br>527<br>527        | 529<br>529<br>529<br>529<br>529<br>529<br>529<br>529<br>529<br>529        | 529<br>529<br>529<br>529<br>530<br>530<br>530<br>530<br>530<br>530<br>530               | 831<br>531<br>531<br>531<br>531<br>531<br>532<br>530<br>530<br>530               | 533<br>533<br>533<br>533<br>533<br>530<br>532<br>530<br>520<br>520<br>530        | 530<br>530<br>530<br>531<br>531<br>531<br>533<br>533<br>532<br>532               | 502<br>  500<br>   534<br>534<br>534<br>534<br>534<br>534<br>534<br>534<br>535<br>535                      | 536<br>536<br>536<br>536<br>536<br>536<br>536<br>536<br>536<br>536               | 597<br>597<br>597<br>597<br>597<br>597<br>597<br>598<br>598<br>598        | 587<br>537<br>538<br>540<br>539<br>538<br>538<br>538<br>538<br>538               | 506<br>506<br>506<br>505<br>504<br>504<br>504<br>500<br>501<br>501<br>501<br>501 | 501<br>530<br>530<br>530<br>529<br>529<br>529<br>529<br>529<br>520               | 529<br>529<br>529<br>529<br>529<br>529<br>529<br>529<br>529<br>529               | 528<br>528<br>528<br>527<br>527<br>527<br>527<br>527<br>527<br>527               | 50%<br>50%<br>50%<br>50%<br>50%<br>50%<br>50%<br>50%<br>50%               |
|   |  |   | Tr   | rm   | luy.  | read  | ings  | of t   | he 1  | 3roo  | ke b  | alar   | ice n  | ugr  | eton  | ictei   | ·, M   | ay 1  | ñ, 1   | 883.   |  |  |  |   |
| 00<br>5<br>10<br>15<br>20<br>25<br>40<br>45<br>50                       | <br>487<br>487<br>487<br>487   | 184<br>184<br>184<br>185<br>185<br>185<br>185<br>185<br>185<br>185<br>185<br>185<br>185 | 4%5<br>4%5<br>4%6<br>1%6<br>1%7<br>1%7<br>1%7<br>1%8<br>1%8                    | 487<br>483<br>483<br>483<br>483<br>483<br>483<br>483<br>483<br>480               | 479<br>479<br>480<br>480<br>479<br>478<br>478<br>478<br>479<br>479        | # 17 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                                  | A to the second of the second | 472<br>472<br>472<br>472<br>471<br>471<br>470<br>468<br>168<br>168               | 467<br>466<br>466<br>465<br>465<br>464<br>461<br>462<br>460<br>457<br>455 | 450<br>457<br>454<br>445<br>444<br>452<br>452<br>454<br>454<br>454        | 457<br>456<br>456<br>458<br>457<br>458<br>455<br>455<br>453<br>448<br>450               | 456<br>461<br>457<br>461<br>468<br>468<br>463<br>459<br>461<br>462<br>466        | 466<br>465<br>468<br>472<br>474<br>476<br>476<br>477<br>474<br>478<br>478<br>479 | 481<br>480<br>481<br>480<br>481<br>480<br>481<br>481<br>481                      | 182<br>482<br>483<br>483<br>483<br>483<br>484<br>485<br>486<br>487<br>487   | 487<br>487<br>489<br>489<br>489<br>489<br>400<br>491<br>491<br>491<br>493               | 403<br>406<br>490<br>409<br>498<br>496<br>495<br>495<br>497<br>498<br>497        | 497<br>464<br>493<br>492<br>491<br>491<br>1 491<br>1 491<br>1 490<br>489  | 489<br>490<br>489<br>490<br>489<br>489<br>487<br>489<br>489<br>489               | 4HB<br>4HH<br>4HH<br>4HH<br>4HG<br>4HG<br>4HG<br>4HG<br>4H4<br>4H4<br>4H4        | \$83<br>\$80<br>\$80<br>\$70<br>\$77<br>\$77<br>\$76<br>\$77<br>\$78             | 478<br>478<br>477<br>477<br>477<br>477<br>477<br>477<br>477<br>478<br>470        | 476<br>475<br>475<br>475<br>475<br>475<br>473<br>471<br>471<br>471               | 110<br>470<br>470<br>170<br>170<br>170<br>170<br>170<br>170<br>173<br>173 |
|   |  |   | Ter  | ·m-d   | ay)   | eadi  | ngs   | of t   | he I  | Troo  | ke h  | alan   | ee n   | tagn   | ieton   | reter   | r, J   | une   | 1, 1   | 383,   |  |  |  |   |
| 0 <sup>rs</sup> h<br>10<br>15<br>20<br>15<br>30<br>81<br>40<br>45<br>50 | 538<br>536<br>536<br>537<br>537<br>537<br>537<br>537<br>537<br>537               | 797<br>708<br>148<br>548<br>547<br>5 8<br>504<br>544<br>544<br>544<br>544               | 7014<br>5014<br>7018<br>5018<br>5018<br>7014<br>7014<br>7018<br>7018           | 503<br>501<br>514<br>503<br>504<br>504<br>504<br>504<br>504<br>504<br>504        | 563<br>563<br>562<br>562<br>562<br>561<br>561<br>561<br>561<br>561<br>561 | 580<br>580<br>580<br>581<br>531<br>531<br>531<br>530<br>530<br>530        | 6 30<br>5 31<br>5 32<br>5 31<br>5 32<br>5 30<br>5 30<br>5 30<br>5 30<br>5 30<br>5 30<br>5 30<br>5 30  | 560<br>560<br>560<br>560<br>560<br>560<br>560<br>560<br>560<br>560               | 585<br>585<br>584<br>583<br>583<br>583<br>582<br>582<br>582<br>582        | 532<br>531<br>531<br>531<br>531<br>532<br>532<br>532<br>531<br>531        | 531<br>532<br>538<br>534<br>534<br>535<br>535<br>534<br>534<br>534                      | 534<br>534<br>534<br>534<br>533<br>533<br>532<br>532<br>532<br>533<br>533<br>534 | 534<br>534<br>534<br>534<br>534<br>535<br>541<br>542<br>538<br>538<br>538<br>538 | 587<br>587<br>587<br>585<br>584<br>584<br>583<br>583<br>582<br>582<br>582        | 532<br>532<br>532<br>532<br>532<br>533<br>533<br>533<br>533<br>534  | 534<br>536<br>536<br>536<br>536<br>536<br>537<br>537<br>537<br>537                      | 538<br>538<br>538<br>541<br>542<br>541<br>541<br>541<br>542<br>542<br>542        | 548<br>542<br>541<br>541<br>541<br>540<br>540<br>540<br>539               | 549<br>544<br>544<br>544<br>545<br>544<br>542<br>542<br>542<br>542<br>542        | 542<br>542<br>540<br>540<br>540<br>538<br>538<br>538<br>538<br>532<br>532        | 531<br>532<br>529<br>524<br>524<br>522<br>521<br>521<br>518                      | 517<br>517<br>517<br>519<br>519<br>519<br>519<br>518<br>518                      | 518<br>518<br>518<br>518<br>517<br>517<br>517<br>517<br>517                      | 517<br>517<br>518<br>519<br>519<br>519<br>519<br>519<br>519<br>519        |
|   |  |   | Teri   | n-de   | y re  | adis  | gn e  | f th   | e B   | rook  | e hu  | lan  | ve m   | agn  | etom  | eter  | , Ju   | ine 1   | 5, 1   | 883.   |  |  |  |   |
| 6m<br>5<br>10<br>15<br>20<br>25<br>30<br>40<br>45<br>50                 | 500<br>501<br>501<br>501<br>501<br>501<br>501<br>500<br>500<br>500               | 528<br>508<br>508<br>508<br>508<br>507<br>507<br>507<br>507                             | 526<br>526<br>527<br>526<br>526<br>526<br>526<br>526<br>526<br>526             | 526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>525<br>527               | 525<br>525<br>525<br>525<br>526<br>526<br>526<br>526<br>526<br>525<br>525 | 525<br>525<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524        | 524<br>524<br>524<br>524<br>524<br>524<br>524<br>528<br>528<br>528  | 524<br>522<br>522<br>522<br>523<br>523<br>523<br>523<br>523<br>524<br>524        | 524<br>524<br>524<br>524<br>524<br>525<br>525<br>525<br>525<br>525        | 524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524        | 524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524                      | 524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524<br>524               | 525<br>525<br>525<br>525<br>525<br>525<br>525<br>525<br>525<br>525               | 525<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526               | 526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526  | 527<br>527<br>527<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526<br>526 | 527<br>528<br>528<br>528<br>529<br>529<br>529<br>520<br>520<br>520<br>529<br>520 | 530<br>530<br>530<br>530<br>530<br>530<br>530<br>530<br>530<br>529<br>529 | 520<br>529<br>529<br>529<br>529<br>529<br>529<br>529<br>528<br>528               | 528<br>528<br>527<br>527<br>527<br>528<br>528<br>528<br>528<br>528<br>527<br>527 | 527<br>526<br>526<br>526<br>525<br>525<br>525<br>524<br>524<br>524<br>524<br>524 | 525<br>525<br>524<br>525<br>525<br>525<br>525<br>525<br>526<br>526<br>526        | 525<br>524<br>525<br>525<br>524<br>524<br>524<br>524<br>524<br>524               | 523<br>523<br>523<br>523<br>523<br>523<br>524<br>524<br>524<br>525<br>524 |
|   |  |   | Ter  | m-de   | uy r  | eadi.   | nys -   | of t   | he I  | Brook   | ke be   | ılan   | ce m   | agn  | ctom  | eter  | , Ji   | uly 1   | 1, 18  | 83,  |  |  |  |   |
| 0 <sup>10</sup> 5 10 15 20 25 30 35 40 45 50 55                         | 525<br>524<br>524<br>523<br>523<br>524<br>524<br>529<br>520<br>529<br>521<br>529 | 519<br>512<br>511<br>508<br>507<br>507<br>503<br>501<br>491<br>492<br>492               | 499<br>500<br>501<br>501<br>501<br>1<br>492<br>493<br>495<br>494<br>498<br>497 | 500<br>503<br>506<br>507<br>507<br>507<br>507<br>507<br>509<br>509<br>512<br>512 | 511<br>516<br>519<br>519<br>518<br>518<br>518<br>518<br>517<br>517<br>516 | 515<br>512<br>511<br>510<br>507<br>506<br>506<br>504<br>504<br>502<br>502 | 502<br>503<br>598<br>508<br>509<br>509<br>512<br>513<br>516<br>516  | 518<br>519<br>520<br>519<br>520<br>519<br>518<br>520<br>520<br>520<br>520<br>519 | 517<br>517<br>516<br>515<br>515<br>514<br>514<br>514<br>514<br>514        | 512<br>512<br>514<br>515<br>515<br>516<br>516<br>517<br>518<br>518<br>516 | 509<br>508<br>508<br>508<br>508<br>511<br>513<br>512<br>511<br>513<br>514<br>516<br>518 | 520<br>519<br>521<br>521<br>524<br>522<br>522<br>527<br>522<br>530<br>529<br>529 | 538<br>539<br>537<br>537<br>531<br>534<br>538<br>529<br>531<br>532<br>533<br>534 | 536<br>536<br>535<br>534<br>535<br>536<br>536<br>536<br>536<br>537<br>537<br>536 | 538<br>537<br>534<br>535<br>536<br>534<br>535<br>535<br>538<br>540<br>543   | 545<br>544<br>544<br>544<br>543<br>543<br>543<br>543<br>543<br>543                      | 547<br>558<br>557<br>557<br>556<br>555<br>557<br>558<br>558<br>558<br>557<br>557 | 557<br>555<br>555<br>555<br>555<br>555<br>554<br>556<br>556<br>556<br>557 | 558<br>560<br>562<br>564<br>561<br>560<br>559<br>563<br>563<br>558<br>559<br>561 | 563<br>565<br>564<br>564<br>565<br>566<br>563<br>563<br>557<br>557<br>557        | 554<br>554<br>552<br>549<br>548<br>547<br>543<br>543<br>543<br>547<br>547<br>547 | 543<br>541<br>538<br>536<br>536<br>534<br>535<br>536<br>537<br>536<br>534<br>533 | 534<br>535<br>535<br>535<br>536<br>536<br>536<br>536<br>536<br>535<br>536<br>535 | 534<br>535<br>536<br>537<br>539<br>538<br>538<br>538<br>537<br>537        |

#### Term-day readings of the Brooke balance magnetometer, July 15, 1883.

|      | , | -    |      |       | 1     |       |     |       |       | 1 .  |       |       |     | North |      |      |      |       |        | 1         |      |       |      |     |       |
|------|---|------|------|-------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|------|------|------|-------|--------|-----------|------|-------|------|-----|-------|
|      | 4 | 0.   | 1.   | 3.    | 10.   | 41    | 9.  | 65    | 3.0   | 90   | 90    | 10.   | 11. | Boom  | 19.  | 14"  | 10.  | 10.   | 11.    | 14.       | 100  | 30.   | 31.  | 33. | 530   |
|      | - | 1    |      |       |       |       |     | 1     | 1     |      |       |       |     |       |      |      |      |       |        |           |      |       |      |     |       |
| 60   |   | 545  | 5.66 | 544   | 643   | 539   | 544 | 542   | 545   | 544  | 549   | 543   | 545 | 543   | 542  | 543  | 544  | 546   | 556    | n field - | 549  | 543   | 688  | 539 | 505   |
|      |   | 046  | 545  | 543   | 1 044 | 539   | 544 | 840   | 545   | 5.43 | 548   | 5 543 | 546 | 0.63  | 841  | 0.63 | 045  | 0.46  | 55%    | 1667      | 554  | 0.61  | 634  | 034 | 587   |
| 10   |   | 546  | 544  | 044   | . 043 | 540   | 544 | 1 643 | 1 545 | 543  | 542   | 544   | 545 | 543   | 0.42 | 0.42 | 0.10 | 0.10  | 558    | 562       | 687  | 642   | 539  | DSM | 537   |
| 15   |   | 546  | 7-44 | 544   | 1 542 | 541   | 544 | 0.413 | 545   | 542  | 542   | 544   | 545 | 0.43  | 5.63 | 543  | 545  | F47   | 558    | 659       | 554  | 542   | 540  | 530 | 537   |
| 210  |   | 546  | 544  | 544   | 542   | 541   | 543 | 543   | 545   | 5-63 | 541   | 544   | 544 | 643   | 0.42 | 543  | 0.45 | 5.50  | 5550   | 580       | 561  | 843   | 041  | 536 | 5.04  |
| 117  |   | 547  | 514  | 514   | 541   | 542   | 543 | 544   | 545   | 0.83 |       | 544   | 540 | 543   | 149  | 0.43 | 545  | 550   | 558    | 550       | 850  | 0.418 | D41  | 637 | 5394  |
| (11) |   | 547  | 5.4  | 544   | 541   | 542   | 540 | 544   | 543   | 544  | 542   | 044   | 544 | 0.616 | 5.43 | 0.43 | 5-86 | 550   | 558    | 558       | 550  | D43   | 041  | 637 | 51334 |
| 35   |   | 0.60 | 514  | 543   | 541   | 543   | 543 | 544   | 544   | 544  | 548   | 544   | 544 | 643   | D401 | 0.63 | 516  | 0.50  | 5584   | 555       | 0.67 | D41   | 541  | 530 | 539   |
| 40   |   | 540  | 543  | 544   | 541   | 5.43  | 543 | 0.45  | 544   | 544  | 548   | 544   | 544 | 0.44  | 543  | 0.43 | 0.47 | : 550 | 569.1  | 354       | 547  | 5412  | 542  | 535 | 539   |
| 45   |   | 540  | 514  | . 543 | 540   | 0.412 | 542 |       | 544   |      | 542   |       |     | 544   |      |      |      |       |        | 555       | 546  | 840   | 040  | 500 | 541   |
| 60   |   | 546  | 543  | 543   | 540   | 543   | 542 | 545   | 544   | 544  | 542   | 544   | 544 | 544   | 543  | 548  | 048  | 554   | 714547 | 8049      |      |       | 541  | 536 | 542   |
| 85   |   | 540  | 044  | 541   | 540   | 648   | 542 | 545   | 344   | 544  | 5-812 | 544   | 548 | 543   | 843  | 543  | 545  | , 555 | 0494   | 556       | 044  | 541   | 0.40 | 535 | 543   |
|      |   |      |      | 1     | 1     |       |     |       |       | 1    | 6     |       | 1   | -     |      | 1    | 1    |       |        |           |      |       |      |     |       |

#### Term-day readings of the Brooke balance magnetometer, August 1, 1883.

| 5<br>10<br>15 | <br>550<br>540<br>548 | 5.01<br>635<br>832 | 532<br>534 | 534<br>534 | 536<br>536<br>536 | 528<br>528 | 529<br>534<br>535 | 543<br>545<br>545 | 547<br>548<br>548 | 847<br>548<br>448 | 547<br>548<br>547 | 557<br>557<br>564 | 546<br>547<br>549 | 547<br>546<br>546 | 551<br>552 | 584<br>569<br>559 | 555<br>554 | 569<br>561<br>562 | 560<br>560 | 559<br>556<br>539 | 559<br>551<br>551 | 544<br>546<br>547 | 549<br>549<br>548 | 550<br>540<br>546 |
|---------------|-----------------------|--------------------|------------|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 0.            | <br>641               | 532                | 536        | 534        | 535               | 830        | 538               | 545               | 548               | 548               | 547               | 562               | 549               | 548               | 652        | 560               | 858        | 563               | 561        | 558               | 549               | 5-16              | 551               | 647               |
| 35            | <br>540               | 530                | 536        | 504        | 683               | 628        | 538               | 546               | 5-17              | 546               | 550               | 559               | 554               | 540               | 553        | 558               | 555        | 2445              | 562        | 555               | 548               | 5-141             | 549               | 547<br>548        |
| 45            | <br>BBB               | 530                | 535        | 534        | 630               | 627        | 539               | 548               | 547               | 544               | 563               | 559               | 553               | 547               | 555        | 557               | 557        | . 561             | 561        | 551               | 516               | 046               | 549               | 548               |
| 50            | <br>537               | 530                | 586        | 835        | 528               | 530        | 541               | 548               | 547               | 545               | 663               | 561               | 550               | 548               | 655        | 557               | 557        | . 560             | 561        | 663               | 514               | 546               | 550               | 0.47              |

#### Term-day readings of the Brooke balance magnetometer, August 15, 1883.

| ** |      | 1     |     |       |     |     |     |      |     |     |     |      |       |     |     |     | 1 . |      |     |     |       |     |       |      |
|----|------|-------|-----|-------|-----|-----|-----|------|-----|-----|-----|------|-------|-----|-----|-----|-----|------|-----|-----|-------|-----|-------|------|
| Da | N    | 546   |     |       |     |     |     |      |     |     |     |      |       |     |     |     |     |      |     |     |       |     | 541   | 529  |
| 5  | 47   | 547   | 144 | 545   | 543 | 548 | 544 | 544  | 545 | 640 | 545 | 5-43 | 545   | 548 | 547 | 548 | 548 | 548  | 547 | 543 | 543 . | 544 | 540   | 530  |
| 10 |      | 544 ( |     |       |     |     |     |      |     |     | 545 |      |       | 548 |     |     | 548 |      |     |     | 543   |     | 540   | 5339 |
| 15 |      | 545   | 545 | 545   | 544 | 547 | 546 | 544  | 545 | 840 | 544 | 543  | 544   | 548 | 547 | 549 | 549 | G-8H | 544 | 514 | 542   | 542 | 540   | 504  |
| 20 |      | 544   | 546 | 545 : | 546 | 546 | 546 | D4-8 | 546 | 545 | 545 | 544  | 544 1 | 547 | 547 | 549 | 548 | 548  | 546 | 543 | 542   | 542 | 541   | 538  |
| 25 | 1:47 | 544   | 546 | 548   |     |     |     |      |     |     | 545 |      |       |     |     |     | 548 |      |     |     | 542   | 542 | 539-1 | 5008 |
| 30 | 547  | 514   | 544 | 544   | 547 | 545 | 545 | 543  | 647 | 545 | 546 | 544  | 546   | 547 | 547 | 549 | 549 | 548  | 546 | 543 | 542 - | 542 | 539 [ | 5000 |
| 33 | 545  | 5.84  | 546 |       |     |     |     |      |     |     |     |      | 548   |     |     |     |     |      |     |     |       |     |       |      |
| 40 | 147  | 544   |     |       |     | 545 |     |      |     |     |     |      | 546   |     |     |     |     |      |     |     |       |     |       | 5334 |
| 45 | 547  | 545   |     |       |     |     |     |      |     |     |     |      | 547   |     |     |     | 549 |      |     |     | 540   | 542 | 540   | 508  |
| 50 | 547  | 545   | 547 | 544   | 547 | 545 | 545 | 545  | 546 | 545 | 545 | 543  | 547   | 547 | 550 | 549 | 519 | 546  | 544 | 543 | 541   | 541 | 5.19  | 637  |
| 65 | 544  | 545 ; | 544 | 544   | 547 | 545 | 544 | 545  | 546 | 545 | 545 | 543  | 547   | 548 | 549 | 549 | £49 | 546  | 544 | 543 | 541   | 541 | 530   | 507  |
|    |      |       |     |       |     |     | -   |      | 1   |     |     |      | 1 1   |     | 1   |     | 1   |      | 1   |     |       |     | _     |      |

READINGS OF THE BROOKE VARIATION INSTRUMENTS, THE UNIFILAR, BIFILAR AND BALANCE MAGNETOMETERS ON TERM-HOURS, AT UGLAAMIE, ALASKA, SEPTEMBER, 1882, TO AUGUST, 1882.

Readings of the Brooke instruments at Uglaamic, Alaska.

[Göttingen time is employed.]

| (Te   | mperat | ure                                   | at be                                      | ginni                                   | 15, 19<br>ng, 43  | at at  | end,   | 45° F   | .)   | (Te   | mper   | ature   | at be   | ober<br>gami  | ц, така<br>нд. 45  | ; nt                                       | end,  | 41. F                                   | .)  |
|---|--------|---------------------------------------|--|---|---|--|--|---|--|---|--|---|---|---|--|--|---|---|---|
| Time.   | Declin | nome                                  | eter.                                      |   | Bittla  |  |  | Balana<br>neton                                   |  | Time.   | Dec  | inom  | eter.   | i<br>- magi   | Bifila:<br>ne ton  | r<br>erterr                                | magi  | Balane<br>netom                         | e<br>eti                                  |
| 1   | 0.     | 201                                   | 10-  | 0,                                      | 20:   | 40*  | 0.   | 20  | 40'  | ! !   | 0.   | 201   | 40.   | 0,  | 20:  | 10:  | ()=   | 201                                     | 11  |
| 5 40<br>5 41<br>5 5 42<br>5 5 44<br>5 5 44<br>5 5 44<br>5 5 5 5 5 5 5 5 5 | 146    | 1244647464677746468888602335555567531 | 530,551,551,551,551,551,551,551,551,551,55 | 7.17.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7. | 715 7744 774 7744 10 8 775 775 10 10 10 10 10 10 10 10 10 10 10 10 10 | 7166<br>7277<br>7144<br>7157<br>7157<br>7157<br>7157<br>7157<br>7157<br>71 | 4011<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017<br>4017 | 1001 1004 1003 1007 1007 1007 1007 1007 1007 1007 | 400<br>400<br>400<br>400<br>400<br>400<br>400<br>400 | $\begin{array}{c} 6.6 & 0.1 \\ 16.6 & 0.1 \\$ | 5.00 (1.00 ( | 5501-1644-11-0-5500-0-1-0-0-0-0-0-0-0-0-0-0-0-0-0 | 551-554-5515-554-5515-554-5515-554-5515-554-5515-554-5515-554-5515-554-5515-554-5515-554-5515-554-554 | 515 512 513 514 515 514 515 514 515 514 515 514 515 514 515 515 | 510<br>510<br>510<br>510<br>510<br>510<br>511<br>511<br>511<br>511 | 507 714 5514 5514 5514 5514 5514 5514 5514 | 110<br>414<br>414<br>415<br>115<br>117<br>413<br>413<br>413<br>414<br>415<br>414<br>415<br>416<br>417<br>419<br>419<br>419<br>419<br>419<br>419<br>419<br>419 | 113 113 113 113 113 113 113 113 113 113 | 我的数据和数据数据数据数据数据数据数据数据数据数据数据数据数据数据数据数据数据数据 |

Readings of the Brooke instruments at Uglaamie, Alaska—Continued.

D BALANCE GUST, 1883.

| (Te  | mper  | ature                                   | Oc.  | lober '<br>ginnit                                    | 15, 189<br>1g, 27                           | 2.<br>; at (   | end, 2                                  | 62.8 F | .)                                      | Tem   | perat   | ure a                                       | Nov                                     | ember<br>nning  | 1, 18<br>, 28 48                            | 82.<br>F; at  | end, 2  | 92.5 <b>I</b>  | ٠.)   |
|--|---|---|--|--|---|--|---|--------|---|---|---|---|---|---|---|---|---|--|---|
| l'ime.                                       |   | linon                                   | eter.  | magi   | Biiilai<br>netom                            | eter.  |   | Balanc |   | Time.   | Dec   | linom                                       | eter.                                   |   | Biillai<br>ictom                            |   | magi  | alane<br>setom   |   |
|  | 0.  | 204                                     | 104  | 0:   | 20  | 101  | 0.                                      | 20*    | 40"                                     | 1   | θ.  | 201   | 40                                      | 01  | 20.   | 40-   | 01  | 201  | 40  |
| A. m 117 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 513 523 527 527 527 527 527 527 527 527 527 527 | 503 503 503 503 503 503 503 503 503 503 | 524 525 525 535 544 551 544 551 551 551 551 551 551 55 | 200<br>200<br>200<br>200<br>200<br>200<br>200<br>200 | 210 211 11 11 12 11 11 11 11 11 11 11 11 11 | 2012<br>2055<br>1190<br>2055<br>1192<br>2155<br>2255<br>2255<br>2255<br>2255<br>2255<br>22 | 4655 4666 4666 4666 4666 4666 4666 4666 |        | 465 466 466 466 466 466 466 466 466 466 | h. mi. 18 0 0 1 18 1 1 1 18 2 1 1 18 2 1 18 | 523 520 520 521 521 521 521 521 521 521 521 521 521 | 520 521 522 522 522 522 522 522 522 522 522 | 522 522 522 522 522 522 522 522 522 522 | 570 553 574 553 574 575 575 575 575 575 575 575 575 575 | 364 369 369 369 369 369 369 369 369 369 369 | 862<br>875<br>873<br>873<br>869<br>879<br>864<br>876<br>864<br>876<br>876<br>876<br>876<br>876<br>876<br>876<br>876<br>876<br>876 | 420<br>420<br>427<br>427<br>427<br>427<br>427<br>427<br>425<br>425<br>426<br>427<br>427<br>427<br>427<br>427<br>427<br>427<br>427 | 424<br>426<br>427<br>427<br>127<br>127<br>127<br>127<br>127<br>127<br>127<br>127<br>127<br>1 | 计记录记录记录 化化物 医电影 医电影 医电影 医克里特氏 医克里特氏 医克里特氏 医克里特氏 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医克里特氏病 医二甲基甲基二甲基甲基二甲基甲基二甲基甲基二甲基二甲基二甲基二甲基二甲基二甲基二甲 |

Readings of the Brooke instruments at Uglaamie, Alaska—Continued.

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|--|------|------|------|-------|-------|-----------|-------|-----|-------|---------|--------|-----|-------|--------|-----|--------|------------|------------|------------|-------|
|  |      | 1)11 | ्य ग | etet. | ш.    | , to - 10 | eter. | mag | neton | nter.   |        | Dec | linon | reter. | mag | neton  | eter.      | mag        | neton      | 10 to |
| 1  | lime | 414  | 200  | 101   |       | 20        | 10:   | 0.  | 20.   | 105     | 1 line | 0+  | 20:   | 10-    | 0+  | 20-    | 40=        | 0.         | . 201      | 41    |
| 15   |      | 11.  |      | 177   | **    | 20        | ***   | .,  |       | * * * * |        |     |       |        |     |        |            | .,         |            | •     |
|  |      |      |      |       |       |           |       |     |       |         |        |     |       | 401    |     | 12.10  |            |            |            |       |
| 19   |      |      | 5.7  |       |       |           | 1.5   |     |       |         |        |     |       |        |     |        | 0.84       | 5.0        | 500        | 5     |
| 1  |      |      | 522  |       | .310  | -19       | . 20  |     |       |         |        |     |       |        |     |        | 11-()      | 3.00       | 5.0        | 5     |
| 19   |      | 145  |      | 0.7   |       |           | 110   |     |       |         |        |     |       |        |     |        | 397        | 53         | 5.4        | 5     |
| 1  |      |      |      |       |       |           |       |     |       | 50.00   |        |     |       |        |     |        | 106        | 5.1        | 531        | 5     |
| 19   |      |      | -11  | 40.   |       | .1.       |       | ٠,  |       | * .     |        |     |       |        |     |        | 109        | 5:         | 5.32       | 5     |
| 16   | 9    | 514  | 544  | 54.4  | 2414  | 247       | . 1   |     |       | 11.0    |        |     |       |        |     |        | 111        | 17.        | 5,4        | 5     |
| 10   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 414        | 5 .2       | 502        | 5     |
| 1  |      |      | 5 0  | 5 1   |       |           |       |     |       |         |        |     |       |        |     |        | 411        | 532        | 532        | 5     |
| 19   1   1   1   1   1   1   1   1   1   |      |      | 524  | 522   |       | 0.3       | 1100  |     | 109   |         |        |     |       |        |     |        | 413        | 502        | 532        | 5     |
| 10   | 9 12 |      | 51.9 |       |       |           |       |     | .100  |         |        |     |       |        |     |        | 416        | 582<br>582 | 5.02       | 5     |
| 10   10   10   10   10   10   10   10  |      | 24   |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 418        | 5000       | 5.62       | 5     |
| 12   16   16   17   18   18   18   18   18   18   18   |      |      |      |       |       | 1.11      |       |     |       |         |        |     |       |        |     |        | 4.20       | 33.5       | 532        | . 5   |
| 19   |      |      |      | +1 %  | 152   | .139      | 317.1 |     |       |         |        |     |       |        |     | 420    | 119        | 532        | 532        | 5     |
| 19   10   20   308   5   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 418        | 582<br>582 | 532        | 5     |
| 19   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 417        | 532        | 532        | 5     |
| 19   17   17   17   18   18   18   18   18   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 416        | 532        | 532        | 5     |
|  |      |      |      |       | 54(3  |           |       |     |       |         |        |     |       |        |     |        | 414        | 500        | 532        | ' 5   |
| 10   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 411        | 532        | 532<br>532 | 1 5   |
| 19   |      |      |      |       |       | 13        |       |     |       |         |        |     |       |        |     |        | 402        | 532        | 532        | 5     |
| 19   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 4114       | 5.3        | 533        | 1 5   |
| 19   | 9 26 | 5.15 | 526  | 526   |       |           |       |     |       |         |        |     |       |        |     |        | 104        | 533        | 533        | 5     |
| 19   |      |      |      | 528   |       |           |       |     |       |         |        |     |       |        |     |        | 411        | 503        | 533<br>533 | 5     |
| 19   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 416        | 5013       | 533        | 5     |
| 9 31 5.59 5.21 5.20 5.71 5.82 5.89 5.00 5.00 5.00 5.00 4.99 20 31 487 488 489 408 408 408 60 0 32 5.85 5.81 5.34 11 5.34 11 5.24 4.55 4.99 4.99 4.99 4.99 4.99 4.99 4.9  |      |      |      |       |       |           |       |     |       |         | 20 30  | 488 |       |        |     |        | 411        | 553        | 533        | 5     |
| 0 32 508 502 500 490 411 434 499 498 498 80 20 34 491 491 492 490 490 490 90 39 39 39 39 39 39 39 39 39 39 39 39 39  | 9.31 | 5.9  | 521  |       |       |           |       |     |       |         | 20 31  |     |       |        |     |        | 406        | 533        | 533        | 5     |
| 9 34 405 105 406 405 105 407 105 408 408 408 20 34 402 492 403 309 309 309 00 05 100 480 185 117 150 433 408 408 408 408 408 408 408 408 408 408   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 401<br>399 | 533<br>533 | 533        | 5     |
| 0         33         490         480         188         477         50         433         498         498         498         203         443         498         498         498         203         443         498         498         498         203         443         492         403         400         400         400         400         400         400         400         400         400         402         403         408         498         498         498         498         498         498         20         33         492         492         402         403         403         498         498         499         20         33         492         492         492         403         404         402         493         491         409         20         33         401         491         403         404         402         403         404         402         403         404         403         403         403         403         403         403         403         403         404         404         404         404         404         404         404         404         404         404         404         404         404  |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 400        | 533        | 533        | 5     |
| 9 37 92 192 193 190 118 199 433 498 448 499 20 37 492 492 492 492 403 444 49 9 30 38 502 53 400 148 82 273 489 499 499 499 20 38 492 491 491 491 494 495 9 50 564 500 498 502 175 483 499 499 499 20 38 492 492 492 402 402 402 402 402 402 402 402 402 40   |      |      |      |       |       |           |       | 498 | 495   | 498     | 20 35  | 493 | 493   | 493    |     | 400    | 400        | 533        | 533        | 5     |
| 9 SB 5002 5 04 5000 108 52 175 489 4199 4199 20 38 402 491 401 405 4044 405 3049 319 50 504 50 500 498 502 152 415 403 419 419 419 419 20 38 402 419 419 419 410 401 401 401 401 401 401 401 401 401   | 9 36 |      |      |       |       |           |       |     |       |         |        | 490 |       |        |     |        | 403        | 533        | 533        | 5     |
| 9 59 5 564 5 500 408 5 29 115 4 33 1 409 4190 499 20 30 401 491 491 491 404 405 91 91 10 10 10 10 10 10 10 10 10 10 10 10 10   |      |      |      |       |       |           |       |     | 100   |         |        | 492 |       |        |     |        | 405        | 532<br>532 | 532<br>532 | 5     |
| 9 10 994 188 488 472 199 489 489 499 99 20 40 402 402 402 400 400 399 942 499 549 189 189 489 99 49 199 549 499 549 499 549 499 549 499 549 499 549 499 549 499 549 54   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 403        | 532        | 532        | 5     |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |      |      |      |       |       |           | 483   | 199 |       |         |        |     | 492   | 492    | 401 | 401    | 401        | 532        | 532        | 5     |
| 9 - 41 5 11 5 12 5 12 5 1 5 1 5 5 1 5 5 1  |      |      |      |       | 489   |           |       |     |       |         |        |     |       |        |     |        | 399        | 532        | 532        | 1 5   |
| 0 44 5 750 5 120 130 5 470 129 443 5 102 5 102 5 102 5 10 12 5 |      |      |      |       | 1 -11 |           |       |     |       |         |        |     |       |        |     |        | 399<br>401 | 532<br>532 | 532<br>532 | 1 5   |
| 9 15 1900 488 488 2431 1631 470 500 500 500 500 20 4 493 493 494 602 401 4401 50 10 14 481 481 481 481 481 481 481 481 481   |      |      |      |       |       | . 19      |       | 502 |       |         | 20 44  |     |       |        |     |        | 400        | 532        | 532        | 5     |
| 9 17 489 482 499 483 418 402 400 500 500 20 47 494 494 494 493 393 392 115 405 405 405 405 405 405 405 405 405 40  |      |      |      | 482   | 443   | 163       | 470   | 500 | 500   | 500     | 20 4   | 493 | 493   | 492    | 401 |        | 400        | 532        | 532        | 5     |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |      |      |      |       |       |           |       |     |       |         | 20 46  |     |       |        |     |        | 396        | 532        | 532        | 5     |
| 6 19 496 497 492 389 388 891 500 500 500 20 49 496 496 486 389 390 20 20 49 496 391 497 498 398 389 389 391 510 496 496 497 498 389 389 389 391 51 496 496 497 498 389 389 389 51 496 496 497 498 389 389 389 51 496 496 497 498 389 389 389 51 496 496 497 498 498 498 390 391 51 496 496 497 498 390 391 51 497 498 498 498 390 391 51 498 496 497 498 390 391 51 498 498 498 498 390 391 51 498 498 498 498 390 391 51 498 498 498 498 390 391 51 498 498 498 498 390 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 391 391 51 498 498 498 498 498 498 498 498 498 498   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 392        | 532<br>532 | 532<br>532 | 5     |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 1.9  |      | 497  | 493   |       | 388       | 391   | 500 | 500   | 500     | 20 49  | 496 | 496   | 496    | 369 | 390    | 390        | 532        | 532        | .5    |
| 9 · 2 · 486 · 4 · 5 · 486 · 120 · 1,9 · 422 · 499 · 400 · 499 · 20 · 52 · 499 · 406 · 405 · 303 · 305 · 307 · 303 · 488 · 487 · 177 · 428 · 133 · 420 · 499 · 300 · 409 · 20 · 53 · 494 · 491 · 494 · 309 · 309 · 307 ·  | e in | 492  | 494  |       |       |           |       |     |       |         |        |     |       |        |     |        | 389        | 532        | 532        | 5     |
| 1 53 488 485 157 428 133 429 499 499 199 20 53 494 491 491 494 396 397 75 498 50 50 50 50 50 50 50 50 50 50 50 50 50   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 391        | 532<br>532 | 532        | 5     |
| 9 54 489 494 193 121 114 409 500 500 500 20 <b>54 493 493 494 396 394</b><br>9 55 499 500 503 399 387 379 500 500 501 20 <b>55 495 496 497 389 386</b>   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 396        | 532        | 532<br>532 | 5     |
| 9 55 499   500 503 , 399 387 379 500 500 501 20 55 , 495 496 , 497 , 389 . 386   | 54   | 489  | 494  | 193   | 121   | 414       | 409   | 500 | 560   | 500     | 20 54  | 493 | 493   | 494    | 396 | 294    | 092        | 532        | 533        | 5     |
|  | 55   |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 385        | 532        | 532        | 5     |
| 0 57 500 500 502 389 399 408 501 501 501 20 57 498 498 497 338 380   |      | 502  | 501  | 500   | 375   | 378       | 382   | 501 | 501   | 501     | 20 56  | 498 | 498   | 498    | 386 | 386    | 387        | 532<br>532 | 532<br>532 | 5     |
| 0 56 502 502 500 412 415 412 501 501 501 20 56 492 495 495 389 390   |      |      |      |       |       |           |       |     |       |         |        |     |       |        |     |        | 390        | 532        | 532        | 5     |

#### ${\it Readings~of~the~Brooke~instruments~at~Uglaamie,~Alaska}\hbox{--} {\rm Continued}.$

| (Te)  | mpetaturo  |  |   | 15, 18<br>ig. 4°.   |   | end,                                    | 5°.2 F                                  | .)                                      | (Tem  | pera!  | ture a   |  | uary t<br>nung   |  |  | enci, l                                  | 160,81  | F.)                                     |
|-------|--|--|---|---|---|---|---|---|---|--|--|--|--|--|--|--|---|---|
| ittie | eclinon  | eter.                                      | ning                                    | Bifflar<br>netom  | eter.   | mag                                     | Balanc<br>netom                         | e '<br>eter.                            | Time.   | Dec  | linome   | eter.                                    | tnagi  | Sitrlat<br>ictori.   | etet.  | magr                                     | alane<br>ietom  | e<br>efe                                |
|       | 01 201   | 401  | 0,                                      | 201   | 40*   | ()+                                     | 20                                      | 401                                     |   | 0.   | 20.  | 40-                                      | 6)*  | 20.  | 10.  | 0,                                       | 201   | 11                                      |
|       | 10   100 | 723 5 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 200 5 200 6 100 6 | 308 308 309 300 300 300 300 300 300 300 300 300 | 522 522 522 522 522 522 522 522 522 522 | 522 522 522 522 522 522 522 522 522 522 | 502 520 520 520 520 520 520 520 520 520 | \$\begin{align*} \lambda_1 & \text{in}_1 & \text{in}_2 & \t | 4484508510064454454054054564558888888884444556688777788888886677776666666666 | 在各位的时间,这种是一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个 | 4455 6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 1098-1016 (117) (109) (1 | 25 (20 miles) (20 mile | 17.44 (5.4 ) 17.77 (17.1 ) 18.0 (18.1 ) 18.0 | 445.5.5.5.5.5.5.6.6.6.6.6.5.5.5.6.6.6.6. | \$45.5 \\ \text{14.55} \\ \text | 100 100 100 100 100 100 100 100 100 100 |

## Readings of the Brooke instruments at Uglaamie, Alaska—Continued.

| (Tem   | bera   | ture   | Jar<br>it beg                             | mary<br>innin  | 15, 18<br>g. —7  | 83.<br>2.2; a                                  | t end                                    | <b>—6</b> 0.8                           | 8 F.)                                   | (Tem  | perat   | ure a                                   | Feb<br>t begi  | rnory<br>innin                         | 1, 188<br>, —9   | 3.<br>.2; at  | end,                                    | U ,                                     | F.)                                     |
|--|--|--|---|--|--|--|--|---|---|---|---|---|--|--|--|---|---|---|---|
| Time.  | Dec  | elinor   | neter.                                    | , mag  | Bifila<br>neton  | r<br>neter.                                    | mag                                      | Balane<br>neton                         | ce<br>neter.                            | Time.                                       | Dec   | linon                                   | eter.  |  | Bifila<br>neton  | r<br>ieter.   |   | Balano<br>neton                         |   |
| 11110.   | 0.   | 20   | 40  | 0,   | 20.  | 40-  | 0.                                       | 20:                                     | 40:                                     |   | 0.  | 20.                                     | 40   | 0,2                                    | 20-  | 10-   | 0.                                      | 201                                     | 40                                      |
| 3 44<br>3 45<br>3 46<br>3 47<br>3 48<br>3 49<br>3 50<br>3 51<br>3 52<br>3 53<br>3 54<br>3 56<br>3 57 | 470<br>470<br>471<br>465<br>465<br>470<br>471<br>471<br>471<br>471<br>471<br>471<br>471<br>471<br>471<br>471 | 化多分子 医克克克氏 医克克克克氏 医克克克氏  医克克克克氏 医克克克克氏 医克克克克氏 医克克克克氏 医克克克克氏 医克克克克氏 医克克克克氏 医克克克克氏 医克克克克克氏 医克克克氏 医克克克克氏 医克克克克氏 医克克克克克氏 医克克克克氏 医克克克克氏 医克克克氏 医克克克氏 医克克克氏 医克克克克氏 医克克克克氏 医克克克克克克克克 | 47600161556611111111111111111111111111111 | 46602778661177866117786444866667911844666679757666797484866667976786848824414446644466667976797679767976797679767976 | 4674<br>4444<br>4460<br>4460<br>4460<br>4460<br>4460<br>4460 | 470 474 483 484 484 484 484 484 484 484 484 48 | 5088 508 508 508 508 508 508 508 508 508 | 508 508 508 508 508 508 508 508 508 508 | 508 508 508 508 508 508 508 508 508 508 | h.m., 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 486<br>486<br>486<br>486<br>486<br>478<br>478<br>478<br>477<br>477<br>477<br>477<br>477<br>477<br>477 | 484448664447774774477447774477447774477 | 4864<br>4844<br>4886<br>4886<br>4886<br>4886<br>4886<br>4886 | 42444444444444444444444444444444444444 | 4767<br>4777<br>4777<br>4777<br>4777<br>4777<br>4777<br>4777 | 484 463 473 466 478 487 487 487 487 487 487 487 487 487 | 5022 5028 5020 5020 5020 5020 5020 5020 | 5022 5020 5020 5020 5020 5020 5020 5020 | 500 600 600 600 600 600 600 600 600 600 |

 $Readings\ of\ the\ Brooke\ instruments\ at\ Uylaamie,\ Alaska- {\bf Continued.}$ 

| (Te          | mper       | ature      | Febr<br>at be | uary<br>ginnin | 15, 188<br>ng. 49, | 3.<br>0; at | end,           | Մ°.ե <b>F</b>  | .)         | (То          | spera      | ituri :    | Ma<br>a, beg | arch 1<br>ginniu | , 18×3<br>ig 9 ,: | 2; at i    | end, 1     | 20.0 F     | <b>'</b> .) |
|--------------|------------|------------|---------------|----------------|--------------------|-------------|----------------|----------------|------------|--------------|------------|------------|--------------|------------------|-------------------|------------|------------|------------|-------------|
| ime.         |            | <br>linom  | eter.         |                | Bifilat<br>actom   |             | mag            | alanc<br>netom | eter,      | Time.        | Dec        | linom      | eter.        |                  | Bifflar<br>neton  |            |            | alane      |             |
|              | 0,         | 20.        | 40            | 0:             | 20.                | 40-         | 00             | 201            | 104        |              | 01         | 20         | 401          | 0-               | 291               | 10-        | 61         | 20:        | 10:         |
| . m.         |            |            | ,,            |                |                    |             |                |                |            | h. 10        |            |            |              |                  |                   |            |            |            |             |
| 1 0          | 482<br>470 | 480        | 479           | 426<br>406     | 468                | 401         | 505            | 505            | 595<br>595 | 2 0'         | 489        | 479        | 470          | 515              | 520               | 518        | 501        | 501<br>501 | 50<br>50    |
| 1 2          | 481        | 481        | 401           | 414            | 422                | 423         | 505            | 505            | 505        | 2 2          | 4-0        | 400        | 453          | 513              | 514               | 50:1       | 501        | 501        | 50          |
| 1 3          | 481        | 481        | 4×1           | 421            | 425                | 425         | 565            | 505            | 505        | 2 3          | 1 ~11      | 483        | 600          | 1.56             | 473               | 473        | 501        | 5.11       | 50          |
| 1 4          | 481        | 451<br>451 | 481           | 424            | 421                | 121         | 505            | 505            | 505        | 2 4          | 182<br>479 | 481        | 4.51         | 473              | 121               | 478        | 501        | 501        | 50          |
| 1 6          | 451        | 47.)       | 178           | 1:2            | 411                | 111         | 505            | 505            | 505        | 2 5<br>2 6   | 178        | 177        | 478          | 492              | 4.5               | 189        | 501        | 501        | 50          |
| 1 7          | 478        | 477        | 474           | 112            | 411                | 421         | 505            | 505            | 505        | 11 7         | 477        | 17.1       | 474          | 186              | 498               | 510        | 591        | 501        | 51          |
| 1 8          | 475        | 476        | 47.1          | 421            | 119                | 416         | 505            | 505            | 505        | 2 8          | 476        | 470        | 478          | 512              | 503               | 199        | (1)        | 562        | 54          |
| 1 9<br>1 10  | 476        | 474        | 470           | 417            | 428                | 441         | 505            | 305<br>505     | 505<br>565 | 2 9          | 475        | 483        | 483          | 49 1             | 497               | 195        | 502<br>502 | 502<br>502 | 50          |
| 1 11         | 472        | 472        | 175           | 115            | 430                | 119         | 505            | 5.75           | 505        | 3 11         | 4 2        | 1-15       | 453          | 493              | 185               | 479        | 502        | 502        | 54          |
| 1 12         | 479        | 482        | 4-5           | 400            | 455.0              | 1189        | 505            | 505            | 50.5       | 9 19         | 452        | 4 - 4      | 4 - 3        | 47 -             | 4500              | 500        | 502        | 502        | 54          |
| 1 13         | 483        | 186        | 1 - 5         | 394            | 395                | 395         | 505            | 595            | 505        | 2 13         | 1-1        | 4.0        | 487          | 523              | 522               | 510        | 502        | 503        | 50          |
| l 14<br>l 15 | 485        | 475        | 471           | 443            | 421                | 142<br>440  | 505            | 505            | 565        | 2 14 2 15    | 107        | 457        | 486          | 507<br>512       | 513               | 515<br>520 | 503        | 503        | 51          |
| 16           | 475        | 474        | 475           | 4.18           | 410                | 450         | 505            | 505            | 505        | 2 16         | 1-1        | 486        | 4-6          | 530              | 135               | 533        | 563        | 303        | 5           |
| 17           | 476        | 475        | 475           | 451            | 450                | 435         | 545            | 505            | 505        | 2.1          | 485        | 485        | 4-363        | 524              | 55.1              | 524        | 503        | 502        | .50         |
| 1 18         | 474        | 477        | 475           | 433            | 432                | 425         | 505            | 595            | 505        | 2.18         | 405        | 155        | 484          | 7100             | 534               | 525        | 502        | 502        | - 51        |
| L 19<br>E 20 | 480        | 478        | 480           | 423            | 422                | 416         | อีกอิ<br>อีกอิ | 305<br>505     | 505        | 2 19         | 483        | 484        | 481          | 523              | 529<br>550        | 555        | 502        | 502<br>502 | 5           |
| 21           | 485        | 480        | 482           | 418            | 417                | 4:30        | 505            | 505            | 561.5      | 2 21         | 478        | 478        | 476          | 558              | 556               | 554        | 502        | 501        | 5           |
| 22           | 482        | 483        | 482           | 428            | 425                | 422         | 505            | 505            | Sola       | 2 99         | 175        | 474        | 473          | 552              | 545               | 542        | 501        | 501        | .50         |
| 23           | 484        | 484        | 485           | 424            | 418                | 400         | 50.            | 505            | 500        | 2 23         | 473        | 472        | 471          | 545              | 540               | 527        | 591        | 501        | 5           |
| 1 24         | 485        | 484        | 482           | 403            | 407<br>359         | 404         | 505<br>504     | 505            | 503        | 2 24         | 460        | 471        | 470          | 516<br>566       | 521<br>553        | 540<br>545 | 501        | 501        | 5           |
| 26 1         | 484        | 484        | 45.5          | 409            | 4/9                | 404         | 504            | 504            | 504        | 2.26         | 466        | 1111       | 170          | 555              | 580               | 589        | 591        | 51112      | :           |
| 1 27         | 486        | 4116       | 486           | 411.           | 4.0%               | 402         | 504            | 5:14           | 504        | 2 27         | 469        | 468        | 469          | ast.             | 574               | 576        | 502        | 501        | 51          |
| 28           | 486        | 485        | 485           | 400            | 397                | 41/11       | 501            | 501            | 504        | 2.29         | 471        | 172        | 473          | 067              | 583               | 5455       | 502        | 500        | .10         |
| 29           | 485<br>485 | 483        | 485           | 397            | 393                | 387         | 504            | 504            | 504        | 2 29 2 30    | 474        | 471        | 473<br>470   | 552              | 552<br>547        | 580        | 502        | 501        | 50          |
| 31           | 486        | 487        | 455           | 394            | 387                | 370         | 51.4           | 504            | 50.5       | 2 31         | 47.        | 46-        | 475          | 527              | 528               | 535        | 501        | 591        | 5           |
| 32           | 485        | 485        | 4-2           | 573            | 392                | 398         | 503            | 503            | 503        | 2 32         | 469        | 472        | 467          | 531              | 503               | 535        | 501        | 501        | 7           |
| 34           | 484        | 483        | 488           | 396            | 395                | 394         | 503            | 503<br>504     | 504        | 2 23         | 476        | 472<br>471 | 468          | 554              | 580<br>601        | 592<br>595 | 501<br>502 | 501<br>502 | 56          |
| 35           | 486        | 488        | 484           | 378            | 332                | 390         | 503            | 503            | 504        | 2 6          | 47.1       | 470        | 471          | 590<br>500       | 592               | 591        | 502        | 502        | 5           |
| 36           | 483        | 489        | 485           | 386            | 3~6                | 390         | 503            | 50.3           | 503        | 2.36         | 473        | 47%        | 474          | 575              | 517               | 5,000      | .10.2      | 501        | 5           |
| 37           | 488        | 485        | 487           | 392            | 390                | 389         | 503            | 500            | 503        | 2 37         | 477        | 475        | 477          | 515              | 524               | 504        | 503        | 501        | 5           |
| 88           | 488        | 498        | 489           | 393            | 384                | 387         | 503<br>5e3     | 503            | 503        | 2 38 2 39    | 477        | 477        | 478          | 531<br>548       | 525<br>565        | 532        | 501        | 501        | 5           |
| 40           | 489        | 488        | 488           | 408            | 398                | 395         | 503            | 503            | 503        | 2 40         | 472        | 176        | 4712         | 5-3              | 592               | 598        | 502        | 502        | 5           |
| 41           | 486        | 487        | 486           | 385            | 400                | 406         | 503            | 503            | 503        | 2.41         | 174        | 471        | 167          | Goo              | 595               | 596        | 502        | 500        | 5           |
| 42           | 485        | 485        | 485           | 494            | 404                | 405         | 503            | 503            | 503        | 2 42 2 43    | 467        | 46.        | 402          | 601              | 602               | 198        | 501        | 501        | 5           |
| 43           | 486        | 486        | 486           | 409            | 410                | 419         | 503            | 503            | 500        | 2 43         | 462        | 470        | 464          | 601              | 603               | 626        | 502        | 592<br>503 | : :         |
| 45           | 486        | 485        | 485           | 412            | 416                | \$21        | 5.03           | 503            | 503        | 2 15         | 473        | 475        | 478          | 626              | 615               | 599        | 503        | 503        | .5          |
| 46           | 485        | 485        | 486           | 421            | 418                | 419         | 503            | 503            | 503        | 2.46         | 471        | 479        | 482          | 590              | 611               | C30        | 503        | 503        | 5           |
| 47           | 486<br>486 | 487        | 487           | 420            | 427                | 423         | 503            | 503            | 503        | 2 47         | 482        | 478<br>479 | 481          | 630              | 626               | 623<br>636 | 503<br>503 | 503        |             |
| 49           | 486        | 486        | 486           | 427            | 428                | 429         | 503            | 503            | 503        | 2 49         | 480        | 476        | 478          | 634              | 45 4 1            | 662        | 503        | 503        | -           |
| 50           | 4×6        | 485        | 485           | 431            | 434                | 435         | 503            | 503            | 503        | 2 50         | 477        | 472        | 472          | 675              | 675               | 677        | 503        | 503        | 1.5         |
| 51           | 485        | 486        | 486           | 435            | 435                | 433         | 503            | 503            | 503        | 2.51         | 473        | 168        | 472          | 683              | 679               | 665        | 503        | 502        | 5           |
| 52           | 485 .      | 486<br>487 | 486<br>485    | 434<br>428     | 436<br>428         | 432         | 503            | 503            | 593        | 2 52<br>2 53 | 472        | 472        | 460<br>470   | 658<br>637       | 645               | 635<br>645 | 502<br>502 | 502<br>502 | 5           |
| 54           | 488        | 487        | 486           | 428            | 424                | 424         | 503            | 503            | 5004       | 2 54         | 471        | 478        | 476          | 638              | 644               | 655        | 502        | 502        | 5           |
| 55           | 486        | 485        | 485           | 426            | 421                | 429         | 503            | 503            | 503        | 2 55         | 473        | 471        | 473          | 650              | 331               | 615        | 502        | . 501      |             |
| 1 56         | 457        | 488        | 488           | 432            | 428                | 419         | 503            | 503            | 503        | 2.56         | 478        | 470        | 475          | 614              | 620               | 618        | 501        | 501        |             |
| 1 58         | 490        | 490        | 488<br>488    | 420            | 424                | 424         | 503            | 503<br>503     | 503        | 2 57<br>2 58 | 472        | 474        | 473          | 601              | 589<br>620        | 596<br>611 | 501<br>500 | 500        |             |
| 1 59         | 456        | 485        | 482           | 432            | 434                | 438         | 503            | 503            | 503        | 2 59         | 471        | 473        | 468          | 600              | 603               | 620        | 500        | 500        |             |

H. Ex. 44---70

Readings of the Brooke instruments at Uglaamie, Alaska.

| Time         | D.         | '11 a      | e free     | nuc        | Bab"<br>meter |            |            | lai m<br>ne let | acter.     | Time.          | Des        | . 121-121  | eter.      |            | Bittla<br>neteti |            | mag   | Lilane<br>neton |     |
|--------------|------------|------------|------------|------------|---------------|------------|------------|-----------------|------------|----------------|------------|------------|------------|------------|------------------|------------|-------|-----------------|-----|
|              | ()         | 200        | 10-        | ()-        | 50.           | 10-        | 0.         | 20.             | 101        |                | 43+        | 20-        | 10.        | 04         | 20:              | 10-        | 01    | 20-             | 46  |
| h            |            |            |            |            |               |            | E 443      |                 |            | 1. m.          | 1*4        | ,          | 450        | 454        | 470              | 14111      | 4.411 | 440             |     |
| 0            | 1.5        | 1-         | 150        | 150<br>462 | 101           | 461        | 542        | 24.             | -12        | 1 1            | 410        | 157        | 159<br>159 | 474<br>472 | 470              | 485        | 143   | 443             | 4   |
|              | 4 . 21     | 1-1        | 120        | 4549       | 156           | 154        | 541        | 1.1             | 1.1        | 4 2            | 1.49       | 1.39       | 460        | 489        | 402              | 4116       | 444   | 444             | 4   |
|              | 100        | 17.7       | 1 5        | 156        | Serie         | 470        | 542        | 11              | 517        | 4 4            | 460<br>459 | 459<br>460 | 460<br>159 | 501<br>509 | 508              | 202        | 114   | 444             | 4   |
| 3 1          | 17 (       | 17         | 176        | 1 1        | 110           | 415        | 4.1        | 311             | 241        | 4 5            | 459        | 460        | 461        | 199        | 498              | 450        | 144   | 444             | 4   |
| 3 1          | 1 .        | 47.        | 17.7       | 17.1       | 135           | 110        | 541        | 511             | +411       | 4 6            | 481        | 160        | 560        | 491        | 48-61            | 157        | 444   | 444             | 4   |
| 1            | 17.4       | 1          | 1 -        | \$61.1     | 464           | 1 1        | -11        | 541             | 741        | 4 7            | 4.15       | 159        | 1.75       | 197        | 509              | 515        | 411   | 414             | 4:  |
| 1 0          | ( )        | 1 -        |            |            | 132           | 11 -       | 711        | 541<br>542      | 541        | 4 5            | 459        | 157        | 458        | 510        | 513              | 500        | 114   | 144             | 4   |
| 1 10         | 16.        | 1 -        | 1 -        | 1          |               | 12.        | 7.4        | 540             | 540        | 4 10           | 464        | 463        | 464        | 489        | 480              | 178        | 111   | 114             | 4   |
| 3 11         | 477        | 1.0        | 1. "       | 1.5        | 1.0           | 418        | 540        | 110             | 540        | 4 11           | 463        | 462        | 462        | 451        | 1                | 4 < 14 )   | 411   | 141             | 14  |
| 3 12         | 175        | 10         | 17.1       | 427        | 450           | 4 19       | 540        | 540             | 541        | 4 12           | 461        | 461<br>462 | 463        | 483        | 480              | 17.4       | 111   | 114             | 4   |
| 3 13         | 476<br>476 | 170        | 176        | 17.4       | 100           | 2370       | 541        | 541             | 511        | 4 14           | 164        | 463        | 463        | 107        | 161              | 27.5       | 111   | 143             | 4.  |
| 1            | 17         | 4.5        | 177        | 40         | \$5,000       | 450        | 541        | 110             | 541        | 1.15           | 160        | 462        | 162        | 174        | 477              | 1 - 1      | 1111  | 443             | 44  |
| 3 1/5        | 475        | 117        | 100        | 116        | 4.50          | 4.11       | 311        | 541             | 541        | 4 16           | 464        | 464        | 161        | \$4000     | 166<br>455       | 100        | 145   | 143             | 1.  |
| 3.1          | 475        | 461        | 1651       | 11.        | 4.21          | 427        | 541        | 511             | 511        | 4 17           | 465<br>468 | 166        | 167        | 463        | 415              | 447        | 445   | 4.43            | 4.  |
| 3.13         | 1. 11      | 10 -       | 475        | 170        | 5000          | 540        | 541        | 542             | 543        | 4 19           | 466        | 467        | 168        | 446        | 445              | \$ 412     | 143   | 41%             | 11  |
| 33 - 1       | 457        | 281.7      | 450        |            | 4,710         | 503        | 5411       | 543             | 54.        | 4 20           | 465        | \$1553     | 470        | 445        | 447              | 11>        | 140   | 14:             | 11  |
| 3 : '        | 150        | 177        | 476        | 170        | 108           | 400        | 541        | 569             | 540        | 4 21 4 22      | 470        | 470        | 470        | 445        | 446              | 143        | 443   | 443             | 1.  |
| 4 1          | 475        | 17.        | 171        | 1000       | 125           | 435        | 519        | 739             | 740        | 4 23           | 172        | 472        | 171        | 421        | 417              | 413        | 443   | 14.1            | 43  |
| 1 11         | 1"4        | 175        | 4-1,       | , 10       | 116           | 152        | 540        | 510             | 540        | 1 24           | 474        | 474        | 474        | 412        | 415              | 150        | 1 100 | 44.3            | 41  |
| 3 26         | 170        | 477        | 175        | \$1.0      | 146           | 101        | 541        | 541             | 540        | 4 25           | 473<br>473 | 474<br>472 | 47.1       | 423        | 427              | 426<br>429 | 443   | 143             | 11  |
| 3 -7         | 475        | 470        | 175        | 45:        | 4 4 6         | 402        | 540        | 540             | 540        | 4 27           | 474        | 475        | 475        | 128        | 426              | 121        | 443   | 443             | 1.1 |
| 3 28         | 476        | 176        | 176        | 11.2       | 140           | 160        | 740        | 110             | 540        | 4.28           | 476        | 475        | 175        | 416        | 411              | 409        | 443   | 143             | 11  |
| 3 29         | 471        | 17.3       | 1-1        | 462        | 167           | 452        | 54.5       | 50.9            | 539        | 4 20           | 474        | 473        | 474        | 412        | 413              | 415        | 443   | 443             | 41  |
| 3 31         | 471        | 471        | 171        | 67.6       | 472<br>178    | 454        | 559        | 540             | 540        | 4 31           | 176        | 476        | 478        | 420        | 417              | 413        | 11.1  | 113             | 1   |
| 3 32         | 470 .      | 171        | 470        | 15+        | 1.154         | 498        | 540        | 540             | 540        | 4 32           | 177        | 478        | 477        | 409        | 407              | 410        | 140   | 443             | 11  |
| 3 33         | 471        | 170        | \$6.9      | 19.,       | 1 -24         | 455        | 540        | 540             | 540        | \$ 333         | 476        | 475        | 474        | 444        | 414              | 414        | 44"   | 143             | 44  |
| 3 34         | 470        | 468        | 467        | 495        | 191           | 493<br>492 | 540        | 504             | 585<br>584 | 4 34<br>4 35 : | 472        | 473        | 474        | 417        | 420              | 419        | 443   | 1 533           | 44  |
| 1. 36        | 16-        | 1417       | 465        | 492        | 400           | 191        | 504        | 534             | 533        | 4.36           | 469        | 470        | 46.0       | 422        | 425              | 4:17       | 4 177 | 443             | 44  |
| 3 37         | 164        | 461        | 465        | 506        | 517           | 522        | 534        | 504             | 574        | 4 37           | 468        | 469        | 468        | 428        | 431              | 436        | 443   | 443             | 44  |
| 3 35         | 461        | 465        | 464        | 523        | 525<br>520    | 524<br>515 | 534        | 534             | 585        | 4 38           | 468        | 469        | 46×        | 439        | 443              | 448        | 443   | 443             | 44  |
| 3 40         | 465        | 464        | 466        | 512        | 507           | 500        | 535        | 531             | 532        | 4 10           | 465        | -\$459     | 469        | 449        | 461              | 452        | 443   | 443             | 44  |
| 3 41         | 466        | 467        | 466        | 195        | 495           | 500        | 532        | 532             | 582        | 4 41           | 469        | 168        | 465        | 148        | 445              | 446        | 443   | 443             | 41  |
| 3 42         | 466        | 167        | 466        | 518        | 508<br>521    | 512        | 532        | 532<br>532      | 532<br>532 | 4 42 4 43      | 467        | 467        | 463        | 448        | 449<br>459       | 451        | 443   | 443             | 44  |
| 3 44         | 465        | 465        | 461        | 511        | 508           | 512        | 532        | 532             | 532        | 4 44           | 462        | 463        | 462        | 472        | 475              | 479        | 443   | 443             | 41  |
| 3 45         | 464        | 466        | 467        | 519        | 518           | 514        | 532        | 5.32            | 532        | 4 45           | 461        | 461        | 461        | 482        | 4H.              | 480        | 443   | 443             | 11  |
| 3 47         | 469<br>472 | 470        | 471<br>472 | 510        | 511<br>503    | 510        | 532<br>532 | 532             | 532<br>532 | 4 46 1         | 461        | 461        | 461        | 478<br>492 | 479              | 485        | 443   | 443             | 44  |
| 3 4-         | 472        | 471        | 471        | 501        | 498           | 492        | 5.32       | 531             | 531        | 4 48           | 162        | 461        | 461        | 490        | 490              | 495        | 440   | 443             | 3 1 |
| 3 49         | 471        | 470        | 472        | 485        | 485           | 150        | 531        | 531             | 531        | 1 49           | 461        | 461        | 462        | 500        | 500              | 495        | 44:   | 443             | 4.1 |
| 3 50         | 472        | 173        | 1.4        | 475        | 475           | 475        | 531<br>529 | 530<br>529      | 529<br>529 | 4 50<br>4 51   | 462<br>464 | 465        | 462        | 494        | 491<br>495       | 494        | 443   | 143             | 41  |
| 3 51<br>3 52 | 474        | 475        | 47.5       | 476        | 475           | 476<br>472 | 529        | 529             | 529        | 4 52           | 464        | 463        | 461        | 484        | 481              | 479        | 113   | 443             | 4:  |
| 3 53         | 476        | 476        | 476        | 473        | 475           | 476        | 529        | 529             | 529        | 4 53           | 459        | 458        | 457        | 480        | 484              | 490        | 443   | 443             | 41  |
| 3 54         | 476        | 477        | 478        | 474        | 472           | 470        | 529        | 529             | 529        | 4 54 .         | 457        | 458        | 459        | 495        | 498              | 499        | 443   | 443             | 41  |
| 3 56 1       | 478        | 478<br>479 | 478        | 469        | 466           | 465        | 529<br>528 | 528<br>528      | 528<br>528 | 4 55<br>4 56   | 160<br>461 | 460        | 460        | 495        | 492<br>493       | 492<br>490 | 443   | 443             | 11  |
| 3 57         | 450        | 481        | 479        | 462        | 458           | 456        | 526        | 525             | 525        | 4 57           | 459        | 459        | 459        | 487        | 487              | 490        | 443   | 443             | 14  |
| 3 58         | 479 :      | 481        | 481<br>481 | 454        | 454           | 457        | 525        | 525             | 525        | 4 58           | 459        | 460        | 460        | 494        | 495              | 491        | 143   | 443             | 44  |

#### Readings of the Brooke instruments at Uglaamie, Alaska.

| ime          | Dec        | hnom       | eter.      | magi         | Bitilai<br>ir (e m | ifet       | magi    | alane<br>ietom | e<br>eter. | F811  | 1160       | linono     | Her.        |                   | Bifflan<br>netons |            |            | lalane<br>before |   |
|--------------|------------|------------|------------|--------------|--------------------|------------|---------|----------------|------------|-------|------------|------------|-------------|-------------------|-------------------|------------|------------|------------------|---|
| 111149       | 0.         | 201        | 40.        | 0+           | 20.                | 401        | 0.      | 204            | 40-        | Time. | ()+        | 20.        | 401         | ():               | 20.               | 401        | ():        | 20.              | 1 |
|              |            |            |            |              |                    |            |         |                |            |       |            |            |             |                   |                   |            |            |                  |   |
| 1            | 4-1        | 171        | 471        | 28.0%        | ., 1               |            | 440     | 149            | 449        | b. m  | 452        | 45.5       | 154         | 577               | 377               | 574        | 5 1        | 5.11             | 5 |
|              | 171        | 171        | 174        | 307          | **                 | .1 5       | 410     | 440            | 440        | 6 3   | 451        | \$ 50      | 151         | 1111              | 280               | 575        | 201        | 531              |   |
|              | 17.1       | 171        | 474        | 370          | 0.1                | . 1 T      | 419     | 449            | 449        | 6 2   | 4 10       | 110        | 4 8 1 7     | 350               | Aug 1             | 506        |            | 551              |   |
| 1            | 174        | 174        | 170        | 1,014        | 40.0               | 110        | 1411    | 1411           | 1 150      | 0 1   | 14"        | 446        | 1107        | 100               | ti., 1            | 1.15       |            | 5.11             |   |
|              | 1 .        | 17.3       | 17.        | 1.7          | 11.53              | 0.5        | 100     | .14            | \$ \$51    | 6.5   | \$ 51      | 111        | 11:         | (6, 12            | 62                | 1 "        |            | -01              |   |
| 11           | 17.1       | 173        | 17.        | 7.1          |                    | - 1        | 134     | 119            | 4.19       | 6 5   | 11         | 111        | 1.1         | 123               | 6.17              | 0.23       | 3.11       | 5,00             |   |
|              | 173        | 17.        | 1. :       | 460          |                    |            | 449     | 111            | 1.15       | 1     |            | 4 10       | 110         | 0.23              | 619               | 115        | 500        | 730              |   |
| 5 14         | 173        | 473        | 477        | 376          | 168                |            | 1.50    | 64%            | 1.11       | 81 -1 | 11         | 1-612      | 8.5         | 1/1               | 61.               | +1.        | 5.5        | 5.40             | - |
| 3 11         | 174        | 171        | 1.1        | -652         | 400                | 405        | 140     | 149            | 449        | 6 le  | 44.,       | 110        | 14.5        | 0.20              | O <sub>m</sub>    | 1 Lie      | 730        | 530              |   |
| 5 12         | 174        | 471        | 171        | 368          | 126.75             | 70         | 5.514   | 149            | 449        | 6.11  | 110        | 1.69       | 440         | 0.44              | 6.11              | 650        | 500        | 500              |   |
| 11           | 474        | 171        | 474        | .0 -         | 2.                 | .,         | 139     | 4 4 9          | 1 229      | 6     | 1000       | 44!        | 414         | 6.12              | 6.12              | 61         | 500        | 5 10             |   |
| 5 14         | 47.4       | 171        | 174        | 4.23         | (0.0)              | 48.10      | \$ \$11 | 149            | 4.19       | 6.14  | 44         | 411        | 141         | 0134              | 647               | + 17       |            | * .0             |   |
| 113          | 171        | 471        | 174        | 116154       | . 662              | 3624       | 1 121   | 419            | 449        | 6 15  | 1 57       | 4.57       | 100         | 64                | 6.11              | 125        | 5.0        | * 4<br>7.0       |   |
| 5 17         | 474        | 471        | 174        | 369          | 369                | 370        | 8.811   | 449            | 4 19       | 6 16  | 139<br>144 | 442        | 440         | 6.65              | 629               | 0.14       | 500        | 5.00             |   |
| 18           | 475        | 475        | 475        | 368          | Hib                | 368        | 449     | 119            | 4 4 9 9    | 6 15  | 449        | 451        | 1.50        | 646               | 640               | 1.6        | 5 10       | 529              |   |
| 19           | 475        | 475        | 475        | 369          | 369                | 568        | 449     | 134            | 4.89       | 6 19  | 451        | 451        | 450         | 611               | 613               | + 21       | 50         | 25.0             |   |
| 5 20         | 175        | 475        | 475        | 3310         | 365                | 370        | 449     | 419            | 4 1 11     | 6.20  | 450        | 149        | 450         | 628               | 626               | 6.76       | 4.0        | .:1              |   |
| 90           | 475        | 474        | 474        | 370<br>571   | 374                | 371        | 4411    | 419            | 449        | 6 21  | 450        | 453        | 452         | 632<br>625        | 637               | 635        | 524        | 5.9              |   |
| 2.;          | 471        | 474        | 471        | 371          | 37.4               | 34 3       | 4411    | 445            | 140        | 6 23  | 1.15       | 116        | 446         | 614               | 611               | 609        | 7,000      | 1.14             |   |
| 24           | 474        | 474        | 174        | 376          | 376                | 137.45     | 44!+    | 449            | 449        | 6.24  | 416        | 441        | 142         | 612               | 615               | 619        | 22-        | 50%              |   |
| 5 25<br>5 26 | 171        | 474        | 474        | 376          | 1.76               | .50        | 449     | 449            | 3 401      | 6.25  | 142        | 441        | 441         | 625               | 635               | 637        | 100        | 523<br>538       |   |
| 26           | 474        | 471        | 474        | 3474<br>3474 | 376                | 470        | 440     | 419            | 449        | 6 16  | 441        | 415        | 450         | 650               | 571               | 602<br>566 | 525        | 528              |   |
| 25           | 471        | 174        | 471        | 371          | 375                | 1,75       | 119     | 119            | 149        | 6 28  | 454        | 452        | 152         | 5669              | 5841              | 592        | 505        | 28               |   |
| 5 : 9        | 174        | 471        | 474        | 376          | 376                | 357.6      | 449     | 110            | 449        | 6 29  | 453        | 448        | 452         | 602               | 663               | 601        | 528        | 5.28             |   |
| 5 1.0        | 474        | 474        | 474<br>474 | 376          | 376<br>376         | 376        | 449     | 149            | 449        | 6 31  | 454        | 456        | 456         | 6an<br>598        | 503               | 597        | 1929       | 528<br>528       |   |
| 32           | 471        | 471        | 471        | 376          | 376                | 176        | 444     | 149            | 340        | 6.32  | 457        | 459        | 457         | 594               | 586               | 7,81       |            | 18               |   |
| 33           | 471        | 474        | 475        | 176          | 374                | 374        | 449     | 449            | 149        | 6.33  | 457        | 455        | 453         | 585               | 593               | 50%        | 1.0        | -                |   |
| 114          | 475        | 475        | 175        | 1171         | 374                | 374        | 419     | 449            | 449        | 6 14  | \$51       | 450        | 445         | 596               | 78,1              | 586        |            | 52.              |   |
| 35           | 475        | 475<br>475 | 475        | 371          | 37.1               | 374        | 449     | 149            | 449        | 6.35  | 458        | 455        | 459         | 550<br>578        | 392               | 7.74       | 528        | 528<br>528       |   |
| 37           | 475        | 475        | 475        | 374          | 374                | 574        | 440     | 449            | 4419       | 0.37  | 451        | 153        | 458         | 583               | 592               | 595        | 528        | 528              |   |
| 38           | 474        | 474        | 474        | 375          | 375                | 070        | 419     | 449            | 419        | 6.58  | 45%        | 463        | 463         | 591               | 588               | 590        | 52a        | 528              |   |
| 39           | 474        | 474        | 474        | 375          | 375                | 375        | 449     | 449            | 449        | 6.39  | 469        | 467        | 466         | 593               | 591               | 588        | 528        | 528<br>528       |   |
| 40           | 474        | 474        | 474        | 374<br>372   | 373                | 371        | 419     | 449            | 449        | 6 41  | 400        | 468<br>468 | \$65<br>470 | 595<br>583        | 568               | 507        | 528<br>528 | 528              |   |
| 42           | 474        | 475        | 475        | 371          | 571                | 071        | 44.)    | 449            | 149        | 6 42  | 469        | 467        | 167         | 567               | 5.59              | 550        | 528        | 1234             |   |
| 43           | 475        | 475        | 475        | 371          | 371                | 371        | 449     | 440            | 440        | 6 43  | 467        | 468        | 466         | 545               | 553               | 554        | 528        | 3228             |   |
| 44           | 475<br>475 | 475        | 475        | 371          | 371                | -71<br>-71 | 449     | 149            | 4:19       | 6 44  | 467        | 467        | 467         | 548               | 529<br>528        | 533<br>526 | 527<br>527 | 527<br>527       |   |
| 46           | 175        | 475        | 47.5       | 370          | 369                | 369        | 449     | 449            | 149        | 6 46  | 461        | 159        | 158         | 527               |                   | 514        | 307        | 327              |   |
| 47           | 47.5       | 475        | 474        | 370          | 370                | 570        | 449     | 4419           | 449        | H 47  | 457        | 160        | 462         | $\frac{527}{552}$ | 554               | 550        | 327<br>527 | 307<br>307       |   |
| 48           | 475        | 475        | 475        | 370          | 370                | 371        | 449     | 149            | 419        | 6 48  | 463        | 464        | 463         | 54.1              | 540               | 5.39       | 528        | 528              |   |
| 49           | 475<br>475 | 475        | 475        | 372<br>371   | 372<br>375         | 37.2       | 449     | 449            | 449        | 6 49  | 461        | 463        | 463         | 136<br>521        | 529<br>525        | 523        | 528<br>528 | 324              |   |
| 51           | 475        | 475        | 475        | 375          | 375                | 375        | 449     | 449            | 149        | 6.51  | 161        | 466        | 166         | 527               | 536               | 5012       | 708        | 55%<br>51%       |   |
| 52           | 475        | 475        | 175        | 376          | 375                | 375        | 449     | 449            | 449        | 6.52  | 463        | 461        | 461         | 527               | 524               | 526        | 528        | 1.28             |   |
| - 53         | 475        | 475        | 175        | 375          | 375                | 373        | 449     | 449            | 449        | 6.53  | 461        | 461        | 460         | 532               | 533               | 532        | 528        | 528<br>528       |   |
| 54           | 475<br>475 | 475        | 475        | 375          | 375                | 375        | 449     | 44:1           | 449        | 6.55  | 459        | 459<br>457 | 458<br>156  | 522<br>512        | 510               | 505<br>518 | 528<br>527 | 527              |   |
| 56           | 175        | 475        | 475        | 375          | 37:1               | 373        | 119     | 149            | 419        | 6 56  | 454        | 453        | 452         | 507               | 501               | 507        | 527        | 527              |   |
| 57 .         | 475        | 475        | 475        | 373          | 373                | 173        | 140     | 449            | 449        | 6.57  | 4.53       | 451        | 451         | 516               | 511               | 504        | 527        | 527              |   |
| 59           | 474        | 473        | 474        | 374          | 375                | 376        | 449     | 449            | 449        | 6 58  | 450        | 451        | 452         | 499               | 500               | 504        | 527        | 527              |   |

# Readings of the Brooke instruments at Uglaamie, Alaska-Continued.

|                | argic ri          | ECCEPT OF  | at be; | ,11411111  |                |             |            |                 |             |              |            |            |                   |                 | m, 10           | .5: at |            |                 |     |
|----------------|-------------------|------------|--------|------------|----------------|-------------|------------|-----------------|-------------|--------------|------------|------------|-------------------|-----------------|-----------------|--------|------------|-----------------|-----|
| Time.          | Dec               | Lnom       | eles   | Bulg       | Bin'a<br>prion | r<br>setets | mug        | lalane<br>nefon | e<br>lefet: | Time         | Dec        | linom      | eter.             |                 | Bitlla<br>neton |        |            | Balano<br>neton |     |
| A HHIV.        | 62                | 201        | 401    | 0.         | 20:            | 10*         | 0.         | 201             | 4611        |              | 0,         | 30-        | 40.               | . 0*            | 20.             | 10,    | 0.         | 20-             | 4   |
| h. 10          |                   |            |        |            |                |             |            |                 |             | h. m.        |            |            |                   |                 |                 |        |            |                 |     |
| 7 0            | 467               | 465        | 465    | 472        | 420            | 420         | 472<br>472 | 47 -            | 47.         | 5 0          | 4-1        | 183        | 484               | 3.89            | 336             | 314    |            | 2.3             |     |
| 7 0            | 46-               | 408        | His    | 421        | 424            | 424         | 470        | 47.1            | 47.1        | 8 2          | 42-6       | 4-7        | 1866              | 250             | 356             | 356    | 5 .        | 535             | -   |
| 7 3            | 41.5              | 165        | 468    | 421        | 425            | 424         | 472        | 47.1            | 472<br>472  | % 18<br>% \$ | 487        | 4×6        | 487               | 360             | 370             | 355    | 5.15       | 535             |     |
| 7 4            | 467               | 467        | 467    | 421        | 120            | 4126        | 479        | 47.1            | 1 1         | 5 5          | 1-0        | 485        | 185               | 27.7.1          | 3               | 160    | 515        | 5.45            |     |
| 7 6            | 465               | ICa        | 468    | 4250       | \$31           | 431         | 472        | 4               | 1.2         | P (          | 100        | 1.5        | 155               | 140             | 564             | 1613   | 5.45       | . 45            | -   |
| 7 7            | 4100              | 465        | 468    | 430        | 425            | 4194        | 47.1       | 47.3            | 47.1        | 8 7          | 1-1        | 1-1        | 184               | 163             | 364             | .107   | 1. 3       | 50              | -   |
| 7 8            | 468               | 11.5       | 165    | 430        | 129            | 428         | 473<br>470 | 473             | 471         | 8 0          | 4503       | 111        | 453               | 1161            | 369             | 570    | 544        | 5014            |     |
| 7 10           | 105               | this.      | 10-    | 421        | 10.1           | 421         | 470        | 473             | 1,2         | 8 10         | 482        | 482        | 482               | 369             | 308             | 369    | 534        | 53.1            | 2   |
| 1.1            | 408               | 40%        | 167    | 122        | 424            | 195         | 472        | 4"              |             | 8 11         | 132        | 181        | 182               | 369             | 36.0            | 36,5   | 591        | 5014            | -   |
| 7 12           | 467               | 167        | 87     | 423        | 424            | 423         | 172<br>472 | 472             | 1 1         | 21;          | 1-1        | 151        | 1-1               | 1003 s<br>10039 | 369             | (0)    | 177        | 514             |     |
| 4 11           | 365               | 4117       | 465    | 124        | 425            | 423         | 47.2       | 472             | 40.         | 511          | 1=11       | 170        | 479               | 369             | 369             | 1      | 3.04       | - ; ;           |     |
| 7 15           | 465               | 465        | 465    | 427        | 425            | 120         | 477        | 1.2             | 1 .         | 5 15         | 1,50       | 479        | 470               | 266             | + 11.5          | 166    | 544        | 3.15            |     |
| 7 10           | 80 )              | 455        | 465    | 401        | 433            | 420         | 472        | 4.2             | 1           | 5 17         | 470        | 179<br>179 | 479               | 366             | 365             | 105    | 254        | 50.4            | -   |
| 7 17           | 465               | 465        | 465    | 453        | 12.            | 109         | 172        | 172             | 473         | 8 15         | 479        | 470        | 179               | 365             | 36              | 160    | 51         | 21.3            | -   |
| 7 19           | 46.5              | \$655      | 465    | 400        | 429            | 425         | 47.2       | 17.2            | 170         | r 1.1        | 1.0        | 175        | 47.               | 3965            | 33.7            | 11.5   | 5 1        | 51.             |     |
| 7.20           | 400               | 465        | 165    | 427        | 426            | 421         | 472        | 472             | 17.         | - Ju         | 4:0        | 478        | 113               | .165.1          | 1,00            | 370    | à.,        | 213             | :   |
| 7 21           | 465               | 465        | 465    | 425        | 427            | 427         | 472        | 471             | 471         | 8 21         | 17-        | 17.5       | 475               | 270             | 370             | 370    |            | 311             |     |
| 7 23           | 465               | 407        | 107    | 406        | 426            | 407         | 17.        | 471             | 172         | 8 23         | 17 -       | 177        | 170               | 571             | 371             | . 7    | -          | 533.4           | :   |
| 7.21           | 407               | 4:5        | 1955   | 427        | 4:3            | 424         | 17.2       | 471             | 473         | 8 24         | 175        | 177        | 177               |                 | 374             | 35.4   | 3.5        | 533             |     |
| 7 25 ;         | 4t 5<br>165       | 465        | 465    | 424        | 124            | 426<br>426  | 471        | 471             | 471         | 8 25         | 477        | 177        | 177               | 374             | 373             | 375    | 37.5       | 5.11            | 1   |
| 7:3            | 465               | 465        | 465    | 426        | 426            | 426         | 171        | 471             | 470         | 4 27         | 477        | 177        | 177               | 47.4            | : 7.3           | 37 1   | · de       | 55,             | :   |
| 7              | 1455              | 465        | 465    | 426        | 428            | \$20        | 470        | 470             | 470         | 8 18         | 177        | 177        | 476               | 37 1            | 37.3            | 374    | 51.3       | 53.1            | -   |
|                |                   | 465        | 465    | 429        | 427            | 428         | 470<br>470 | 470             | 470         | 8 30         | 476        | 476<br>476 | 476               | 371             | 75              | 37.5   | 500        | 5.33            |     |
| i si           | 465               | G65        | 165    | 405        | 431            | 431         | 469        | 469             | 460         | 8 31         | 176        | 476        | 477               | 375             | 374             | 372    | 1,1,1      | 50.1            | :   |
| 7 32           | 465               | 465        | 465    | 4'11       | 431            | 431         | 469        | 469             | 469         | n 32         | 477        | 477        | 477               | 372             | 372             | 372    | 5. 1       | 70.73           |     |
| 7 33           | 465               | 465        | 416    | 1 1        | 430            | 420         | 469        | 469             | 469         | 8 33         | 476        | 477<br>476 | 477<br>476        | 373             | 373             | 373    | 50.0       | 533             | -   |
| 7 34 7 35      | 465               | 465        | 465    | 4.6        | 429<br>425     | 425         | 469        | 1/09            | 19          | 8 35         | 176        | 176        | 476               | 377             | 378             | .179   | 5.4        | 533             | -   |
| 7 36           | 465               | 465        | 465    | 125        | 125            | 425         | 460        | 417.7           | 409         | 8.06         | 176        | 476        | 476               | 379             | 375             | 377    | 51.2       | 500.1           | ;   |
| 7.57           | 467               | 41.5       | 160    | 42.5       | 423            | 423         | 465        | 469             | 469         | 8 53         | 476        | 476        | 476               | 376             | 375             | 374    | 532        | 532             | -   |
| 7 38 7 39      | 465               | 465<br>165 | 465    | 425        | 424            | 426         | 469<br>468 | 468             | 468         | 8 34         | 476<br>475 | 175<br>175 | 475               | 373<br>371      | 371             | 371    | 2.63       | 582<br>582      | . [ |
| 7 40           | 465               | 465        | 465    | 425        | 425            | 425         | 466        | 413             | 468         | 8.40         | 475        | 175        | 470               | 371             | 372             | 372    | 50.1       | 533             |     |
| 7.41           | 465               | 465        | 465    | 424        | 423            | 423         | 468        | 465             | 468         | 8 41         | 475        | 470        | 475               | 374             | 374             | 375    | 1512       | 532<br>532      | -   |
| 7 42 7 43      | 465<br>467        | 465        | 467    | 424        | 423<br>420     | 423<br>421  | 468        | 411             | 408         | 8 43         | 475<br>476 | 476<br>476 | $\frac{476}{476}$ | 376             | 377             | 370    | 502        | 532             |     |
| 7 44           | 467               | 467        | 467    | 421        | 421            | 421         | 468        | 46%             | 40%         | 8 44         | 476        | 476        | 175               | 376             | 37.5            | 377    | 5002       | 532             | -   |
| 7.45           | 465               | 465        | 465    | 422        | 422            | 423         | 41 8       | 402             | 1614        | F 15         | 475        | 475        | 475               | .376            | 377             | 379    | 532        | 532             |     |
| 7 46 7 47      | 467<br>467        | 467        | 467    | 422        | f - 4          | 422         | 10%        | 468             | 159         | 8 46<br>8 47 | 175<br>475 | 474        | 474               | 379             | 380             | 378    | 552<br>532 | 552<br>552      | 1   |
| 7 48           | 467               | 467        | 467    | 421        | 420            | 4:40        | 4165       | 16%             | 465         | × 4×         | 471        | 474        | 475               | 379             | 374             | 370    | 5.42       | 531             |     |
| 7 49           | 4bti              | 466        | 466    | 420 .      | 421            | 4:11        | 465        | 40.5            | 468         | 9 49         | 474        | 475        | 475               | 238.01          | 318.2           | 380    | 502        | 500             | - 5 |
| 7 50<br>7 51 - | 460<br>460        | 466<br>466 | 466    | 421        | 423<br>422     | 423<br>421  | 467        | 467             | 467         | 8 50<br>8 51 | 175        | 475        | 475               | 1180            | 384             | 185    | 532        | 550<br>532      | 5   |
| 7 52           | 466               | 466        | 466    | 422        | 101            | 121         | 167        | 100             | 117         | 8 52         | 175        | 475        | 470               | 385             | 585             | 387    | 332        | 5002            |     |
| 7 53 1         | 467               | 467        | 467    | 420        | 139            | 415         | 4.7        | 4.7             | 467         | 8 53         | 176        | 175        | 475               | 355             | 355             | 386    | 532        | 56.2            |     |
| 7 54           | 467               | 467        | 467    | 418        | 418            | 417         | 467        | 467             | 467         | 8 EH         | 175        | 473        | 475               | 385             | 385             | 385    | 502        | 502             |     |
| 7 55<br>7 56   | $\frac{467}{467}$ | 467        | 467    | 415<br>412 | 113            | 412 414 .   | 467        | 467             | 467         | 8.56         | 475<br>175 | 175<br>475 | 475               | 381             | 383             | 382    | 532        | 532             | . 0 |
| 7 57           | 467               | 45.7       | 167    | 411        | 414            | 411         | 467        | 917             | 467         | r 57         | 17.5       | 1 1        | 174               | 381             | 379             | 378    | 532        | 532             | 7   |
| 7 58           | 467               | 467        | 467    | 411 .      | 411            | 409         | 467        | 467             | 467         | 8.58         | 17:        | 47.4       | 171               | 377             | 376             | 377    | 532        | 533             | -   |
| 7 50           | 467               | 467        | 467    | 408        | 408            | 406         | 467        | 467             | 467         | S 54         | 171        | 477        | 173               | 366             | 377             | 377    | 532        | 532             | . : |

# Readings of the Brooke instruments at Uglaamie, Alaska-Continued.

| (Tem   | pera                                    | ture s                                  | Jt<br>it beg                            | ine 15<br>jinnin   | , 1883.<br>g, 49≎  | 0; nt                                       | end,  | 49°.2                                   | <b>F</b> .)                             | (Ten  | pera                                       | turo a                                  | t beg   | uly 1,<br>inniu                        | 1883.<br>g, 53°.                            | .5; at   | end,                                    | 53 .2                                       | F)             |
|--|---|---|---|--|--|---|---|---|---|---|--|---|---|--|---|--|---|---|----------------|
| Cime.  | Dec                                     | linom                                   | eter.                                   |  | Biñlar<br>netom  |   | mag   | Balano<br>neton                         | en<br>ieter.                            | Time.   | Dec  | linom                                   | eter.   | mag                                    | Bifila:<br>netom                            | r<br>oter.   | magi                                    | helene<br>reton                             |                |
|  | 01                                      | 20-                                     | 400                                     | 0.   | 20.  | 401   | 0-  | 20-                                     | 40*                                     | 2 111101                                      | 01   | 20-                                     | 40-   | 0.                                     | 20*   | 40-  | 0,                                      | 204   | 40             |
| h. m. v. v. v. v. v. v. v. v. v. v. v. v. v. | 477744476666667674777776766647744774477 | 477 478 478 478 478 478 478 478 478 478 | 476 476 477 476 4776 4776 4776 4776 477 | : 3403<br>394<br>394<br>1 393<br>1 394<br>394<br>394<br>394<br>592<br>502<br>394<br>400<br>402 | 390<br>383<br>383<br>383<br>385<br>385<br>390<br>387<br>391<br>401<br>401<br>401<br>401<br>401<br>401<br>401<br>401<br>401<br>40 | 386 350 350 350 350 350 350 350 350 350 350 | 524 521 524 524 524 524 524 524 524 524 524 524 | 524 524 524 524 524 524 524 524 524 524 | 524 524 524 524 524 524 524 524 524 524 | h. mc. 10 10 10 10 10 10 10 10 10 10 10 10 10 | 473 445 445 445 445 445 445 445 445 445 44 | 466 441 441 441 441 441 441 441 441 441 | 460<br>462<br>462<br>463<br>463<br>463<br>463<br>463<br>463<br>463<br>463<br>463<br>463 | 269<br>282<br>329<br>341<br>388<br>376 | 145 198 198 199 199 199 199 199 199 199 199 | 182 245 286 305 310 305 305 305 305 305 305 305 305 305 30 | 509 509 509 509 509 509 509 509 509 509 | 509 510 510 510 510 510 510 510 510 510 510 | 88888888888888 |

# Readings of the Brooke instruments at Uglaamie, Alaska-Continued.

| (Ter                                      | трега                                    | ture  | at lieg  | July<br>pinnin                   | 15, 18<br>g 51°                                 | 2; at   | end,  | 530.2                                   | F.)                                     | Ten   | pera                                    | lure s   | Au<br>t beg   | guat<br>innin  | I, 188:<br>g, <b>4</b> 80                 | 3.<br>.2; nt                               | end,                                    | 480,8                                    | F.)                                     |
|---|--|---|--|----------------------------------|---|---|---|---|---|-------|---|--|---|--|---|--|---|--|---|
| P   | Dec                                      | linon   | mint.  | ,<br>Jung                        | Bifila<br>neton                                 | r<br>n fer.   | mag   | 3alano<br>neton                         | 38<br>ieter.                            | Time. | Dec                                     | linom  | eter.   |  | Bitla                                     |  |   | Balanc<br>noton                          |   |
| l'ini                                     | 0.                                       | 20*   | 4 -  | ()+                              | 20-   | 40-   | 0.  | 20-                                     | 40*                                     |       | 0.                                      | 20-  | 40-   | 0.   | 20-                                       | 40-  | 0.                                      | 201                                      | 40                                      |
| h 11   0   0   11   1   1   1   1   1   1 | 170 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1 | 474<br>476<br>476<br>476<br>476<br>476<br>476<br>476<br>476<br>477<br>477 | 4777<br>477-<br>477-<br>477-<br>477-<br>477-<br>477-<br>477- | 414 442 4412 4414 4412 4414 4412 | 415 426 431 441 441 441 441 441 441 441 441 441 | 4 15 125 440 426 426 440 426 426 441 411 412 421 441 411 412 421 441 411 41 | 515 546 541 544 544 544 544 544 544 544 544 544 | 546 546 546 546 546 546 546 546 546 546 | 646 646 646 646 646 646 646 646 646 646 |       | 984 989 989 989 989 989 989 989 989 989 | 1946<br>1946<br>1946<br>1946<br>1946<br>1946<br>1947<br>1947<br>1947<br>1947<br>1947<br>1947<br>1947<br>1947 | 387<br>380<br>390<br>392<br>390<br>392<br>390<br>411<br>392<br>392<br>392<br>392<br>444<br>448<br>448<br>448<br>448<br>448<br>448<br>448<br>448<br>44 | 670 670 6712 442 442 432 431 442 442 432 431 525 431 552 552 550 554 555 555 555 555 555 555 555 555 | 546 400 400 400 400 400 400 400 400 400 4 | 625 646 646 656 656 656 656 656 656 656 65 | 551 550 550 550 550 550 550 550 550 550 | 550 5549 5549 5549 5549 5549 5549 5549 5 | 564 564 564 564 564 564 564 564 564 564 |

# Readings of the Brooke instruments at Uglaamic, Alaska—Continued.

August 15 Dec. (Lemperature at b. gaming 50 to at end. 50 to 1 to 5

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|                |            |                   |            |                   | Biff!  |              |            | tiline     |                          |
|----------------|------------|-------------------|------------|-------------------|--|--------------|------------|------------|--------------------------|
|                | Des        | ter-              | 1 1        |                   |  | eler         |            | refore     |                          |
| Tene           |            |                   |            |                   |  |              |            |            |                          |
|                | ()-        | 14,               | 1 1.       | 61                | 2.1  | lar          | 0.         | 20.        | 10-                      |
|                | 47         | .,                | : "        | 17                | 200  | 9.47         | 0.         | 20         | 441.                     |
|                |            |                   |            |                   |  |              |            |            |                          |
| 1: 0           | 170        | 170               | 150        | 751               | *111   | 1            | 54.4       | -11        | 119                      |
| 13 1           | 1.50       | 170               | 17.1       | 7.0               | 7.34   | 7 1 11       | 510        | 111        | +19                      |
| 1: :           | 17.2       | 17:               | 13.3       | 7.7               | 170  | 71:          | 549        | + \$50     | 549                      |
| 11 1           | 175        | 176               | 47 G       | 74a<br>75a        | 713  | 772          | 1319       | 015        | 518<br>518               |
| 11             | +76        | 17.5              | \$ 715     | 700               | 7150   | 750          | 546        | 315        | 518                      |
| 1: 6           | 176        | 176               | 176        | 7.42              | 761  | 762          | 41.        | -15        | 518                      |
| 11 7           | 176        | 175               | 175        | 7.10              | 1.1.   | 7.55         | 534        | 245<br>545 | 314                      |
| 11 (           | 17.6       | 170<br>170<br>170 | 1 1        |                   | 761<br>757<br>757<br>750<br>751<br>751<br>746<br>714 | 754<br>755   |            | 1112       | 518                      |
| 14.29          | 1.1        | 170               | 10         | 7.01              | 750  | 4.17         | 518        | 54         | 514                      |
| 1 11           | 170        | 170               | 111        | 75"               | 751  | 750          | 548        | 545        | 118                      |
| 1:11           | 171        | 172               | 172        | 717               | 746  | 715          | 518        | 548<br>548 | 518                      |
| 1:11           | 171<br>171 |                   | 1 1        |                   | 714  | 715          | 548        | 548        | 518                      |
| 111            | 174        | 100               | 1 1        | 7 147             | 7.17   | 717          |            | 515        | 17                       |
| 1: 1:          | 1-1        | 171               | 171        | 717               | 717  | 717          | 317        | 517        | 17                       |
| 1114           | 4 7 2      | .6 . 1            | 17.        |                   |  | 745          | 217        | 517        | 54.5                     |
| 3.5 4.5        | 173        | 4771              |            | 7 145             | 715  | 711          | 517        | 517        |                          |
| 1 1 20         | 1-1        | 1                 | 171        | 741<br>741<br>740 | 715<br>715<br>711<br>241<br>240                      | 711          | 28.5       |            | 200                      |
| 11.2           | 173        | 471<br>171        | 17.1       | 710               | 111  | 71.14        | -44        | 91         | 217                      |
| HE             | 17:1       | 1.73              | 17.1       | 730               | 7.68   | 737          | 1-         | 17         | 517<br>117<br>117<br>517 |
| 1.3 1.1        | 171        | 171               | 171        | 1117              | 7.47   | 737          | 414        | 517        | 517                      |
| 13 % a<br>13 % | 175        | 175<br>176<br>176 | 175<br>176 | 734<br>736        | 714  | 731          | 547        | 547        | 517                      |
| 133 17         | 176        | 176               | 175        | 7.5               | 7.65   | 401          | 517        | 147        | 117                      |
| 11 1           | 175        | 1.4               | 474        | 234               | 745  | 726<br>737   | 547        | 47         | 317                      |
| 11:0           | 1-1        | 474               | 473        | 7.6               | 7.16   | 726          | 347        | 547        | 517                      |
| 1. 1           | 171        | 171               | 173        | 1 189             | 737  | 137          | 547<br>517 | 547        | 547                      |
| 1: /           | 171        | 174               | 4          | 7.6               | 7.6  | 7.36<br>7.65 | 547        | 517        | 547                      |
| 11:3           | 175        | 175               | 475        | 735               |  | 705          | 54.        | 517        | 547<br>517               |
| 13.35          | 177        | 176               | 176        | 7.6               | 7 11<br>7 13<br>7 14                                 | 733          | 547        | 517        | 547                      |
| . 1            | 175        | 475<br>475<br>475 | 17-        | , 313             | 7 64   | 734          | 547        | 547        | 547                      |
| 14.7           | 178        | 175               | 1          | 736               | 13.1   | 736          | 547        | 547        | 547                      |
| 13 .9          | 170        | 179               | 179<br>179 | 736               | 736  | 737<br>736   | 547<br>547 | 547        | 547                      |
| 13 10          | 179        |                   | 180        | 7.36              | 735  | 735          | 547        | 547        | 547                      |
| 10.11          | \$=41)     |                   | 480        | 7.35              | 735  | 735          | 547        | 547        | 547                      |
| 13 42          | 451        | 481               | 481        | 734               | 734<br>735   | 734          | 547        | 547        | 547                      |
| 13 14          | 1-1        | 481               | 481        | 734               | 734  | 733          | 547        | 547<br>547 | 547                      |
| 1.1 45         | 481        | 181               | 481        | 733               | 733  |              | 547        | 547        | 457                      |
| 13 46          | 481        | 441               | 481        | 737               | 737  | 737          | 547        | 547        | 548                      |
| 13 47          | 481        | 481               | 481        | 737               | 737  | 737<br>738   | 548<br>548 | 548<br>548 | 548                      |
| ( 13, 19       | 132        | 492               | 482        | 738               | 738  | 736          | 548        | 548        | 518                      |
| 13.50          | 140        | 153               | 482        | 737               | 736  | 736          | 547        | 548        | 548                      |
| 13 51          | 480<br>480 | 1-2               | 483        | 735               | 734  | 7:34         | 548        | 54h        | 517                      |
| 13 53          | 484        | 1-1               | 484        | 734<br>732        | 733  | 732<br>731   | 547        | 547        | 548                      |
| 13.54          | 444        | 1-1               | 453        | 731               | 731  | 731          | 548        | 545        | 518                      |
| 10 -5          | 160        | 450               | 4-00       | 731<br>731<br>732 | 731  | 731          | 548        | 548        | 548                      |
| 13 57          | 480        | 1-1               | 184        | 702               | 732 -  | 732          | 548        | 548        | 548                      |
| 13 58          | 1-1        | 1-1               | 184        | 731               | 729  | 720          | 548        | 547        | 547                      |
| 18 59          | 483        | 483               | 483        |                   | 736  | 729<br>733   | 547        | 547        | 517                      |
| 1              |            |                   |            |                   |  |              |            |            |                          |

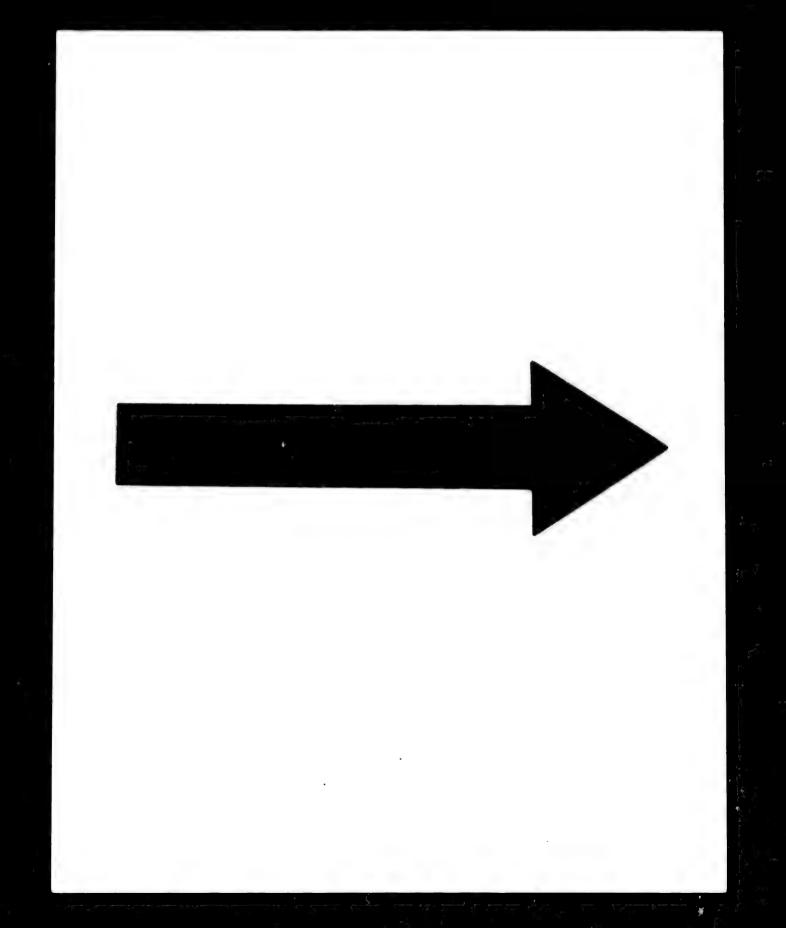
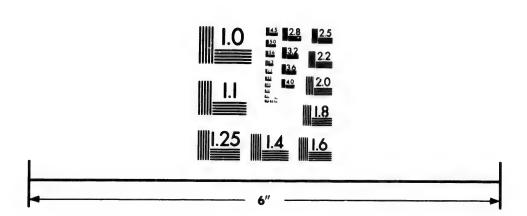


IMAGE EVALUATION TEST TARGET (MT-3)

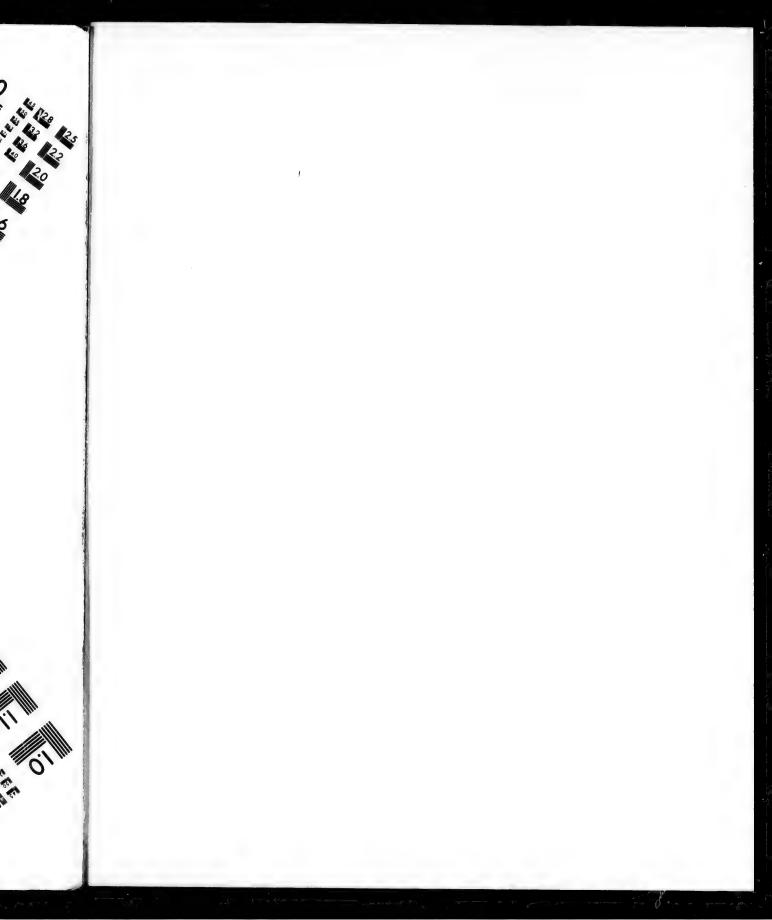


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# APPENDIX No. 1.

RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS MADE AT THE UNITED STATES POLAR STATION, UGLAAMIE, POINT BARROW, ALASKA, IN 1881-82-83, IN CONNECTION WITH MAGNETIC WORK.

| WORK. [Computa  | tion by J. G. Porter, January 12, 1884. A. C. Da   | ck, observer.]  |
|---|--|---|
| [November 16, 1881. Altitudes of Jupite<br>Stackpole theodolite. Chronometer, Bor<br>235 (sidereal).]   | r. [January 24, 1882. Equal altitudes of Mars.<br>Stackpole theodolite. Chronometer,<br>Fletcher 1713.]  | [February 21, 1882. Equal altitudes of Orionis. Stackpole theodolite. Chronometer, Hutton 512 (sidereal).]                        |
| Time. Attitude 10b 44m 42° D = 280° 1b' 48 28.5 30 11 05 50.5 R = 31 01 14 20 50  | 3   7 b 21m 21r   7 b 33m 17 b 32m 17 b | Before culmination.   After culmination.   155 44 225   166 63 = 19c.5   144 50   45 23.5   62 11.5   45 55   01 36 46 25   00 59 |
| 19 58 22 Refraction = $\begin{array}{c} 29 & 50 \\ -1 \\ z = & 60 & 11 \end{array}$   | 7 Chron, time of culmination. $7^h 27^m 21^s$ $\alpha = 5 48 26$   | Chron, time of culmination. $a = \begin{bmatrix} 15^{16} & 53^{m} & 47^{*} \\ 5 & 30 & 16 \end{bmatrix}$                          |
|   |  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | Sidereal interval 14 51 13   | [March 2, 1882. Fqual altitudes of Marc<br>Stackpole theodolite. Chronometer, Hu-<br>ton 312 (sidereal).]                         |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | Local mean time  | Before culmination.   After culmination.   168 to 011   |
| [November 28, 1881. Equal altitudes of Jupiter. Stackpole theodolite. Chronon   | •  | Chron. time of culmination. $16^{h}$ $20^{m}$ $21^{s}$ $a = 6$ $06$ $00$  |
| eter, Negus 544.]  Before culmination. 8 h 10m 46* 10 32.5 08 26  08 26   | [February 4, 1882. Equal attitudes of Mars. Stuck pole theodolite. Chronometer, Fletcher 1713.]  Before culmination. After culmination.  | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   |
| 10 53.5 05 05<br>24 23.5 00 35<br>30 00 8 54 58.5   | 6h 33# 30# 6h 53# 41*5<br>34 03 53 08<br>34 03 52 35<br>35 09 52 02  | [March 11, 1882. Equal altitudes of $\beta$ Can<br>Minorls. Stackpole the odolite. Chronon<br>eter, Fletcher 1713.]               |
| Chron. time of culmination. $8^h 42^m 29^s$ $\alpha = 3 07 41$  | 35 42 51 28.5<br>Chron. time of culmination. 6 <sup>h</sup> 43 <sup>m</sup> 35 <sup>s</sup> .5   | Before culmination.   |
| Long. from Washington       5       18       27         Washington sidereal time       8       26       08         Sidereal time of noon       16       30       58 | Long. from Washington 5 46 34.5 5 18 27  | 57 09 05 57.5<br>57 39.5 05 26<br>58 09.5 04 56   |
| Sidereal interval   | Washington sidereal time . 11 05 01.5 Sidereal time of noon 20 50 02 Sidereal interval   | Chron. time of culmination. 6h 01m 33<br>a = 7 20 44<br>Long. from Washington 5 18 27   |
| Mean time interval.         15         52         35           Long. from Washington.         6         18         27   | Sidereal into solar  | Long. from Washington 5 18 27   Washington sidereal time 12 39 11   Sidereal time of noon 23 17 01                                |
| Local mean time. 10 34 08<br>Chronometer 8 42 29<br>$\Delta T = +1 51 39$   | Local mean time  | Sidereal interval   |
| November 30, 1881. Equal altitudes of Sa  | $\Delta T = +2 \ 01 \ 38.5$  | Mean time interval         13         19         59           Long, from Washington         5         18         27               |
| urn. Stackpole theodolite. Chronometer<br>Negus 544.]  Before culmination. After culmination.   | [February 10, 1882. Equal altitudes of<br>a Orionis. Stackpole theodolite. Chro-<br>nometer, Hutton 312 (sidereal).]   | Local mean time 8 01 32 Chronometer 6 01 33 ΔT = +1 59 59   |
| 7 <sup>h</sup> 40 <sup>m</sup> 48 <sup>s</sup> .5 8 <sup>h</sup> 01 <sup>m</sup> 40 <sup>s</sup> .5 52 19.5 7 50 09.5 53 09.5 58 19.5 55 01.5 56 27.5               | Before submination. After culmination. 15 <sup>h</sup> 57 <sup>m</sup> 23 <sup>s</sup> 16 <sup>h</sup> 20 <sup>m</sup> 30 <sup>s</sup> 57 54 19 57 58 25 19 26 .5  | [March 30, 1882. Equal altitudes of Sur<br>Chevallier sextant. Chronometer, Negu<br>544.]   |
| Chron. time of culmination. $7^h$ $55^m$ $44^s$ .<br>Long. from Washington $a = 2$ $21$ $05$ $5$ $18$ $27$  | 58 56 18 56<br>59 27 18 23<br>Chron. time of culmination. 16 <sup>h</sup> 08 <sup>m</sup> 56 <sup>s</sup>  | Before culmination. After culmination.  9h 57m 40" 11h 10m 559 10 01 01 5 07 31 5   |
| Washington sidereal time. 7 39 32<br>Sidereal time of noon 16 38 49   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 04 23 .5 04 07<br>10h 34m 16  |
| Sidereal interval   | or + 1 39 53   | Correction for $\Delta\delta$   |
| Mean time interval  |  | Mean time of culmination . 12 04 23 $\Delta T = +1 30 49$   |
| Local mean time   |  |   |
| $\Delta T = +1  44  04$   |  |   |

#### RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS—Continued.

| [April 11, 1882. Altitudes of sun. Cheval-<br>her sextant. Chronemeter, Negus 544.]   | [April 17, 1882. Attitudes of sun. Cheval-<br>lier sextant. Chronometer, Negus 544.]   | [April 23, 1882. Altitudes of sun. Cheval-<br>lier sextant. Chronometer, Negus 544.]  |
|---|--|---|
| Time. Double altitudes.  1 32° 37°.5  | Time.  8 38 90 1   | Tyme. Double altitudes. 8° 03° 57° 55° 25° 25° 04° 50° 30° 65° 37° 35° 66° 28° 40° 67° 60.5 5° 55° 55° 55° 55° 55° 55° 55° 55° 55   |
| 1 37 25   | Mean 8   40   15   Index =   53   32   4   +1   0       On arc   31   00   |   |
| 38 47   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $z = \begin{array}{cccc} & 62 & 28.1 \\ \phi = & 71 & 17.7 \\ \phi = & 12 & 42.1 \\ & & & & \\ 2s = & 116 & 27.9 \end{array}$   |
| Off are 33 00 $h' = 21 + 14 \cdot 9$<br>Refraction = $-1 \cdot 0$<br>In. cor. $+1'$ $z = 68 + 46 \cdot 1$                                       | 2s = 14s 56.4<br>8 = 72 28.2<br>8 - = 1 10.5<br>8 - 8 = 01 48.0<br>8 - z = 9 28.8  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
|   | $\begin{array}{cccc} \sin \left(s\!-\!\phi\right) & 8 & 3119 \\ \sin \left(s\!-\!\delta\right) & 9 & 9452 \\ \sec \left(s\!-\!z\right) & 0 & 0060 \\ \sec s & 0 & 5211 \end{array}$  | sin (s-\phi) 8,5202<br>sin (s-\phi) 9,5 98<br>sec (s-\phi) 0 0077<br>sec \phi 0,5 99  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | $	an^2 \frac{1}{4} \frac{t}{t} = \frac{8.7812}{270.43^2}$ $\frac{t}{t} = \frac{17.643}{10.600.52^2}$ Equation of time = $\frac{10.000}{34}$  | $\begin{array}{cccc} \tan^2\frac{1}{2}t & & 0.0164 \\ & t = & 35.7 & 44 \\ & = & 2 & 22m & (5)^2 \\ & & 0.37 & 0.4 \\ & & & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & & \\ & & & \\ & & & \\ & & & & \\ & & \\ & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & & \\ & & & \\ & & \\ & & \\ & & \\ & $ |
| sec (s—z) 0.0021<br>sec s 0.5683<br>(an <sup>2</sup> \(\frac{1}{2}\) 45° 54'  | Local mean time  | Local mean time   |
|   |  |   |
| [April 28, 1882. Altitudes of sun. Blunt sextant. Chronometer, Fletcher 1713.]  | [May 16, 1882. Attitudes of sun. Blunt<br>sextant. Chronometer, Negus 544.]  | [May 23, 1882. Altitudes of sun. Blum<br>sextant. Chronometer, Fletcher, 1713.]   |
| Time. 75 32" 54s  | Time. 72 40° 07° 47° 07° 47° 40° 55° 48° 25° 48° 25° 49° 47° 47° 48° 48° 47° 48° 47° 49° 47° 40°  Mean 7 48° 03°  Index = -2.8°  | Time. Double altitudes.  12° 06° 42°.5  |
|   | h' = 32 - 42.4 Refraction = -1.5 Semi diam. = +15.8  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |
| in. cor. $-2'.8$ $z = 60 50.6$ $\phi = 71 17.7$ $\delta = 14 18.6$  |  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| $\begin{array}{ccc} \sin \ (s-\phi) & 8.5274 \\ \sin \ (s-\delta) & 9.9327 \\ \sec \ (s-c) & 0.0102 \\ \sec \ s & 0.5397 \end{array}$           | 8in (8—\$) 8. 6376<br>8in (8—\$) 9. 9il di<br>8ec (8—2) 0. 0188<br>8ec 8 0. 5540   | ein (s-\psi) 2.5054 sin (s-\psi) 2.5054 sin (s-\psi) 8.699 sec (s-\psi) 0.0240 sec s 0.5373   |
| $tan^{3}$ t $t = 55^{\circ}$ 28'.5' $t = 35^{\circ}$ 28'.5' $t = 2^{\circ}$ 21'' 54' $t = 2^{\circ}$ 21'' 64' 9 38 66  Equation of time = -2 41 | $\begin{array}{ccc} \tan^2\frac{1}{2}\ell & 9.1214 \\ t & 39^{\circ} 58' \\ 26 & 30^{\circ} 58' \\ 20 & 08^{\circ} 52' \\ & 50^{\circ} & 50^{\circ} \\ &$ | tan² ½t 8. 9657<br>f = 330 50′<br>½h 15n 20°<br>Equation of time = -3 28  |
| Local mean time $-2$ 41  Local mean time $0$ 95 25  Chronometer time $7$ 86 27 $\Delta T = +1$ 58 58  | Local mean time  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |

H. Ex. 44---71

STATES POLAR TH MAGNESIC

tual altitudes of heodolite, Chroereal).]

ltitudes of Mars. bronometer, Hut-

fter culmination. 16<sup>h</sup> 48<sup>m</sup> 41<sup>s</sup> 48 06 5 47 34 46 59 5 46 23

fter culmination. 6h 06m 58° 06 27.5 05 57.5 05 26 04 56

-2 11
-13 19 59
-5 18 27
-8 01 32
-6 01 33
-7 = +1 59 59

Ititudes of Sun, onometer, Negus

7ter culmination.
11h 10m 55s
07 31 .5
04 07

10h 34m 16s
-42
1. 10 33 34
1. 12 04 23

T=+1 30 49

# RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS—Continued.

| Time.  | Double altitudes.   | Time. 1  | Double altitudes.   | Time.<br>8h 06m 07°  | Double altitudes  |
|--|---|--|---|--|---|
| 7 <sup>h</sup> 49 <sup>m</sup> 55°<br>50 34<br>51 15   | ○ 70° 30′<br>55   | 23 47  | ⊙ 73° 10′<br>14   | 06 54  | 05  |
| 51 52  | 71 00<br>05   | 21 43  | 16  | 07 17 5<br>08 10<br>08 49.5  | 10<br>15  |
| 52 34<br>53 20 .5<br>54 22   | 10<br>15  | Mean 8 23 47   | 73 13.3   | 09 40  | 2n<br>25  |
| 7 59 14  |   | On arc 30' 15"   | $x = \frac{+1.0}{-0.000}$   | Mean 8 07 51   | 75 12.5   |
| 8 00 02<br>01 10   | 71 00   |  | h' = 36 - 37.2 $m = -1.3$   | On are 34' 00"   | Index == $-5 8$   |
| 01 57.5<br>02 41.5<br>03 25  | 05<br>10<br>15  | In. cor. +1' Refraction<br>Semi-dia:   |   | Off arc 22 30  | h' = 37 :3.8  |
| 03 23<br>04 05 .5  | 20  |  | a = 53 08.3<br>a = 71 17.7  | In. cor. —5-8  | Refraction = -1.3<br>Semi diam, = -15.8   |
| fean 7 56 53   | → 71 05.0   |  | $ \phi = 71  17.7 \\ \delta = 21  23.0 $  |  |   |
|  | Index =5.8  |  | 2s = 145 - 49.0<br>s = 72 - 54.5  |  |   |
|  | h' = 35 - 29.6<br>Refraction : -1.3   |  | -b == 1 36 8<br>-5 == 51 31.5   | 1  | 2s = 140 - 43.6   |
| On are 34' 00"<br>Off are 23 30  |   | 8-   | -z = 10 40¶3  |  | s = 73  21.8<br>s = 6 = 2  04.1   |
| In. cor5'.8  | z = 54 - 31.7<br>$\phi = 71 - 17.7$<br>$\delta = 21 - 22.5$   | sin (s-  | <ul> <li>φ) 8, 4495</li> <li>δ) 9, 8937</li> </ul>  |  | 8—8 — 50 39 2<br>8—2 = 20 38.5  |
|  | 2s == 147 11.9  | 800 (8-  | -2) 0.0264  |  | ain (ε-φ) 8.5574  |
|  | s = 73 + 6.0<br>$s = \phi = 2 + 18.3$   | tana   | 8, 9014   |  | sin (s8) 9.8883<br>sec (sz) 0.0:88  |
|  | 8—8 - 52 13.5<br>8—2 10 01.3  |  | t == 31° 32′<br>2h 09m 08m  |  | 860 a 0.5431  |
|  | sin (sф) 8, 6641  | Equation of tir  | ne = 9 53 52<br>-: 95   |  | $ \begin{array}{ccc} \tan^2 bt & 9.0182 \\ t = & 35 & 47' \\ & & 25 & 230 \\ \end{array} $  |
|  | sin (s=-5) 9, 8978<br>sec (s=-z) 0, 0245  | Local mean time  | 9 50 47   | Pare   | -= 2 <sup>h</sup> 23 <sup>m</sup><br>9 36<br>ation of time = -1   |
|  | tan <sup>2</sup> 37 9, 0753   | Chronometer time   | 8 23 47<br>AT = +1 27 00  | Local mean time.   |   |
|  | 1 35 01/  |  | A7 5 +1 27 00   | Chronometer tim  | e   |
| F  | 2b 32m 16<br>9 27 44<br>ation of time = -3 05   |  |   |  | $\Delta T = \pm 1 - 27$   |
| Paliti   |   |  |   |  |   |
| Logo: man in time  | 0 94 99   |  |   |  |   |
| Chronometer tim<br>Jane 24, 1882. – A.<br>Lant. – Chronome   | 2   | July 7, 1882. Altitudes of<br>tant. Chronometer, Nege  | ts 544.]  | sextant. Chron   | Altitudes of sun. Bloometer, Negus 544.]  |
| tant. Chronome<br>**Line.** \$8.03\times 20\times 04.05 04.40 05.24  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negr<br>TSm-9.<br>1h 24m 22c<br>25 21<br>26 14<br>27 08   | 18 544.]  Double altitudes.  24 567 50 45 40  | ### Restant Chron ### Restant Chron ### Restant Chron ### Restant ### Restant  | iometer, Negus 541.]  |
| June 24, 4802. A<br>fant. Chronome<br>fant. Chronome<br>b 03 20<br>04 40<br>05, 21<br>06 12<br>0, 52   | 5   | Tant. Chronometer, Nega<br>Times.<br>1b 24m 22a<br>25 21<br>26 14<br>27 08<br>28 41<br>1 34 56   | is 544.]  Double altitudes.  2 74 56' 50 45   | ## Section 1. Chron ## Time.    8h 30m 42r   | Double altereds    Double altereds   54 07   20   25   30   38   51   |
| June 24, 4842. A. taut. Chronome Line. St. 03# 298 04 05 94 49 05; 24 06 12 06; 52 8 12 51 11 49   | 5   | tant. Chronometer, Negr<br>Tymes.<br>1b 24w 22s<br>25 21<br>24 14<br>27 08<br>28 41<br>1 34 56<br>35 42<br>36 26<br>37 12 5  | is 544.]  Double altitudes.  2 74 50'   | ## Section 1. Chron   Time.   8h   30 m   42s   32   18   33 m   08   34 m   07   35   25   5   36   58  | Double altitude  540 97 20 25 30 38 54  |
| June 24, 4842. A. Lint. Chronome I-me. St. 03a 20a 04 05 05 24 06 12 06 52 8 12 51 14 49   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negr<br>Tyme.  15 24 w 224 25 21 26 14 27 08 22 41 1 34 56 35 82 36 26 37 12 5 38 14  | 18 544.]  Danble altitudes.  2 74 59' 50 45 40 30 57 74 56 50 45 10 30  | ### Action   ### A | Domble altitude   |
| Unne 24, 4862. A tort. Chronometer time Line. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | ΔT +1 27 46  AT +1 27 46  Ritudex of sun. 1 Bant sex etc. Nogue 541;  Danble estitudes.  7 59 35  50 76 90  2 75 35  45 55  76 99 | tant. Chronometer, Negr<br>Tymes.<br>1b 24w 22s<br>25 21<br>24 14<br>27 08<br>28 41<br>1 34 56<br>35 42<br>36 26<br>37 12 5  | 18 544.]  Double altitudes.  2 74 567 50 45 40 30 57 74 56 50 45 10 30  | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Double altrind    Double altrind   049 079   054 079   050 054   050 054   050 054   050 054   050 054   050 056 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056 056   050 056 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 056   050 056 05 |
| Unne 24, 4862. A tort. Chronometer time Line. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negarities 12 21 m 22 m 22 m 22 m 22 m 22 m 22 m  | 18 544.]  Double altitudes.  2 74 567  50 45  40 30  77 56  50 45  19 30  77 4 4.2  0 .0  b = 37 22.1   | ### Action   ### A | Double altitud  Double altitud  District State State  Double altitud  District State  Distric |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | tant. Chronometer, Negarity 27   | to 544.<br>Double altitudes.  ≥ 74 56° 50 45 40 30 51 74 56 45 45 45 40 30 50 74 44.2 $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$   | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Double all trude   Double all trude   040 07     050 05     050   |
| Unne 24, 4862. A tort. Chronometer time Line. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negarities 12 21 m 22 m 22 m 22 m 22 m 22 m 22 m  | 16 344.1  Double altitudes.  74 56' 50 40 00 74 56 50 45 10 30 74 44.2 0.0 10 17 4 44.2 0.0 10 17 4 44.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0  | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Double altitude   Double altitude   Section   |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negr<br>Tyme.<br>19 24 m 22 s<br>25 21<br>29 10<br>29 10<br>24 11<br>1 34 56<br>35 42<br>36 26<br>37 12 5<br>38 13<br>Me an 1 31 29  Inde   | to 544.1  Domble altitudes.   | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Double altitude   Double altitude   Section   |
| June 24, 4862. A. taut. Chronometer time.  Linux. Chronome  Linux. 30, 40, 40, 40, 40, 40, 40, 40, 40, 40, 4   |   | tant. Chronometer, Negarity of Paris 19 21 19 22 19 22 19 22 19 22 19 22 11 22 19 22 11 22 19 22 11 22 19 22 11 22 19 22 19 22 11 22 19 22 | 16 544. Domble altitudes.  □ 74 56'  □ 74 56'  □ 74 56'  □ 74 56'  □ 74 44.2  □ 0.0  □ 77 4 44.2  □ 0.0  □ 77 4 44.2  □ 0.0  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 2.3  □ 3.1.5  □ 4.6  □ 3.1.5  □ 4.6  □ 3.1.5   | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | nometer, Negna 541,  Double all trude  0 640 07  30  30  30  34  55  66  67  10  10  10  10  10  10  10  10  10  1  |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negr<br>Tyme.<br>19 24m 22s<br>25 21<br>29 04s<br>29 11<br>1 34 56<br>35 42<br>36 26<br>37 12.5<br>38 14<br>Mean 1 31 29  Inde  | 15 544. 1  Domble altitudes.  □ 74 55' 50 45 66  □ 74 56' 50 74 56  □ 74 56' 50 30  □ 74 44.2  □ 0.0  □ 77 4 44.2  □ 1.3  □ 2.2 11.5  □ 2.3 39.2  □ 17.7  □ 6 = 12 31.5  □ 18.6 28.4  □ 1.3  □ | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Double altitude   Double al   |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Neger  Tyme. 25 21 22 22 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 25 21 3 2 2 3 2 2 3 2 2 3 2 2 3 2 2 3 2 3  | 16-544. Domble altitudes.  2-74-56  30  30  74-56  45  40  30  74-44.2  45  45  46  47  17-1.3  2z 52 39.2  3z 17-6 = 22 31.5  4z 17-7  4z 17-7  5z 29 35.0  5z 18-5000  5z 18-5000   | ## Restant. Chron ### Time.  ## 30 # 42 **  ## 30 # 42 **  ## 31 08 **  ## 34 07 **  ## 36 58 **  ## 36 58 **  ## 126 42 08 **  ## 37 17 **  ## 40 36 **   | Dombte altitude  □ 549 07  □ 549 07  □ 550 04  □ 56 193  □ 56 193  □ 56 193  □ 56 193  □ 56 193  □ 56 193  □ 57 21.2  Refraction = -1.8  z = 0.0  □ 17.7  δ = 13 35.6  z = 0.0  z = 14.7  z = 17.7  z = 18.7  z = 0.0   |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Nege  Tyme. 25 21 22 22 25 21 3 2 2 3 4 3 2 3 4 5 4 3 5 5 4 2 3 6 2 6 3 7 12 5 3 6 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  | 16 544.1  Domble altitudes.  2 74 567  50 40  10 74 567  50 45  10 30  74 44.2  50 45  10 1 74 56  10 30  50 45  10 30  50 45  10 17  75 4 44.2  76 47 11 17.7  8 = 22 31.5  8 = 73 14.2  8 = 73 14.2  8 = 73 14.2  9 = 73 14.2   | ## Restant. Chron ### Time.  ## 30 # 42* ## 30 # 42* ## 31 08* ## 34 07* ## 35 25.5* ## 36 58* ## 15 41 26 ## 208 ## 37 17* ## 40 36   | pometer, Negras 541.  Double altitude  0 449 of  30  30  38  50  51  0 50  0 61  0 60  10  29  0 60  10  29  0 70  11  Refraction = -1.8 $x = 02$ $x = 02$ $x = 02$ $x = 03$   |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Nege  Tyme.  25 21 22 22 25 21 3 2 2 3 4 3 2 4 1 4 3 4 5 4 5 2 6 3 7 12 5 3 8 4 1 4 1 4 3 4 5 4 5 4 5 2 6 5 3 8 4 1 4 1 4 5 4 5 5 5 8 4 1 4 1 4 5 5 5 8 6 1 4 1 4 1 5 5 5 8 6 1 4 1 4 1 5 5 5 8 6 1 4 1 1 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6   | 16.544.]  Domble altitudes.  2.74 567 30 30 30 574 565 45 45 45 40 30 30 74 44.2 0.0 30 30 75 44.2 2 30 22 52 39.2 31.5 48 22 31.5 48 23 31.4 2 48 73 14.2 48 73 14.2 48 73 14.2 48 73 14.2 48 73 14.2 49 1.5 49 1  | ## Restant. Chron ### Time.  ## 30 # 42* ## 30 # 42* ## 31 08* ## 34 07* ## 35 25.5* ## 36 58* ## 15 41 26 ## 208 ## 37 17* ## 40 36   | Dombie alt.trude   Dombie alt.trude   Ode   O   |
| June 21, 1862. A taut. Chronometer time taut. Chronome trume. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | tant. Chronometer, Nege  Tyme. 25 21 22 22 25 21 3 2 2 3 4 3 2 3 4 5 4 3 5 5 4 2 3 6 2 6 3 7 12 5 3 6 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  | 16 544. 1  Domble altitudes.  □ 74 56' 50 45 69 10 30 □ 74 44. 2 30 30 □ 74 44. 2 30 30 □ 77 4 44. 2 30 30 □ 78 4 44. 2 30 30 2 31 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 72. 1 31 73 73 72. 1 31 73 73 72. 1 31 73 73 73 73 73 73 73 73 73 73 73 73 73  | ## Restant. Chron ### Time.  ## 30 # 42* ## 30 # 42* ## 31 08* ## 34 07* ## 35 25.5* ## 36 58* ## 15 41 26 ## 208 ## 37 17* ## 40 36   | Double altitude    Double altitude   Od9 of   |
| Unne 24, 4862. A tort. Chronometer time Line. St 03# 20# 20# 20# 20# 20# 20# 20# 20# 20# 20  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Negative State Chronometer, Negative Stat | 10.544. 1  Domble altitudes.  2.74 567  30  30  30  30  45  45  40  30  30  45  45  40  45  45  40  45  45  46  47  47  48  48  48  48  48  48  48  48  | ## Restant. Chron ### Time.  ## 30 # 42* ## 30 # 42* ## 31 08* ## 34 07* ## 35 25.5* ## 36 58* ## 15 41 26 ## 208 ## 37 17* ## 40 36   | Dombte alt trade   Dombte alt   |
| Unne 24, 4862. A tant. Chronome France.  State Chronome State Chro | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | tant. Chronometer, Neger  Tyme.  25 92 92 92 92 92 92 92 92 92 92 92 92 92   | 16-544. Domble altitudes.  □ 74 56  □ 74 56  □ 74 56  □ 74 56  □ 74 56  □ 74 56  □ 74 56  □ 30  □ 74 44.2  □ 0.0  □ 77 4 44.2  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 2.1  □ 1.3  □ 1.3  □ 1.4  □ 2.1  □ 1.5   | ### Restant Chron  ### Time.  ### 810** 428  ### 340 47  ### 35 25 5  ### 36 58  ### 38 15  ### 208  ### 30 47  ### 40 36  ### 30 47  ### 40 36  ### 37 12   | Dombte altitude    Dombte altitude   Dombte alt |

st.m. | Divint seq. 6 544.]

75 12.5

 $a' = 37 - 33 \cdot 8$  a = -1.3 b = -1.3  $b = -1.5 \cdot 8$  c = 71 - 17.7  $c = 22 - 42 \cdot 6$   $c = 144 - 43 \cdot 6$   $c = 24 \cdot 146 - 43 \cdot 6$ c =

of sun. Blunt | gus 544.]

8 60° 1 9, 9376 0, 00% 0, 5495

9. 1019 - 30° 03° - 26° 36° 36° 0 23° 24 - 44° 01

#### RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS-Continued.

| sextant. Chro                                     | Altitudes of Sun. Blunt<br>mometer, Negue 544.]  | [September 29, 1882. Altitudes of a Lyre<br>Blunt sextant. Chronometer, Bond 2<br>(sidereal).]                           | 8. [November 1, 1882. Altitudes of a Lyri<br>Blunt sextant. Chronometer, Bond 2:<br>(sidereal).] |
|---|--|--|--|
| Time.   | Double altitudes.  | Time. Double altitude<br>8h 27= 26: 94° 52'  | s. Time. Double altitude   |
| 1h 25m 59h.2<br>28 23.5                           | <b>⊙</b> 45° 49′.7   | 90 30 47   | 8h 20m 01*,5 96° 58'<br>20 50 .6 20  |
| 30 16   | 23   | 32 52 35 .3<br>36 25 28 .7   | 22 44 13.7   |
| 31 15   | 16   | 32 52 35.3<br>36 25 28.7   | 24 37 .4 07 .3   |
| 32 18<br>33 35                                    | 10 .2<br>02  | 38 13 22   | 25 27 .2 95 30   |
| 1 35 47.5   |  | 8 32 59 94 37.0  | 8 22 44 96 13.8  |
| 37 03.5<br>38 27                                  | 30 .1  | Index = +.8  | Index = +.8  |
| 39 44   | . 6 . 7<br>19  | h' = 47 18.9   | h' = 48 07.3   |
| 40 27   | 15.3   | Refraction =9  | Refraction =9  |
| 42 06   | 0.40   |  | z = 41 53.6  |
| 1 31 37   | € 44 22.9  | $z = 42 	ext{ } 42.0$<br>$\phi = 71 	ext{ } 17.7$  | s = 41  63.6<br>$\phi = 71  17.7$  |
| 100000000000000000000000000000000000000           |  | $\delta = 38 \ 40.5$   | 8 = 38 40.5  |
| On are 31' 40''<br>Off are 33   20                | Index = + .8   | 2s = 152 40.2  | $2s = 151 - 51 \cdot 8$  |
|   | h' = 22 - 11.8   | s = 76 20.1  | s = 75 - 55.9  |
| In. cor. +0'.8                                    |  | $a - b = 5 \cdot 02.4$   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| R   | efraction = 2.3  | 8 - 8 = 37 39.6<br>8 - 2 = 33 38.1   | $s - \delta = 37 - 15.4$<br>s - z = 34 - 02.3  |
|   | z == 67 50.5   | 8-2= 33 38.1   | 3- 2- 34 02.3  |
|   | 6 - 71 17.7  | sin (e 6) 8 .9438  | sin (**) 8 .9076   |
|   | $\delta = 7 18.5$  | sin (s — 8) 9.7860<br>sec (s — z) 0.0798   | sin (s — 8) 9.7820<br>sec (s — z) 0.0816   |
|   | 2s = 146 - 26.7  | sec (s — z) 0 .0796<br>sec s 0 .6266   | sec (s → 2) 0.0816<br>sec s 0.6142   |
|   | $s = 73 \cdot 13 \cdot 4$<br>$s = \phi = 1 \cdot 55 \cdot 7$   |  |  |
|   | $a - \phi = 1 - 55.7$<br>$a - \delta = 65 - 54.9$  | tan <sup>2</sup> it 9 .4360<br>t= 55° 10'  | tan <sup>2</sup> åt 9 .3854  |
|   | s - z = 5 22.9   | z== 30° 10°<br>z== 36° 40° 40°   | t = 52 · 29 · = 34 · 29 · 564  |
|   | The same of a second   | a == 18 32 59  | a = 18 32 58   |
| 8   | in $(s - \phi)$ 8.5270<br>in $(s - \delta)$ 9.9604   | Local sidereal time 22 13 39   | Local sidereal time 22 02 54   |
| 8   | 0.019  | Local siderest time  | Chronometer time 20 22 34  |
|   | 80 8 0 5 196   |  | 0.0000-0-10.000000000000000000000000000  |
|   | tan <sup>2</sup> 3# 9 0289   | $\Delta T = +1 + 40 + 40$  | $\Delta T = +1$ 40 10  |
|   | tan' sr 9 0080   | l<br>Ī   |  |
|   | 2 2h 24m 48m   |  |  |
| Equation  | m of time = -57  |  |  |
| Local mean time.                                  | 2 23 51  |  | •  |
| Chronometer tim                                   | 8 1 34 37  |  |  |
|   | The second secon |  |  |
|   | $\Delta T = +49 \cdot 14$  |  |  |
| December 1, 188<br>Blunt sextant.<br>(sidercal).] | 2 Altitudes of Jupiter,<br>Chronometer, Bond 235   | [December 13, 1882. Altitudes of Jupit<br>Blunt sextant. Chronometer, Bond ;<br>(sidereal).]                             | or. [December 23, 1882. Altitudes of Satu<br>Blunt sextant. Chronometer, Bond (sidereal).]       |
| Time.   | Double altitudes.  | Time. Double altitud   |  |
| 11h 55m 161                                       | 59 50  | 11h 59m 32s 61° 23'.7  | 9h (13m 00e 43 2 50e   |
| 59 51   | 60 32  | 12 00 57 .5 36 .5  | 05 13 .5 44 20   |
| 12 05 07<br>05 4"                                 | 61 2a<br>26  | 04 39 62 09.8<br>05 45.5 20.0  | 06 27 31<br>07 31 .5 41  |
| 05 47<br>07 20                                    | 40   | 09 29 .5 20 .0   | 07 31.5  |
| 08 07   | 47.2   |  |  |
| 10 30   | 62 09  | 12 04 01 62 02 .0<br>Index = + .8  | 9 08 20 44 35<br>Index = + 0 .8  |
| 11 13   |  |  |  |
| 12 05 24  | 61 22.8  | h' = 31 - 01.4   | h' 23 15 .4  |
|   | Index = +.8  | Refraction == -1.6   | Refraction 2.3   |
|   | $h' = 30 - 4^{+}.8$  | z = 59 00.2  | $z = 67 \ 42.9$  |
| H   | efraction = -1.6   | $\phi = 71 \ 17.7$   | $\phi = 71 \ 17.7$   |
|   | 20.40.2  | ð = 23 02 ,8   | $\delta = 15  30.7$  |
|   | $z = 59 	ext{ 19.8}  b = 71 	ext{ 17.7}$   | 2s = 153 - 20.7  | 2s == 154 31 .3  |
|   | $\delta = 23 \ 02.9$   | 8 = 76 40.4  | $s = 77 + 15 \cdot 6$  |
|   |  | s = h = 5 22.7   | $e - \phi = 5 	ext{ ff 9}$<br>$e - \delta = 61 	ext{ 44.9}$                                      |
|   | 2s = 153 - 40.4  | s-b=53 37.6<br>s-z=17 40.2   |  |
|   | s = 76  50.2<br>$s - \phi = 5  32.5$   |  | Comment of the comment   |
|   |  | sin (εφ) 8.9719  | $\sin (s - \phi)$ 9.0167<br>$\sin (s - \delta)$ 9.9419   |
|   | s z == 17 30 .4  | $ \begin{array}{cccc} & & \sin (s-\delta) & 9.9059 \\ & & \sec (s-z) & 0.0299 \\ & & & & & & & & & & & & \\ & & & & & &$ | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| A   | in (a - d) 8 9848  | 800 s 0 .6373  | 800 8 0 .6 .65   |
| 8   | in (s 8) .9.9068   |  | 4  |
| 84  | 90 (s z) 0 .0206<br>800 s 0 .6425  | $tan^2 it 9.5360$ $t = 60^2 45^\circ$  | tan <sup>2</sup> §\$ 9.6242  |
|   | -  | = 4h 0:1m 00*  | t = 65° 58'<br>= 4° 23° 52   |
|   | $\tan^2 \frac{1}{2}t = 9.5547$   | · a== 5 47 41.   | a = 3 12 36  |
|   | t = 61° 51′  | Local sidereal time 1 44 41  | Local sidercal time 22 48 44   |
|   | no. Ab 07m 94e   | Chronometer time 0 04 01   | Chronometer time   |
|   | a = 4b 07m 24*<br>a = 5 53 18  |  |  |
|   | a == 5 53 18   |  |  |
| Local sidereal tip                                | a = 5 53 18  | $\Delta T = +1  40  40$  |  |
| Local sidereal tip                                | $a = \begin{array}{ccccccccccccccccccccccccccccccccccc$  |  |  |
| Local sidereal tip                                | a = 5 53 18  |  |  |

# RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS—Continued.

| January 7, 1883. Altitudes of Jupiter. Che<br>allier sextant. Chronometer, Bond 2:<br>(sidereal).]   | y-<br>35 [January 25, 1883. Altitudes of Jupiter.<br>Chevallier sextant. Chronometer, Bond<br>235 (sidereal).]   | [March 2, 1883. Altitudes of Jupiter. Che allier sextant. Chronometer, Bond 2 (sidereal).]   |
|--|--|--|
| Time. Double altitude  | p. Time. Double altitudes.   | Time. Double altitude  |
| 13b 93m 93e 72° 037.2<br>06 37 29  | 14h 17= 33* 80° 09'<br>18 30 .5 13   | 16h 57m 32* 81° 10° 11° 11° 11° 11° 11° 11° 11° 11° 1  |
| 08 17.5 41   | 20 10 20<br>21 16 .5 24 .7   | 02 37.5 51<br>03 08 48.3   |
| 69 40 50<br>11 50 59   | 22 48 29 8   | 05 34 38 .5  |
| 13 07 53 72 36.4   | 23 48 35<br>24 45 5 39 .5  | 17 01 55 80 53.0   |
| Index = +.8  | 28 52 .5 54 .8   | Index = + .8   |
| h' = 30 - 18.6   |  | Sun's disc.<br>On arc 31' 10" h' = 40 26.9   |
| Refraction = -1 3  | 14 23 03 Index = 80 31.5 + 8   | Offare 32 50 Refrac. = -1.1  |
| z = 53 - 42.7  | h' = 40 - 16.2   | In. cor. +0'.8   |
|  |  | $ \phi = 71  17.7 \\ \phi = 28  02.5 $   |
| $ 2s = 148  00.1 \\ s = 74  00.0 $   | z = 40 44.0  | 2e == 143 54 .4  |
| $s - \phi = 2 + 42 \cdot 3$  | φ = 71 17.7<br>8 = 22 57.4   | #= 71 57.2<br>#-♠= 0 39.5  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 20 == 144 00.0   | s — 8 = 48 54.7<br>s — s = 22 23.0   |
|  | a = 72 00.0  | The state of the s   |
|  | a - b = 49 02.6  | $ \begin{array}{cccc} \sin (s - \phi) & 8.0603 \\ \sin (s - \delta) & 9.8772 \end{array} $   |
| Bin (# 8) 9.8905<br>Bro (# z) 0.0278<br>Sec. # 0.5597  | s-z=22-15.1  | sec (s — z) 0.0340<br>sec sec s 0.5089   |
|  | $\sin (s - \phi)$ 8.0809<br>$\sin (s - \delta)$ 9.8781   |  |
| t = 41° 17'  | $\sec (s-z) = 0.0336$  | t= 19° 44′   |
| 2h 45m 08*<br>a=- 5 32 27  | 8 008  | 1h 18m 56*<br>a == 5 24 14   |
| ocal sidereal time 2 47 19   | $\tan^2 \frac{1}{2}t = \frac{8.5116}{t} = \frac{20^\circ \ 26'}{}$   | Local sidereal time 6 43 10  |
| bronometer time  | 1h 21m 44e   | Chronometer time 5 01 55   |
| $\Delta T = +1 39 26$  | a = 5 23 19  | $\Delta T = +1 \ 41 \ 15$  |
| 42-1-1-00-00   | Local sidereal time 4 03 35<br>Chronometar time 2 23 03  |  |
|  |  |  |
|  | $\Delta T = +1  40  32$  |  |
|  | [April 16, 1883. Altitudes of Sun. Chevallier<br>sexiant. Chronometer, Blunt 214 (mean<br>time).]  | sextant. Chronometer, Negus 544.]  |
| real).}  Time. 19h 031 21* 04 55 68 50   | time). ]  Time.  8 <sup>b</sup> 21= 31*.5  22 09  Double altitudes.  49° 50′  55  55   | Time. Double altitudes. 9h 02m 07*.5 \(\Omega\$ 05 55  |
| Time. Double altitudes.  19 <sup>h</sup> 05 <sup>m</sup> 21 <sup>s</sup> 68 <sup>s</sup> 02'.5  04 55 68 50  07 58 25  10 28 04  | time).   Double altitudes.<br>8 <sup>b</sup> 21 <sup>m</sup> 31 <sup>s</sup> . 5 49 <sup>o</sup> 50 <sup>s</sup><br>22 09 55 5 5 90  | Time. Double altitudes.  9   |
| Time. Double altitudes.<br>19h 03 ≈ 21* (8c 02'.5<br>04 55 64 50<br>07 58 25   | time).   Double altitudes.<br>8 <sup>b</sup> 21 <sup>m</sup> 31 <sup>s</sup> . 5 49 <sup>o</sup> 50 <sup>s</sup><br>22 09 55 5 5 90  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| Time. 19h 039 214 90 455 04 55 07 58 07 58 08 50 07 58 08 50 07 58 08 50 07 58 08 50 07 58 08 50 07 58 08 50   | time).}    Time.   Double altitudes.   8   21 = 31 \cdot 5 \cd   | Time.  9 <sup>3</sup> 02 <sup>∞</sup> 07*.5  02 56  03 48  04 32  05  05 26  9 08 06  09 07  35  |
|  | time).}    Time.   Double altitudes.   8   21 = 31 \cdot 5 \cd   | Time.  9 <sup>3</sup> 02 <sup>∞</sup> 07*.5  02 56  03 48  04 32  05  05 26  9 08 06  09 07  10 48  11 40  50  |
| Time. 10b 03w 21v 04 55 68 50 07 58 25 10 28 044 12 39 67 44.7  19 07 52 Index = 8 25.2  Index = 8 25.2    Index = 8 25.2  | time).}  Time.  8 21=31.5  22 55.5  22 55.5  50 00  23 32 50  24 32 00  25 12  25 12  27 38.5  27 38.5  28 27  29 20  45   | Time. Double altitudes.  9 02= 07*.5   |
| Time. 19b 03w 21v 04 55 68 50 07 58 25 10 28 044 12 39 67 44.7 19 07 52 Index = 8 25.2  Index = 8 25.2  k'= 34 13.0  Refraction = -1.4   | time).}    Time.   Double altitudes.   8   21 = 31 \cdot 5 \cd   | Time. Double altitudes.  9 02= 07*.5  02 56  03 48  04 32  05  04 32  05 06  08 07  08 07  11 40  12 38  9 07 07  - 62 51.5  |
| Time. 10h 03h 21h 04 55 04 55 07 58 10 28 110 28 110 28 110 27 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52 110 07 52   | time).}    Time.   Double altitudes.     8   21 = 31 \cdot 5   5   5     22   05   5   5     23   05   5   5     24   22   10     25   12   15     8   26   50   5   5     27   38   5   5     28   27   40     30   15   5     31   10   5     32   20   45     31   10   5     32   20   7     33   34   5     34   20   7     35   5     36   7   7     37   7     38   7   7     39   7     30   7   7     30   7   7     31   7   7     32   7   7     34   7   7     35   7     36   7   7     37   7   7     38   7   7     38   7   7     40   7   7     50   52   5     50   7     50   52   5     50   7   | Time.  9 02=07.5  02 56  04 55  04 12  05 26  05 26  05 26  05 26  09 07  11 40  12 38  9 07 07  1 1 1 40 50  1 1 1 40  1 2 38  9 07 07  1 1 1 40 50  1 1 40 50  1 1   |
| Time. Double altitudes, 19h 03w 21*   04 55 68 55 097 58 25 10 28 112 39 67 44.7 19 07 52    Index = $\frac{h'=34}{2}$ 13.0 Refraction = $\frac{h'=34}{2}$ 19. 17. 7 $\frac{h'=34}{2}$ 19. 17. 7 $\frac{h'=34}{2}$ 19. 17. 7 $\frac{h'=34}{2}$ 19. 19. 19. 19. 19. 19. 19. 19. 19. 19.   | time).}    Time.   Double altitudes.     8\frac{21 = 31 \cdot 1.5}{22 \cdot 00}   \frac{50'}{55}   \frac{50'}{55}   \frac{25'}{55}   \frac{50'}{55}   50'   | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).]  Tyone.  8 <sup>h</sup> $21 = 314.5$ $22 = 09$ $22 = 55.5$ $23 = 35$ $24 = 22$ $25 = 25.5$ $23 = 35$ $25 = 12$ $25 = 12$ $25 = 12$ $25 = 12$ $25 = 12$ $27 = 38.5$ $38.5$ $38.5$ $38.5$ $38.5$ $39.5$   | Time. Double altitudes.  9 02= 07*.5   |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$  | time).}  Tyne.  8\(^12 = 314.5\) 22 09 55 22 55.5 50 00 23 35 05 24 22 10 25 12 25 12 25 12 27 38.5 30 28 8.7 40 29 20 40 30 16 31 09  8 26 07 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).}  Time.  8 $^2$ 21= 31.5  22 09 55  23 55.5  24 95 50'  24 92 10  25 12  25 12  27 38.5  28 27  30 15  31 09  8 26 07  On are 32 00 1  Off are 32 00 1  Index = -2.0  Index = -2.0  Index = -2.0  Index = -2.0  Index = -2.0  Index = -2.0  | Time.  9 02= 07*.5  02 56  03 48  04 32  05  04 32  05  09 07  10 48  45  11 48  45  12 38  9 07 07  1 Index =   12 34 00  1 In. cor. + 0'.0  2 = 68 35.4  4 5 17  4 5 18  2 e = 165 38.3  |
| Time. Double altitudes, 19h 63 h 21 h 21 h 63 h 25 h 64 50 or 5 h 55 h 64 50 or 5 h 55 h 55 h 55 h 55 h 55 h 55 h 55   | time).}  Time.  8 2 = 3 +.5   22 09 55  23 55 .5 50 00  23 35 6 00  23 35 00  24 52 22  25 52 5 .5 50 00  26 32 25  27 38 .5 35  28 27 40  29 20 45  30 15 55  8 26 07  On arc  32 00 0  Off arc  35 50  In. cor.  +0.0  Refraction = -2.0 $x = (4 - 35 - 36 - 26)$ $x = (4 - 35 - 36)$  | Time. Double altitudes.  9 02= 07*.5   |
| Time. Double altitudes, 19h 63h 21s 186 625 5 64 55 64 55 67 58 25 12 39 67 44 .7 19 07 52 Index = $\frac{h'}{2} = \frac{3}{2}$ Index = $\frac{h'}{2} = \frac{h'}{2} = \frac{h'}{2}$  \frac{h'}{2}$ Index = $\frac{h'}{2} = \frac{h'}{2} = \frac{h'}{2} = $   | time).}  Time.  8 2 = 3 1.5  22 09 55  23 55 .5 50 00  23 35 000  23 35 000  33 22 000  35 000  35 000  35 000  35 000  35 000  35 000  36 000  37 000  38 26 07  001 arc 32 000  001 arc 32 000  001 arc 35 50  In. cor. +9.0  Refraction = -2.0 $x = 64$ 35.3 $x = 73$ 03.2 $x = 73$ 03.2  | Time. Double altitudes.  9 02=07.5   |
| Time. Double altitudes, 19h 03% 21*   04 55 64 50 07 58 25 12 28 67 44 .7 19 07 52   Index = $\frac{1}{2}$ $\frac$ | time).}  Type.  8 2 = 3 1.5 22 09 55 5 09 22 55.5 50 09 23 35 005 24 32 2 3 35 005 35 35 35 35 37 38.5 35 38 26 7 100  On arc 32 00 0  Off arc 35 50  In. cer. $+9.9$ Refraction = $-2.0$ $x = 64$ 353 $x = 73$ 17.7 $x = 6$ 10 13.3 $x = 73$ 10.2 $x = 6$ 145.5 $x = 6$ 145.5 $x = 6$ 145.5 $x = 6$ 155.5 $x = 6$ 1   | Time. Double altitudes.  9 02=07.5   |
| Time. 19b 039 214  | time).}    Time.   Double altitudes.     8   21 = 31 \ .5   \times 480 \ 50'   \times 50'     22   09   5.5   50   05     23   5.5   50   05     24   22   10     25   12   15     8   26   50   5.5   \times 51   30     27   38   55   \times 51   35     28   27   40     30   15   50     31   09   \times 52     8   28   07   \times 10     90   1   1   1   1     10   1   1   1   1     10   1   1   1   1     11   1   1   1   1  | Time.  9 02=07.5 02 56 03 48 02 00 04 32 05 06 07 05 08 08 07 05 11 40 50 12 38 55  9 07 07 Index = +0.0  On are 32' 10"  In. cor. +0'.9  2 50 8 35.4 6 71 17.7 8 15 45.2 2 2 16 33.8 8 72 34.0 2 2 6 6 3 35.4 6 71 17.7 8 15 45.2 2 6 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2 8 6 7 1 17.7 8 15 45.2  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).}    Time.   Double altitudes.     8\ 2  = 3 1.5   \times 480 \ 50'   \times 55'     22  | Time. Double altitudes. 9 02 97.5 $\Omega$ 619 50' 02 97.5 $\Omega$ 619 50' 03 48 $\Omega$ 62 06 $\Omega$ 63 30 $\Omega$ 69 07 $\Omega$ 35 $\Omega$ 69 07 $\Omega$ 35 $\Omega$ 69 07 $\Omega$ 35 $\Omega$ 69 07 $\Omega$ 35 $\Omega$ 69 07 $\Omega$ 11 $\Omega$ 62 $\Omega$ 63 30 $\Omega$ 69 07 $\Omega$ 12 38 $\Omega$ 75 $\Omega$ 10 $\Omega$ 75 $\Omega$ 10 $\Omega$ 11 $\Omega$ 12 38 $\Omega$ 75 $\Omega$ 10 $\Omega$ 11 $\Omega$ 12 $\Omega$ 12 $\Omega$ 12 $\Omega$ 12 $\Omega$ 12 $\Omega$ 12 $\Omega$ 12 $\Omega$ 13 $\Omega$ 14 $\Omega$ 15 $\Omega$ 15 $\Omega$ 15 $\Omega$ 15 $\Omega$ 16 $\Omega$ 17 $\Omega$ 18 $\Omega$ 18 $\Omega$ 18 $\Omega$ 18 $\Omega$ 18 $\Omega$ 19 |
| Time. 10b 03w 21t 045 68 55 07 58 68 55 07 58 225 10 28 67 44.7 19 07 52 1 Index $\frac{h'=3}{4}$ $\frac{34}{13.0}$ $\frac{3}{13.0}$ $\frac{h'=3}{13.0}$ $\frac{3}{13.0}$ $\frac{1}{13.0}$  | time).}  Time. 8 21=31.5 22 09 55 55 65 50 65 22 35 5.5 50 65 22 38 22 15 25 12 8 26 50.5 5 50 65 27 38.5 5 50 65 28 27 40 29 20 45 30 15 55 28 27 40 30 15 55 31 09 55  Refraction = -2.0 In. cer. +0'.9  Refraction = -2.0 $x = 64 35.3 67$ $x = 73 30.2 x 64$   | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$  |
| Time. Double altitudes, 19h 03 × 21* 04 55 68 55 07 58 25 10 28 10 28 67 44 .7 19 07 52 Index = $\frac{h'=31}{25}$ $\frac{h'=31}{25}$ $\frac{3}{10}$ $\frac{3}$   | time).}  Time. 8 21=31.5 22 09 55 22 55.5 23 32 00 23 55.5 24 32 00 24 52 12 25 12 25 12 25 12 26 27 38.5 28 27 40 30 15 31 09 55  8 26 07  In. cor.   | Time. Double altitudes.  9 02= 97.5  |
| $ \begin{array}{c cccccc} Time. & Double altitudes, \\ 10^{h} & 03^{m} & 21^{s} & 68^{h} & 65^{o} \\ 04 & 55^{o} & 68^{h} & 50 \\ 07 & 58^{o} & 25^{o} & 67^{o} & 44.7 \\ 10 & 28^{o} & 67^{o} & 44.7 \\ & 12 & 39^{o} & 68^{o} & 25.2 \\ & & 10 & 28^{o} & 41.3 & 13.0 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & & 13.4 & 13.0 \\ & & & & & & 13.0 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & & 17.5 \\ & & & & & & & & 17.5 \\ & & & & & & & & & 17.5 \\ & & & & & & & & & & & 19.1 \\ & & & & & & & & & & & & & \\ & & & & $   | time).   Double altitudes.  8 21=31.5  | Time. Double altitudes.  9 02= 97.5  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).]  Time.  8 21=31.5  22 09  25 5.5  22 50.5  23 55.5  30 25 5.5  30 25 5.5  30 30 55  27 38.5  28 27  40 30 15  31 09  8 26 07  On are 32 000  Off are 30 50  In. cer. $+0.9$ Part of 4 35.3 $= 73$  | Time. Double altitudes.  9 02=07.5   |
| $ \begin{array}{c cccccc} Time. & Double altitudes, \\ 10^{h} & 03^{m} & 21^{s} & 68^{h} & 65^{o} \\ 04 & 55^{o} & 68^{h} & 50 \\ 07 & 58^{o} & 25^{o} & 67^{o} & 44.7 \\ 10 & 28^{o} & 67^{o} & 44.7 \\ & 12 & 39^{o} & 68^{o} & 25.2 \\ & & 10 & 28^{o} & 41.3 & 13.0 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & 10 & 28^{o} & 25.2 \\ & & & & & 13.4 & 13.0 \\ & & & & & & 13.0 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & 17.7 \\ & & & & & & & & 17.5 \\ & & & & & & & & 17.5 \\ & & & & & & & & & 17.5 \\ & & & & & & & & & & & 19.1 \\ & & & & & & & & & & & & & \\ & & & & $   | time).}    Time.   Double altitudes.     8\[^2\] 2  = 31.5   \( \) \(\) \( \) \( \) \( \) \( \) \( \) \( \) \(\) \( \) \(\) \( \) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\   | Time. Double altitudes. 9 02=07.5  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).}    Time.   Double altitudes.     8   21 = 31 - 5   $\bigcirc$   480 for     22   03   5.5   $\bigcirc$   50     23   35   5.5   $\bigcirc$   60     24   22   10     25   12   15   $\bigcirc$   15     8   26   50   5.5   $\bigcirc$   51   30     27   38   57   $\bigcirc$   40     30   10   $\bigcirc$   50   52     31   100   $\bigcirc$   60   52   55     8   20   07   Index   $\bigcirc$   60   52   55     1n. cer.   $\bigcirc$   1n   $\bigcirc$   60   52   55     In. cer.   $\bigcirc$   60   60   60     1n   $\bigcirc$   70   $\bigcirc$   70     $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70     1n   $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70     1n   $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70     1n   $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70   $\bigcirc$   70     1n   $\bigcirc$   70   $\bigcirc$ | Time. Double altitudes. 9 02 = 07*.5   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | time).}    Time.   Double altitudes.     8\[^2\] 2  = 31.5   \( \) \(\) \( \) \( \) \( \) \( \) \( \) \( \) \(\) \( \) \(\) \( \) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\) \(\   | Time. Double altitudes. 9 02=07.5  |
|  | time). ]  Time.  8 21=31.5 22 09 55.5 35 65 69 65 65 22 35.5 32 32 10 25 5.5 32 32 10 35 65 32 32 10 35 65 32 32 10 35 27 38.5 32 27 40 30 15 31 09 55  8 26 07 Index = 4.9  Off are 32 50  In. cer.  10. cer  | Time. Double altitudes. 9 02=07.5  |

# ntinued. Jupiter. Chev-leter, Bond 235 Double altitudes, 810 1197 88 0 571 3 69 571 3 6 Sun. Chevallier egus 544.] ouble altitudes. ⊙ 61° 50′ 55 62 00

| o     | 63  | 05<br>10<br>30<br>35<br>45<br>50 |  |
|-------|-----|----------------------------------|--|
| -     | 62  | $\frac{51.5}{+.9}$               |  |
| 11 11 | 31  | 26.2<br>-1.6                     |  |
|       | 8.0 | 95. 4                            |  |

= 68 35.4 = 71 17.7 = 15 45.2 = 165 38.3 = 72 40.2 = 1 31.5 = 57 04.0 = 14 13.8 = 8.4251 9.9235 0.0355 0.0355 0.5296 = 3 17 9 51 51 9 07 07 +44 44

+14 44

#### RECORD AND REDUCTION OF ASTRONOMICAL OBSERVATIONS—Continued.

| [May 12, 1883. Altitudes of action. Chronometer, Bi   | Sun. Chevallier<br>lunt 214.)  |  | 883. Altitudes of Sun. Che. Chronometer, Negus 544. ne. Double altit   | evallier                | [June 6, 1883. Al<br>sextant. Chroi  | titudes of Sun. Chevallie<br>nometer, Negus 544.]<br>Double altitudes.   |
|---|--|--|--|-------------------------|--|--|
|   | © 680 00°<br>05  | 8h 11  | m 44•,8 <u>⊙</u> 65° 45  | Y                       | 8h 56m 12e<br>56 56 ,5   | 20 74° 30′ 35  |
| 45 26<br>46 16  | 10<br>15   | 94   | 49 66 06   | )                       | 57 42<br>58 33.5   | 40<br>45   |
|   | ⊙ 69 25<br>30  | 8 2  | 11 5 67 56<br>54 56  | ) [                     | 59 24<br>9 01 52   | ₹ 76 10  |
| 49 19<br>50 15  | 35<br>40   | 21   | 37 68 06<br>20 03  | )                       | 02 46<br>03 35.5   | 15<br>20   |
| 8 46 53   | → 68 50  | 8 2  |  | 3.9                     | 04 21.5<br>05 15   | 25<br>30   |
| On arc 32' 10" Inde:  |  |  | Index = +  | .9                      | 9 00 40  | ↔ 75 30  |
| - Refraction  | = 34 25 .4<br>= -1 .4  |  |  | .4                      | On are 32' 10"   | Index = +.9  |
|   | = 55 36.0<br>= 71 17.7   |  | z = 56 - 32  | .5                      | Offare 34 00   | Refraction = ${}^{h'}$ = ${}^{37}$ ${}^{45.5}$ ${}^{.5}$   |
| 8   | 3 = 71  17.7<br>3 = 18  12.3   |  | $ \phi = 71  1 $ $ \delta = 20  14 $   | .7                      | In. cor. +0'.9   | 8 == 53   15   7<br>8 == 71   17   7   |
| 24  | = 145 06.0<br>= 72 33.0  |  | 2s = 148 04<br>s = 74 03   | 1.4                     |  | 8 = 22 - 41.1  |
| 8—ф   | $     \begin{array}{r}                                     $                                   |  | sφ == 2 44   | 1.5                     |  | 2s == 146 14 5<br>s == 73 07 .2  |
| 8-2   | 16 57.0  |  | s-z = 17 29  | 9.7                     |  | $s - \phi = 1  49.5$<br>$s - \phi = 50  20.1$  |
| sin (s φ,<br>sin (sδ)   | 8 .3405<br>9 .9098   |  | $\begin{array}{ccc} \sin (s - \phi) & 8.6 \\ \sin (s - \delta) & 9.9 \end{array}$  | 797<br>068              |  | <i>s</i> − <i>z</i> == 20 51 .5  |
| 8ec (#z)  | 0.0193<br>0.5230   |  | sec (a-z) 0.0<br>sec a 0.5   | 306                     |  | sin (s-φ) 8.5031<br>sin (s-δ) 9.8570   |
| tan² ‡  | 8.7926   |  | tan <sup>2</sup> åt 9.1  |                         |  | sec # 0 0294<br>sec # 9 .5370  |
|   | 27° 58′<br>1° 51° 52°<br>10 08 08  |  | 2h   | 58'<br>47" 52°<br>12 08 |  | tan <sup>2</sup> it 8.9565<br>t= 33° 29′   |
| Equation of time  |  | Equ  | ation of time  | 3 38                    |  | 2h 13m 5<br>9 46 0   |
| Local mean time<br>Chronometer time   | 10 04 18<br>8 46 53  | Loca   | onometer time 9  | 08 30<br>24 15          | Equation of  | time 1 3   |
|   | +1 17 25   | Cin  |  | -44 15                  |  | time 9 44 :  |
|   |  |  |  |                         |  | ΔT = +43 -4  |
| 10 30.5 62 55 59 17 34.5 45 18 10 40 18 42 35 10 12 22 27 05 22 60 60 24 06 62 50 25 50.8 35                              | 34 49.5<br>35 28<br>30 11<br>86 57<br>8 41 23 2<br>42 03<br>42 45<br>43 30<br>44 15<br>44 59.5 | 40<br>45<br>50<br>55<br>74<br>35<br>40<br>45<br>50<br>55 | 17 31.5 05 18 01 00 18 36 60 55 3 22 20 0 61 25 22 54.5 20 23 30.5 15 24 00 10 24 36 05 3 20 28 $\oplus$ 61 10                   | 8 12 3<br>13 14         | 7.5 48<br>7.5 50<br>1 55<br>1 56<br>1 64 10<br>0 15<br>6 20<br>5 25<br>7 30      | Time. Double allitue 90 660 23.5 \( \to \) 64\( 0 \) 07 32 64\( 0 \) 08 33 1 09 36 2 10 42 9 12 35 \( \to \) 65 0 4 13 09 4 14 10 5 16 28 68 0 9 11 27 () 65 0 |
| 20 09 62 53.8   |  | 73 42.5  | Index = +0.5   | 8 11 4                  |  |  |
| Index = +0.4  | Index =  | + .5   | h' = 30 35.2   |                         |  | On are -= 30'  |
| On are = 31' 10"  | On are =   | 31' 10"  | Refr. = -1.6   |                         | on are = 31' 10"   | Off are = 30   |
| Off arc = $32 00$<br>Index cor. = $+0'.4$   | Off are :=   | +0'.5  | z = 59 	 26.4<br>$\phi = 71 	 17.7$<br>$\delta = 22. 	 11.3$   |                         | off are $=$ $\frac{32 \text{ 10}}{+0.5}$   | Index corr. = $\frac{+}{32}$   |
| Index cor. = $+0'.4$   $A' = 31 - 27.1$   | h' =   |  | a = 22.11.3 $2a = 152.55.4$  | Index                   | h' = 31 + 6.5  | Refr. = -  |
| $Refr. = \frac{1.6}{-1.6}$  | Refr. =  | -1.3   | s = 76 27.7<br>$s - \phi = 5 10.0$   |                         | Refr. =  | z = 57 - 3   |
| z = 58 34.5<br>$\phi = 71 17.7$<br>$\delta = 23 26.5$   | • Z :=   | 53 09.8<br>71 17.7                                       | $s - \delta = 54  16.4$<br>s - z = 17  01.3  |                         | z := 58 15.0<br>$\phi := 71 17.7$  | δ = 15 4   |
|   | 8 ==   | 23 16.9  | sip (s - \phi) 8.9545  |                         | $ \phi = 71 \ 17.7 \\ \delta = 20 \ 02.8 $                                       | s == 72 1  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   | # ==   | 147 44 .4<br>73 52 .2                                    | $ \begin{array}{lll} \sin (s - \delta) & 9.9095 \\ \sec (s - z) & 0.0194 \end{array} $   |                         | 2s = 149 35.5<br>s = 74 47.8   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| $ \begin{array}{ccc} s - \phi &= & 5 & 21 & .7 \\ s - \delta &= & 18 & 04 & .9 \end{array} $                              | *-9=   | 2 34 .5<br>50 35 .3                                      | sec # 0. 6306  |                         | $e - \phi = 3 \ 30.1$<br>$e - \delta = 54 \ 45.0$                                |  |
| $\sin (s - \phi)$ 8. 9705<br>$\sin (s - \delta)$ 9. 9036  | $s-z = \sin(s-\phi)$   | 8, 6525  | $ \begin{array}{ccc} \tan^2 \frac{1}{2}t & 9.5140 \\ t & 59^{\circ} & 30' \\ & 3^{\circ} & 58^{\circ} & 00^{\circ} \end{array} $ | ain i                   | $s - s = 16 32.8$ $(s - \phi) = 8.7859$  | $\sin (s - \delta)$ 9.9  |
| sec (s - z) 9, 9036<br>sec (s - z) 0, 0220<br>sec s 0, 6368   | $ \begin{array}{c} \sin (s - \phi) \\ \sec (s - z) \end{array} $                               | 9, 8880<br>0, 0290                                       | Equa'n of time +5 08   | sin (                   | $(s - \phi)$ 8. 7859<br>$(s - \delta)$ 9 9126<br>(s - z) 0. 0181                 | sec s 0.5  |
|   | sec (2 — 2)  | 0. 5362  | Local m. time. 4 03 08<br>Chron. time . 3 20 28  | 800                     | sec # 0.5813   | tau <sup>2</sup> 1t 8.6  |
| (nn? 1/ 0 5200)   |  | 9. 1257  |  | 1                       | tan <sup>2</sup> 1 9. 2970   | :- 1h 40m  |
| $\tan^2 \frac{1}{4}t = 0.5329$<br>$t = 60^\circ 34'$<br>$= 4^\circ 02^m 16^\circ$   | tan² it  | 400 00   | $\Delta T = +42 - 40$  | }                       | £ == 48° 63°   | 10 19  |
| $ \begin{array}{c} t = 60^{\circ} 34' \\ = 4^{\circ} 02^{\circ} 16^{\circ} \\ \text{Equat'n of time} + 1 07 \end{array} $ | 1 =  | 2h 40m 36e<br>9 19 24                                    | $\Delta T = +42  40$   |                         | $t = 48^{\circ} 03^{\circ} = 3^{\circ} 12^{\circ} 12^{\circ} 12^{\circ} 8 47 48$ | Equalnoftime +5  |
| t == 60° 34′<br>== 4b 02m 16s   | t ==   | 2h 40m 36s   | $\Delta T = +42$ 40  | Equa'n                  | 3 12 12 8 47 48 of time +6 13  | Local m. time 10 25<br>Chron. time 9 11  |

 $Tabulations\ of\ observed\ chronometer\ corrections,\ United\ States\ meteorological\ and\ magnetiv\ polar\ {\it states}\ tion,\ Uglaamie,\ Alaska.$ 

| Chronou   | neter, Negus No. 544 (mean t     | ne).  | (mean time). | Chronometer, Hutton No. 31<br>(aidereal). |
|---|----------------------------------|---|--------------|---|
| 1881. November 28. + November 39. + November 30 November 30 November 30 November 30 April 11 April 17 April 17 April 18 May 16 May 27 May 24 June 3 | 1 44 04 August 16<br>September 8 | 0 50 13 Fe 49 14 Ma Ap Ma 0 44 14 Ma 0 43 14 Ch 0 42 14 0 42 14 Ap Ma | 1882         | 1881   1                                  |

Observations for latitude at United States meteorological and magnetic polar station, Uglaamie, Alaska.

[April 28, 1882. Sextant, Blunt No. 300. Chronometer, Fletcher No. 1713. Observer, A. C. Dark. Recorder, E. P. Herendeen.]

| Observed<br>times.  | Double<br>altitudes.  | Single<br>altitudes, index<br>correction<br>applied.   | Index correc-<br>tion —2'.8<br>reduction to<br>meridian.  | Meridian<br>altitude.                                      |
|---|---|--|---|--|
| 94 36# 52* 539 25 40 41 21.5 48 60 10.5 48 60 33 52 52 52 52 52 52 52 52 52 52 52 52 52 | 25.8 28.0 32.0 34.0 35.8 37.6 37.7 37.7 37.7 37.0 32.0 32.0 32.0 33.0 32.0 33.0 33.0 33 | 32° 41'.5<br>42.6° 42.6° 44.6° 45.6° 46'.5° 47'.1<br>47'.4 48'.4 4 | 5.6<br>5.1<br>4.6<br>2.5<br>1.9<br>0.8<br>0.4<br>0.0<br>0.0<br>1.0<br>1.3<br>1.3<br>2.1<br>2.4<br>3.2<br>2.7<br>4.3 | 32° 47' 47' 47' 47' 48' 48' 48' 48' 48' 48' 48' 48' 48' 48 |
| Mean time of cul  | $\Delta T + 1$  |  | can<br>efr. and par<br>h ⊙  | 32 48.6<br>-1.4  |
| Chi dii. (ilae di ca  | imination.  | Se   | mi-diameter   | +15.9  |
|   |   |  | φ =   |  |

[June 24, 1882, noon. Theodolite, Fauth & Co. Chronometer, Negus No. 544. Observer, A. C. Dark. Recorder, E. P. Herendeen.]

| 1 | Observed times.                              | Observed altitudes.    | Reduction to<br>meridian.        | Meridian alt | itude.       | Chronometer,<br>Herendeen. T                      |
|---|--|------------------------|----------------------------------|--------------|--------------|---|
|   | 10 <sup>h</sup> 34 <sup>m</sup> 13*<br>36 13 | ⊙ 42° 25′ R<br>25′ L   | 0'.0                             | <u>⊙</u> 42  | 25/.0        | of the four su<br>time of lower of<br>between the |
|   | 37 16.5<br>37 58                             | 24 R  <br>24 L         | 0.0                              |              | 24.0         | seems to indic                                    |
|   | 39 40<br>40 06                               | 23 R<br>23 L           | 0.2                              | !            | 23 .2        | for index error                                   |
| 1 | 40 40<br>42 04                               | ⊙ 42 56 R<br>56 L      | 0.4                              | ō            | 56.4         |   |
|   | 43 10<br>43 31                               | 54 R<br>54 L           | 0.7                              |              | 54.7         |   |
|   | 44 20<br>44 40.5                             | 53 R<br>53 L           | 1.0                              |              | 54.0         | Mean  |
|   | Mean time of cul                             | 12h 02m 12r<br>1 26 36 | Mean ⊙'s center<br>Refr. and par |              | 39.5<br>-0.9 |   |
|   | Chron, time of cul                           | 10 35 36               | 8                                | = 42 23      | 38.6<br>24.8 | Correction to re                                  |
| l |  |                        | φn                               | = 70         | 46.2         | Corrected om                                      |
|   |  |                        |                                  |              |              | From observat                                     |

Unserver, A. C. Dark. Recorder, E. P. Herendeen.]

[June 24, 1882, midnight. Theodolite, Fauth & Co. Chronometer, I. Observer, A. C. Dark. Recorder, E. P. Herendeen. The times given do not correspond to the time of lower culmination of the sun; therefore the mean of the four smallest readings (supposed to indicate the time of lower culmination) were taken. The discordance between the results at upper and lower culminations seems to indicate that the instrument was not adjusted for index error.]

Observed attitudes.

| Coservea attitues.                             |          |       |     |
|--|----------|-------|-----|
| 0  |          | 07'   | R.  |
|  | 5        | 07    | L,  |
| ē  |          | 36    | R.  |
|  | 5        | 36    | L,  |
| Mean   | 5        | 21 .3 | 5   |
| Retraction and par                             |          | !).1  |     |
|  | -        | 12.4  |     |
| A -  |          | 24.0  |     |
| 0 -  | - 20     |       |     |
| φ =  | -71      | 48.4  | 1   |
| Correction to refraction for displaced zenith. |          | -1.2  |     |
| Corrected om                                   | 71       | 47 .2 | !   |
| From observations June 24, noon                | =7<br>=7 | 0° 46 | 7.2 |
| Mann   | 7        | 1 16  | 7   |

etic polar sta-

Hutton No. 312 ereal). AT
..... +1h 39m 53r
..... 1 36 29
..... 1 36 39

Bond No. 235
ereal). .... +15 23m 64s 1 40 49 1 40 10 1 40 30 1 40 30 1 40 24

amie, Alaska. Herendeen.

. Herendeen.

te, Fauth & Co.
k. Recorder, E. P.
correspond to the
therefore the mean
sed to indicate the
. The discordance
ower culminations
twas not adjusted

⊙ 5° 07′ It. 5 07′ It. 5 36 R. 5 36 L. δ 21.5 -9.1 δ =23 24.0  $\phi = 71 \quad 48.4 \\
-1.2 \\
71 \quad 47.2$  $....\phi m = 70^{\circ} 46'.2$   $....\phi m = 71 47.2$ 71 16.7

Observation of lunar distance for longitude, July 7, 1882, at the United States meteorological and magnetic polar station, Uglaamie, Alaska.

|   | Dmerver, A. C  | . Dark. Caronome   | ter, Negu   | 554. Blunt sextant.  | . Index correction =  | 0'.0.]   |
|---|--|--|---|--|---|--|
| Zime<br>9h 32m  | 160  | Distance ①   | and 4   | a 9 term   | Formula.  |  |
|   | 44 .5<br>07 .5   |  | 35  | z', Z' = appa  | zenith distances.<br>rent sonith distances.   |  |
|   | 99   |  | 33  |  | and apparent distance<br>angle.   |  |
| Mean 9 34<br>ΔT +51   | 40   | Semid. ①   | 90 35.3<br>15.8   | 008 2 = 810 ¢<br>008 Δ' = 008 2  | $sin \delta + cos \phi cos \delta cos t' cos Z' + sin z' sin Z' \Delta' - cos z' cos Z'$  | 006 Å  |
| Mean time 10 26   | 03   | Semid. q   | 16. 1   | cos A = cos 4  | a' - cos z' cos Z'  |  |
| Sidereal time 5 28  | 50<br>33   | Δ,   | 91 - 07. 2  | 000 A == 000 z   | $ \begin{array}{ll} \sin z' \sin Z' \\ \cos Z + \sin z \sin Z \cos \end{array} $  | 19 A   |
| ₫₫ 0 49   | 46   |  |   |  |   |  |
| t⊙ 1 38<br>t⊄ 4 39  | 38 == 24° 39′.<br>00 == 69 47 .  | 5  |   | _  |   |  |
| 40 22°  | 32'.6<br>12.5  | ain ø  | 9. 97643  | COS  | sin \$ 9.97643<br>sin \$ 9.20419  | con d 9, 50609<br>con 8 9, 99437   |
| 94 9  | 12.5   | ain 8  | 9. 58363  | cos d 9.96548<br>cos t 9.95847   |   | cos 8 9, 99437<br>cos 8 9, 53847   |
|   |  | sin ¢ sin ô<br>cos ≢ cos ô cos t   | 9, 56006<br>9, 43004  | Refr. = -1.2   | 9, 18062<br>9, 03893  | Refr. = - 3'.5   |
| сов   | Δ' 8, 2911 n   | +  | 0. 24087  | *=+ .1   | + 0. 23594  | $\pi = +57.0$  |
| cos z' cos  | Z' 9. 19187n   | cos 2  |   | $z = 50^{\circ} 46'.7$<br>z' = 50 45.6   | coa Z 9, 41656  | $Z = 74^{\circ} 52'.4$<br>Z' = 75 45.9   |
|   | +0.05142   | ain z  | 9. 88914  | 2 = 00 40.0  | sin Z 9. 98469  | 2 - 10 40.0  |
| cos Δ' cos z' cos   | Z' 0.24329n  |  |   |  |   |  |
| sin z' sin  |  |  |   | 0.0044   | -l  |  |
| eos<br>sin z sin  | Z 9. 87383   |  | COS Z   | 9. 80111<br>9. 39076   | sin z' 9.88902<br>sin Z' 9.98646  |  |
| ein s ein Z cos<br>cos z cos  | A 9. 24164n<br>Z 9. 21749  |  |   |  |   |  |
|   | -1.26696   |  | A for t   | Freenwich 9h 900<br>red 4 90   | 28' 27"<br>32 26  |  |
| 004   | Δ 7.97469n   |  |   | nce  |   |  |
| 000   | Δ 90° 32′ 26′  |  | Digore  |  | 4 01 log 2.3820<br>p. l. 0.2645   |  |
|   |  |  |   |  | 7= 23° 2.6465   |  |
|   |  |  |   |  | 0 94 07 0 00  |  |
|   |  |  |   | ***  | 8 <sup>h</sup> 52 <sup>m</sup> 37 <sup>s</sup> p. m.<br>0 26 07 a. m.   |  |
|   |  |  |   | ongitude 1   |   |  |
|   |  |  |   | ***  |   |  |
|   |  | [Set. II. Chrono   | I   | ***  | 0 26 30   |  |
| Tim   | P. 14 R  | •  | naeter, Ne  | ongitude 1   | 0 26 30   |  |
| 0h 41m<br>46  | 114.8  | Distance ⊙ and ( 90° 30° 4 29. 4   | meter, Ne   | ongitude 1   | 0 26 30   |  |
| 0h 41m  | 114.8  | Distance @ and a   | meter, Ne   | ongitude 1<br>gus 544. Blunt sexta   | 0 26 30<br>nt.]   | d  |
| 0 <sup>h</sup> 44 <sup>m</sup><br>46<br>48<br>50<br>Mean 9 47   | 114.8<br>15.0<br>22.4<br>23.4  | Distance (and a 20 4 28 4 27 3   | meter, Ne   | ongitude 1<br>gus 544. Blunt sexta   | 0 26 30<br>nt.]   | cos φ 9, 5060<br>cos δ 9, 9541   |
| 0 <sup>h</sup> 41 <sup>m</sup> 46 48 50  Mean 0 47 Δ T +51  | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40  | Distance ⊙ and a 90° 30° 4 20 4 28 4 27 36   | meter, Ne   | gus 544. Blunt sexta  9.97843  9.58363  cos \$ 9.583             | 0 26 30  nt.]  ain \$\phi\$ 0.97643  sin \$\phi\$ 9.98359  9.18359  | cos φ 9, 5060<br>cos δ 9, 904°<br>cos ε 9, 46σ0  |
| Mean imo 10 38 Sidereal time 5 41   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40  | Distance ⊕ and a 29 4 28 4 27 3 90 29.2 Semid. ⊙ 15.8                                      | meter, Ne   | 9. 97843 Con # 9. 8 9. 58363 Con # 9. 8 9. 58363 Con # 9. 8 9. 4050 Refr. = -  | nt.]  ain \$\phi\$ 0.07643  sis44 ain \$\phi\$ 0.07643  sis49 20013  -1.2 8.96841   | cos \$\phi\$ 9.5060<br>cos \$\phi\$ 9.954'<br>cos \$\phi\$ 9.46e0<br>Refr. == 3.                                       |
| 0 <sup>h</sup> 41 <sup>n</sup> 46<br>48 50<br>Mean 1 0 47<br>Δ T +51<br>Mean time 10 38<br>Sidereal time 5 41<br>α(°) 7 07  | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40  | Distance ⊙ and c<br>90° 30′ 4<br>20° 4<br>28° 4<br>27° 3<br>Semid. ⊙ 15.8<br>Semid. € 16.1 | meter, Ne   | 9. 97843 Cos \$ 9.8 9.5833 Cos \$ 9.4 9.5 8405 Refr. =   | 00 26 30  nt.]  sin \$\phi\$ 0.07643  sin \$\phi\$ 0.07643  -1.2  -1.1  + 0.20702   | cos \$ 9,5060<br>cos \$ 9,954°<br>cos \$ 9,4660<br>Refr. = -3.<br># = +57.   |
| 0 41 41 46 48 50    Mosn D 47 +51    Mean timo 10 38   Sidereal timo 5 41 α 7 07 α 0 50   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13  | Distance ⊙ and c<br>90° 30′ 4<br>20° 4<br>28° 4<br>27° 3<br>Semid. ⊙ 15.8<br>Semid. € 16.1 | meter, No. 2. 2. 2. 3. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. | gua 544. Blunt sexta  9.97643  | 00 26 30  n6.]  sin \$\phi\$ 0.97643  sin \$\phi\$ 2.2013  1.2  1.1  1.7.5  1.10  1.10  2.3702  3.38056   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4   46   46   50   50   47   46   46   50   50   10   10   10   10   10   10  | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13<br>40 = 72 25  | Distance ⊙ and c<br>90° 30′ 4<br>20° 4<br>28° 4<br>27° 3<br>Semid. ⊙ 15.8<br>Semid. € 16.1 | I meter, Ne 2   | 9. 97843 Cos \$ 9.8 9.5833 Cos \$ 9.4 9.5 8405 Refr. =   | 00 26 30  nt.]  sin \$\phi\$ 0.07643  sin \$\phi\$ 0.07643  -1.2  -1.1  + 0.20702   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 44 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4  | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13  | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, No. 2. 2. 2. 3. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. | gua 544. Blunt sexta  9.97643  | 00 26 30  n6.]  sin \$\phi\$ 0.97643  sin \$\phi\$ 2.2013  1.2  1.1  1.7.5  1.10  1.10  2.3702  3.38056   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4 4 4 6 6 6 7 7 7 1 2 5 1 4 6 6 7 7 1 2 5 1 6 6 7 8 8 6 7 8 8 6 7 8 8 6 7 8 8 6 7 8 8 6 7 8 8 6 7 8 8 8 6 7 8 8 8 8   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13<br>4021°25'<br>4072 55<br>32'.6<br>15.0  | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne  2 0 0 0 8 - sin φ sin δ - + coa z sin z            | gus 544. Blunt sexta  9. 97843  9. 58363  0. 56006  9. 41050  0. 24536  9. 88542  9. 88542  9. 88540   | 00 26 30  nt.]  100009  | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 9 4 4 1 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13<br>40 = 21° 25'<br>40 = 72 55<br>32'.6   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne  2 0 0 0 8 - sin φ sin δ - + coa z sin z            | 9. 97843 Coa \$ 9.8 9.5863 Coa \$ 9.8 9.5863 Coa \$ 9.8 9.5863 Coa \$ 9.8 9.5863 Coa \$ 9.8 9.5863 Coa \$ 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8  | 0 26 30  n6.]  10.0009  | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 9 4 4 1 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>13<br>40 = 21° 25'<br>40 = 72 55<br>32'.6<br>15.0   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne   | 9. 97843   | 00 26 30  nt.]  100009  | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 9 41 46 48 50 Moan 1 9 47 +51 1 46 1 46 1 46 1 46 1 47 +51 1 47 1 47 1 47 1 47 1 47 1 47 1 47 1   | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>33<br>40 = 72 55<br>32'.6<br>15.0<br>2'. 8, 2407 n<br>2'. 8, 2407 n<br>+0.04964   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne   | 9.97643 cos \$ 9.8 (1.0 to \$ 9. | 00 26 30  nt.]  100009  | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4 4 4 6 6 6 7 7 4 7 4 6 1 8 6 6 7 7 4 7 4 6 1 8 6 7 7 7 4 6 1 8 6 7 7 0 7 4 6 1 8 6 7 7 0 7 4 6 1 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 6 7 8 8 8 6 7 8 8 8 8 | 114.8<br>15.0<br>22.4<br>23.4<br>19<br>40<br>59<br>53<br>33<br>33<br>40 = 72 55<br>32'.6<br>15.0<br>2'. 8, 2407 n<br>2'. 8, 2407 n<br>+0.04964   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne  z z z z z z z z z z z z z z z z z z                | 9. 97843   | 0 26 30  n6.]  n6.]  n6.]  n6.]  n6.]  nin   n6.]  ni   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4 4 1 4 6 6 50 Moan 1 9 47 1 451 1 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  | 114.8 15.0 22.4 19 19 40 40 59 53 33 13 40 210 25 55 32.6 40 27 55 32.6 40 60064 40  | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne  z z z z z z z z z z z z z z z z z z                | 9.97843  | 0 26 30  n6.]  n6.]  n6.]  ain   0 9.7643  ai   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4 4 1 4 6 4 8 5 0 4 7 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 114.8 15.0 22.4 19 19 40 40 59 53 33 13 40 210 25 55 32.6 27.5 32.6 40.00152 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.00164 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.001664 40.0016664 40.00 | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne  z z z z z z z z z z z z z z z z z z                | 9.97843  | 0 26 30  n6.]  n6.]  n6.]  n6.]  n6.]  nin   n6.]  ni   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 0 4 4 1 4 6 6 50 Moan 1 9 47 1 451 1 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6  | 114.8 15.0 22.4 15.0 22.4 19 40 40 59 53 33 13 13 24 40 212.5 55 32.6 27 8.2407 n 27 9.16752n 40.04064 27 9.217066 27 9.342906 40 9.215644   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne   | 9. 97843   | 00 26 30  n6.]  ain \$\phi\$ 0.97643  sin \$\phi\$ 9.97643  sin \$\phi\$ 9.2013  1.2  1.1  1.2  1.7'.5  cos \$Z\$ 0.380563  sin \$Z'\$ 9.88598  sin \$Z'\$ 9.88598  sin \$Z'\$ 9.98418  2.22  2.4 178  2.4 22'  2.4 178  3.0 96 64 22'  2.4 178   | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 09 41 46 48 50 Mean 10 47 +51 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 114.8 15.0 22.4 15.0 22.4 19 40 40 59 53 33 13 13 24 40 212.5 55 32.6 27 8.2407 n 27 9.16752n 40.04064 27 9.217066 27 9.342906 40 9.215644   | Distance ⊙ and c 90° 30′ 4 20 4 28 4 27 3 Semid. ⊙ 16. 1                                   | meter, Ne 52 2 2 3 3 4 4 4                                    | 9.97843  | 00000 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.08598 ain \$\pi\$ 0.86598 | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |
| 09 41 46 48 50 Mosn 0 47 +51 46 50 Mosn 10 47 +51 Mean time 10 38 Sideroal time 5 41 4 51 4 51 4 51 4 51 4 51 4 51 4 5  | 114.8 15.0 22.4 15.0 22.4 19 40 40 59 53 33 13 13 20 40 212.25 55 32.6 40.272.5 50 27.6 40.04064 27.0 217069 27.0 27.0 27.0 27.0 27.0 27.0 27.0 27.0   | Distance © and a 900 Str 4 20 4 28 4 27 3 Semid. 0 15.8 Semid. 0 10.1 1                    | meter, Ne 52 2 2 3 3 4 4 4                                    | 9. 97843   | 00000 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.07643 ain \$\phi\$ 0.08598 ain \$\pi\$ 0.86598 | cos \$\phi\$ 0.5060 cos \$\phi\$ 9.93470 cos \$\phi\$ 9.4660  Refr. = -3. \$\pi = +57.\$  \$Z = 759 48'. \$Z' = 76 41. |

## Observation for time at Point Barrow, Alaska, February 21, 1883.

[A. C. Dark, observer. Chronometer, Bond No. 235 (sidereal). Chevallier sextant.]

|                  |          |     |            | (Alt          | itu      | les of Ju | piter.}                |     |               |            |
|------------------|----------|-----|------------|---------------|----------|-----------|------------------------|-----|---------------|------------|
|                  | Ti       | me. |            | Double        |          |           | Double                 |     |               |            |
|                  | $20^{h}$ |     |            |               | 50       |           | Mørn.                  |     |               | 1.3        |
|                  |          | 02  | 20         |               | 88       | 58, 5     | # mm                   | 77  |               | 1.6        |
|                  |          | 14  | 52         |               | 58       | 34        |                        | 54  |               | 1.6<br>1.8 |
|                  |          | 07  | 25         |               | 88       | 12        | Brod u.s.<br>Brod iiii | 16  |               | 1.1        |
|                  |          | 141 | 22<br>20 . | 8             | 58<br>57 | 52. 3     | Broad and              | 10  | 40            |            |
|                  |          | 10  | 30         | 3             | 57       | 41. 3     | nin (s                 |     | 9, 03         | 161        |
|                  |          | U   | 30         |               | 01       | 41.0      | $\sin (a-d)$           |     | 9, 01         |            |
| Mean             | 20       | 06  | 25         |               | 88       | 19.7      | BOC (#-#)              |     | 0, 01         |            |
|                  |          |     |            | Index =       |          | +.8       | 80C Z                  |     | D. <b>6</b> 6 | 144        |
| On arc           | 1        | 11  | 10"        | h' =          | 29       | 10, 2     | tan *åt                | -   | 9, 63         | 110        |
| ) ff are         |          |     | 50         | Refraction =- |          | -1.7      |                        | 660 | 36            |            |
|                  | -        |     |            |               | _        |           |                        | 4h  | 201           |            |
| Index correction | 111      | +0  | V. B       | 1:-           | 60       | 51. 5     | 6.00                   | 5   | 22            | 46         |
|                  |          |     |            | φ==           | 71       | 23.0      |                        | -   |               |            |
|                  |          |     |            | 8             | 22       | 50.8      | Local sidereal time =  | 9   | 49            | 10         |
|                  |          |     |            | 0             | 155      | 13. 3     | Chronometer time=      | 8   | 06            | 23         |
|                  |          |     |            | 2#            | 100      | 15. 5     | $\Delta T = $          |     | 42            | 4          |

## Observation for longitude, Point Barrow, Alaska, February 20, 1883.

[A. C. Dark, observer. Chronometer, Bond 235 (sidereal). Chevallier sextant.]

|                |   | 37<br>39              | 37°<br>56<br>10. 5<br>57<br>50<br>51. 5 |   | Distance mod 530   | n and Jupit<br>05' 10"<br>07 40<br>10 00<br>12 00<br>13 30<br>14 20 | er.   | Longitude<br>Washingt<br>Sidereal t | ime  |  | 1 16   |
|----------------|---|-----------------------|---|---|--|---|---|-------------------------------------|--|--|--------|
| Side re o      | 4 d = 1                                       | 2) 38<br>1 42<br>2 20 | 45<br>49<br>25                          |   | Misread by  53  Index confection = Semi-di, d =  | 10. 4<br>15<br>25. 4<br>+- 8<br>15. 0                               |   |                                     | e interval   | 19 38<br>5 18                                | 27     |
|                | 14=   | 3 17<br>5 58          | 24<br>18                                |   | $     \begin{array}{r}       \Delta' = 53 \\       8 \ q = 11 \\       8 24 = 22     \end{array} $ | 34. 6   |   |                                     |  |  |        |
| sin ø<br>s.n ö | 9, 97662<br>9, 79170<br>9, 56832<br>8, 86870n |                       | cos ¢ cos ċ cos t Refr. =               | 9, 50449<br>9, 96405<br>9, 40016n<br>—3, 1              | sin 🕏<br>sin 8   | 9, 97662<br>9, 30250<br>9, 27912<br>9, 30943                        | Moon.  cos   cos   cos   cos   cos   t  Refr. = | 9. 50449<br>9. 90107<br>9. 81387    | 1  | 9, 77247<br>9, 05390<br>-0, 09215            | h<br>i |
| cos z<br>sin z | 9. 47158<br>9. 98006                          |                       | Z=-                                     | 72° 46′.2<br>72° 43°.1                                  |  | 9. 59557<br>9. 96336  |   | +50.6<br>66° 47′.5<br>67° 35.9      | $\cos \Delta' - \cos z' \cos Z$ $\sin z' \sin Z'$ $\cos A$ $\sin z \sin Z$ | 9, 68032<br>9, 94580<br>9, 73446<br>9, 94342 | 3      |
| am a           | 8. 00000                                      |                       | 008 Z'                                  | 9. 47286<br>9. 58104                                    | sin z'   | 9, 97393<br>9, 96593  | <i>a</i>  | 01 33.9                             | cos A sin z sin Z<br>cos z cos Z   | 9. 07788<br>9. 06715<br>0. 00510             | 3      |
|                |   |                       |   |   |  |   |   |                                     | $\cos \Delta$ $\Delta =$ $\Delta$ for Greenwich $0^b =$ Difference =       | 9. 77307<br>53° 37<br>53 14                  | 01     |
|                | ide of Poin                                   |                       |   | 0 <sup>h</sup> 25 <sup>m</sup> 49 <sup>e</sup><br>+1 25 |  |   | time 0h   |                                     | log.   | 3, 1526<br>0, 2901                           | 41     |
|                | ngitude                                       |                       | _                                       |   |  |   | 10  |                                     | Greenwich time   | 3.4427<br>46m 11°                            |        |

Reduction of observations for azimuth of magnetic marks at the United States meteorologic and magnetic polar station, Uglaamie, Alaska.

[A. C. Dark, observer.]

| ovember 21, 1881. Jupiter." Stackpole theodolite.   | July 25, 1882. Sun.† Fauth<br>theodolite.].  | [July 25, 1882. Sun. Fauth<br>theodolite.]   | [August 31, 1882, Sun.; Fau<br>theodolite.]   |
|---|--|--|---|
| Ver. circle. Hor. circle. D= 2e 40' 880 42'.5 28 55 00 52 R= 149 29 92 04.6 149 00 93 20.5  A'= 290 48'.8 refr: = -1.7 A= 29 47.1 p= 77 3 24.7 2s = 174 20.5 s = 87 14.8 p-3 = 15 57.1 p-4 = 15 57.7 p-7 3 24.7 2s = 174 20.5 s = 87 14.8 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-4 = 15 57.7 p-3 = 15 57.7 p-3 = 15 57.7 p-4 = 15 57.7 p-4 = 15 57.7 p-3 = 15 57.7 p-4 = | R. Ver. circle.  = 146° 50′ 220° 21′ 147 10 360 45 147 20 302 00 147 26 302 00 147 26 302 00 147 15 360 12 147 15 360 12 147 14 306 20    North Park 1 17.7   p 70 28.5  2s 174 27.0  s 87 13.5  - 4 51 32.7  s - p 16 45.0  sin (s - h) 9.9109 sec (s - p) 0.0188 sec s 1.3150 tan¹ A 138° 02′ Hor. ctr. = 362 40′  North reads = 73 42′  Mark reads = 120 17 | D. Ver. circle.  = 211 24' 3080 10' 211 10 307 10 211 10 307 38  r = 211 12 308 50 211 17 300 14 211 13 310 40 | Ver. circle   Hor circle, L = 24° 08° 240° 36° 224 00° 244 00° 225 00° 244 00° 225 00° 244 00° 225 00° 245 00 |
|   | M'k E.of N. = 46 35  | M'k E. of N. = 46 37   | Mark reads = 180 00<br>M'k E, of N. = 49 09   |

Station: First magnetic observatory, first position, magnetometer pier. Mark, wire on dwelling house.
 Station: First magnetic observatory, second position, magnetometer pier. Mark, 800 yards north (magnetic) from observatory, fishion: Second magnetic observatory, declinometer pier. Mark, same as on July 25, 1825.

H. Ex. 44---72

9, 77247 9, 05390n -0. 09215 9, 68032 9, 94586 9, 73446 9, 94342 9. 67788 9. 06715 +0.00510 9. 77307 53° 37' 42" 53 14 01 23 41 3, 1526 0, 2001 3. 4427 46m 11°

17 39 16 21 57 13

19 38 49 5 18 27

14 20 22

## APPENDIX No. 2.

OBSERVATIONS MADE AT WASHINGTON, D. C., IN 1881 AND 1884, FOR DETERMINING THE CONSTANTS OF THEODOLITE MAGNETOMETER NO. AVAND OF KEW DIP CIRCLE NO. 23, TOGETHER WITH THE COMPUTATION AND A RECAPITULATION OF RESULTS.

[Computer: E. H. Courtenay.]

Observations to determine the value of one scale-division of the long magnet L<sub>ij</sub>, accompanying theodolite magnetometer No. 11, made at the Magnetic Observatory on Capitol Hill, Washington, D. C., ty M. Smith, in June, 1881, and by J. E. Maxfield, February 5, 1884.

| 24  | et 1.   | 8   | et 2.  |   | let 3.   | 94  | let 4.   | 8   | let 5.  |   | et 6.   |
|---|---|---|--|---|--|---|--|---|---|---|---|
| Scale.  | Circle<br>reading.  | Scale.  | Circle<br>reading.   | Scale.  | Circle<br>reading.   | Scale.  | Circle<br>reading.   | Scale.  | Circle<br>reading.  | Beale.  | Circle<br>reading.  |
| 0<br>10<br>20<br>30<br>40<br>50<br>60<br>70<br>80 | 102 04<br>101 27, 5<br>100 59<br>100 13<br>19 36<br>19 00<br>198 23, 5<br>197 44, 5<br>97 06, 5   | 0<br>10<br>20<br>30<br>40<br>50<br>60<br>70<br>80 | 0 7<br>102 13. 5<br>101 37. 75<br>101 00. 25<br>100 22. 25<br>199 45. 75<br>199 08. 25<br>199 33. 0<br>197 56. 25<br>197 18. 5 | 0<br>10<br>20<br>30<br>49<br>50<br>60<br>70<br>80 | 58 47, 25<br>58 11, 5<br>57 33, 75<br>56 56<br>76 19, 25<br>55 43<br>55 43<br>55 43<br>55 43<br>55 43<br>55 43<br>56 53 49, 75 | 0<br>10<br>20<br>30<br>40<br>50<br>60<br>70<br>80 | 58 41.75<br>58 07.25<br>57 29.25<br>56 52.75<br>56 13.5<br>55 40<br>55 01.25<br>54 23.75<br>59 46 25 | 80<br>70<br>60<br>80<br>40<br>30<br>20<br>10<br>0 | 58 46, 25<br>54 23, 25<br>55 66<br>50 37, 25<br>56 12, 5<br>56 49<br>57 25, 75<br>58 62, 75<br>58 49, 75<br>56 12, 94 | 80<br>70<br>60<br>50<br>40<br>30<br>20<br>10<br>0 | 175 14<br>175 52<br>176 24<br>177 04<br>177 40<br>178 17<br>178 54<br>179 29 77<br>180 06 5 |
| 40<br>30<br>20<br>10<br>9<br>10<br>20<br>10       | 99 36 1<br>2 27 9<br>1 51 4<br>1 13 9<br>0 36 9<br>0 00 1<br>0 36 1<br>1 12 6<br>1 51 6<br>2 29 6 | 40<br>30<br>20<br>10<br>0<br>10<br>20<br>10       | 99 46.17<br>2 27.3<br>1 51.6<br>1 14.1<br>9 36.1<br>9 00.4<br>9 37.9<br>1 13.2<br>1 40.9<br>2 27.7                             | 40<br>30<br>20<br>10<br>0<br>10<br>20<br>30<br>40 | 2 28. 2<br>1 52. 4<br>1 14. 7<br>0 36. 9<br>0 00. 2<br>0 36. 1<br>1 13. 8<br>1 53. 1<br>2 29. 3                                | 40<br>30<br>20<br>10<br>0<br>10<br>20<br>30<br>40 | 2 26.7<br>1 52.2<br>1 14.2<br>0 37.7<br>0 01.6<br>0 35.1<br>1 13.8<br>1 51.3<br>2 28.8               | 40<br>30<br>20<br>10<br>0<br>10<br>90<br>30<br>40 | 2 26. 7<br>1 50. 7<br>1 12. 9<br>0 35. 7<br>0 00. 4<br>0 36. 1<br>1 12. 8<br>1 49. 8<br>2 27. 8                       | 40<br>30<br>20<br>10<br>0<br>10<br>20<br>30<br>40 | 2 26.6<br>1 48.6<br>1 12.6<br>0 36.6<br>0 00.6<br>0 36.4<br>1 13 4<br>1 49.2<br>2 25 0      |
| 200   | 12 20.1   | (H)   | 12 18. 2   | 200   | 12 24.7<br>=3'.724   | 200   | 12 21.4  | 200   | 12 12.9<br>=3/.665  | 200   | 12 09. 0<br>=3'.650   |

Mean of all =3'.690

### Observations to determine moment of mass of the long magnet $L_{\mu}$ .

[Pate June 10, 1881. Station, Schott's Observatory, Washington, D. C. Instrument, theodolite magnetometer No. 11. Magnet, L. Mass ring not used. Chronometer, P. Walther's No. 2780; daily rate, 236-4, gaining on mean time. Observer, M. Smith.]

| No. of oscil-<br>lations.              | Chronometer<br>time.   | Temp.                   | Extrem              | ne scale<br>lings.    |      | f 100 oa-<br>tiona.                                | Computation.   |   |   |
|--|--|-------------------------|---------------------|-----------------------|------|--|--|---|---|
| 0<br>10<br>20<br>30<br>40              | h. m. s.<br>10 19 35.0<br>20 28.0<br>21 21.0<br>22 14.0<br>28 07.0           | 63, 0                   | 29. 9               | 60. 1                 | 994. | 0.   |  |   |   |
| 100<br>110<br>120<br>130<br>140<br>150 | 24 00.0<br>10 28 25.0<br>29 18.5<br>30 11.0<br>31 04.5<br>31 57.5<br>32 04.5 | 64. 0                   | 35, 5               | <b>62. 9</b> 58. 8    | 8    | 50, 0<br>50, 5<br>50, 0<br>50, 5<br>50, 5<br>50, 5 | $T^{2} = T^{2} \left(1 + \frac{\hbar}{f}\right) (1 - \frac{\hbar}{f})$ (1 - Observed time of 100 oscillations Time of one oscillations | *********                                 | 8,<br>530, 33<br>5, 30<br>-0, 01              |
| 20                                     | Means sient of torsion.  | Differences.            | Value of<br>divisio | one scal<br>n = 3',69 |      | 50, 33   | $t = 0.00085$ $t = t = +0.1$ $mH := \frac{\pi^2 M}{T^2}$ Temp. $t = 63^\circ$ . 4  | $T^{*}$ $1 + \frac{h}{f}$ $1 - (t' - t)q$ | Log'n<br>0, 723<br>1, 446<br>0, 000<br>9, 999 |
| 210 24. 1<br>30 26. 1<br>120 30. 0     |  | 1. 70<br>3. 00<br>5. 10 |                     | + "<br>ar. eo.)       | -    | 3. 73312<br>6. 26761                               |  | $T^{z}$                                   | 1.447   |
| Me                                     | v = 2.45   |                         | 1                   | $+\frac{h}{f}$        |      | 0.00073  |  |   |   |

Observations to determine the moment of mass of  $\hat{m}$  ong magnet  $\hat{L}_{ij}$ , &c.—Continued.

(Date, June 10, 188). Station, Washington, D. C. Instrument, No. 11. Magnet, Lip. Mass ring auspended. Chronometer, P. Walther's No. 2780; daily rate, 239-4, gaining on mean time. Observer, M. Smith.

| No. of oscil-<br>lations.           | Chronometer<br>time.  | Temp.                   | Extreme scale<br>readings.           | Time of 80 os-<br>cillations.                | Computation.                     |
|-------------------------------------|---|-------------------------|--------------------------------------|--|----------------------------------|
| 0<br>8<br>16<br>24<br>32<br>40      | A. m. s.<br>11 42 49.0<br>43 49.5<br>44 50.5<br>45 51.0<br>46 52.0<br>47 53.0 | 63, 5<br>62, 5          | 41. 1 62. 9                          | fit. d.                                      |                                  |
| 80<br>88<br>96<br>104<br>112<br>120 | 11 52 57, 5<br>53 58, 5<br>54 59, 5<br>56 00, 0<br>57 01, 0<br>58 02, 0       | 64. 0                   | 46. 2 57. 3                          | 10 08, 5<br>09, 0<br>09, 0<br>09, 0<br>09, 0 | Observed time of 80 oscillations |
|                                     | Means   | 63. 3                   |                                      | 10 08.02                                     | Log'ma<br>T 0, 80028             |
| Coeffic                             | cient of torsion.   | ,                       | Value of one so                      | 1  | t'—t== −0.1                      |
| Tora. Se                            | ale. Mean.  | Differ-<br>ences.       | division = 8'.                       | 0 Logarithms.                                | $mH = \frac{\pi^2 M}{T^2}$       |
| 210 40, 8<br>30 29, 9               | 57. 3 51. 75<br>62. 0 51. 40<br>68. 8 40. 35<br>73. 7 51. 90                  | 0. 35<br>2. 05<br>2. 55 | v=4'.57<br>5400'+v'<br>5400 (ar. co. | 3, 7327 <b>6</b><br>6, 36701                 |                                  |
| Me                                  | san r : 1, 2375   |                         | 1+ 1                                 | 0. 00087                                     |                                  |

[Date, June 11, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L<sub>n.</sub> Mass ring not used. Chronometer, P. Walther's No. 2780; daily rate, 236.4, gaining on mean time. Observer, M. Smith.]

| No. of oscil-<br>lations.                               |                             | ome <b>ter</b><br>me.   | Temp.                   | Extreme scale readings.                 | Time of 100 os-<br>cillations.                       | Computation.   |
|---|-----------------------------|---|-------------------------|---|--|--|
| 0<br>10<br>20<br>30<br>40<br>50                         | A. n<br>10 0<br>0<br>0<br>0 | 3 45, 9<br>4 39, 4<br>5 33, 2<br>6 27, 1<br>7 20, 4               | 72.0                    | 31.4 57.1                               | 996. #.  | •  |
| 100<br>110<br>120<br>130<br>140<br>150                  | 1                           | 3 40.9<br>3 34.1<br>4 27.6<br>5 20.8<br>6 13.7<br>7 07.2<br>Means | 73.0                    | 33. 2 52. 1                             | 8 55. 0<br>54. 7<br>54. 4<br>53. 7<br>53. 3<br>53. 4 | Observed time of 100 oscillations  |
| Coeffi  | cient of                    | torsion   |                         |   |  | t'-t=-4.3 T'3 1.4528   |
| Tors. Scircle.  | ale.                        | Mean.   | Differ-<br>ences.       | Value of one scale<br>division = 3', 69 | Logarithms.  | $mH = \frac{\pi^2 M}{\hat{q}^2}$ 1+ $\frac{f}{f}$ 0.0005<br>1- $(b'-t)q$ 0.0015<br>Temp. $t = 76^\circ$ . 8 $T^0$ 1.4549 |
| 120   33, 2<br>210   32, 1<br>30   24, 1<br>120   33, 1 | 55. 2<br>55. 9              | 42. 65<br>43. 65<br>40. 00<br>42. 15                              | 1. 00<br>3. 65<br>2. 15 | v = 6'.3 $5400' + v'$ $5400  (ar. co.)$ | 3, 73290<br>6, 26761                                 |  |
| Me  | an v =                      | 1. 70   |                         | $1 + \frac{h}{f}$                       | 0, 00051   |  |

E CONSTANTS ER WITH THE nying theodoington, D. U.,

12 09. 0 .650

#. . 530, 33 . 5, 3033 . - 0, 0145 5, 2888 Log'ms. 0.72336

1. 44671 0.00073 9. 90996 1.44740 Observations to determine the moment of mass of the long magnet  $L_{ii}$ , &c.—Continued.

[Date, June 11, 188]. Station. Washington, D. C. Instrument, No. 11. Magnet, L<sub>II</sub>. Mass ring suspended. Chronometer, P. Walther's No. 2780; daily rate, 23694, gaining on mean time. Observer, M. Smith.]

| No. of oscil-<br>lations.  | Chronometer time.  | Temp.                   | Extreme scal<br>readings.            | Time of 80 os-<br>cillations.           | Computation.  |
|--|--|-------------------------|--------------------------------------|---|---|
| 8<br>16<br>24<br>32<br>40<br>80<br>88<br>96<br>104<br>112<br>120 | h. m. e.<br>11 01 28 4<br>02 29.7 0<br>04 32.5 0<br>05 33.0 0<br>04 32.5 0<br>05 33.7 0<br>06 35.1 | 75. 0<br>76. 0<br>75. 5 | 23. 9 62. 8<br>29. 1 51. 8           | m. s.  10 13.7 13.6 13.7 13.4 13.2 31.1 | Observed time of 80 oscillations  |
| m .  | ale. Mean.   | Differ-                 | Value of one se<br>division =3'.     |   | $mH = \frac{\pi^2 M}{T^2}$ 1+ $\frac{h}{f}$ 0.00145<br>1-(t'-t)q 0.0048<br>Temp, t=76°, 8 $T^2$ 1.76893 |
| 120 29, 1<br>210 17, 2<br>30 19, 2<br>120 15, 1                  |  | 6. 10<br>9. 75<br>3. 70 | v=18'.0<br>5400'+-v'<br>5400 (ar. co | 9. 78384<br>0. 26701                    |   |
| M  | ean v=4.89   |                         | $1+\frac{h}{f}$                      | 0.00145                                 | İ   |

[Date, June 11, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L.,. Chronometer, P. Walther's No. 2780; daily rate, 246-4, gaining on mean time. Observer, M. Smith.]

| No. of os<br>lations                   |                         | Chro   | no <b>me</b> ter<br>ime.   | Temp.             | Extrem               | ie sc <b>ale</b><br>ings. | Time of<br>ciliat |  | Computat  | ion.  |
|--|-------------------------|--------|--|-------------------|----------------------|---------------------------|-------------------|--|---|---|
| 0<br>19<br>20<br>30<br>40              |                         | 11 4   | m. s.<br>12 43.6<br>13 37.2<br>14 30.4<br>15 24.0<br>16 17.5         | 77. 0             | 25. 3                | 56. 1                     | m.                | 2.   |   |   |
| 50                                     |                         | 4      | 7 11.2   | 78. 0             | 30. 2                | 51. 1                     |                   |  |   |   |
| 100<br>110<br>120<br>130<br>140<br>150 |                         | 1      | 51 38, 2<br>52 31, 9<br>53 25, 2<br>54 19, 1<br>55 13, 1<br>56 06, 9 | 79. 0             | 34. 6                | 47. 2                     | 8                 | 54. 6<br>54. 7<br>54. 8<br>55. 1<br>55. 6<br>55. 7 | Observed time of 100 oscillar<br>Time of one oscillation<br>Correction for rate | 5, 350  |
|  | 1                       |        | Means  | 78. 0             |                      |                           | 8                 | 55. 08   |   | Log'm<br>T 0.727                                      |
| c                                      | oeffic                  | ient o | f torsion  |                   |                      |                           |                   |  | t'-t=+10.2  | T'2 1. 4544   |
| Tors.                                  | Sea                     | le.    | Mean.  | Differ-<br>ouces. | Value of<br>division | one scale<br>n = 3, 69    | Loga              | rithms.  | $mH = \frac{n^2M}{T^4}$ Temp. $t = 76^\circ.8$                                  | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ |
| 210                                    | 34. 6<br>22. 2<br>29. 9 | 64, 1  | 43. 15   | 4. 60             | v==8'.               | . 7                       |                   |  |   |   |
| 120                                    | 28. 1                   | 54. 1  | 41. 10   | 2, 55             | 5400°<br>5400        | + v'<br>(ar. co.)         |                   | 3. 73309<br>6. 26761                               |   |   |
|  | Me                      | ean es | -9 35  | -                 | 1-                   | h f                       |                   | 0. 00070   |   |   |

ntinued.

Chronometer, P.

8. 613. 45 7. 6681 ..... 0. 0209

T = 7.6472 Log'ms. T 0.88350

T\* 1.76700 + h 0.00145 - t)q 0.00048

T<sup>3</sup> 1.76893

No. 2780 ; daily

8. ....535. 08 ....5. 3508 ....-0. 0146

T = 5. 3362 Log'ms. T 0. 72723

 $T^2 = 1.45446$   $+ \frac{h}{f} = 0.00070$  -t)q = 9.99056  $T^3 = 1.45472$ 

### Observations to determine the moment of mass of the long magnet $L_{ij}$ , &c.—Continued.

[Date, June 11, 1881. Station, Washington, D. C. Instrument. No. 11. Magnet, Lin. Mass ring suspended. Chronometer, P. Walther's No. 2780; daily rate, 236-4, gaining on mean time. Observer, M. Smith.]

| No. of c<br>latio                   |                |                | nometer<br>ime.   | Temp.             | Extren                 | ne scale<br>ings.        | Time of 80 os-<br>cillations.                         | Con   | putation.  |
|-------------------------------------|----------------|----------------|---|-------------------|------------------------|--------------------------|---|---|--|
| 0<br>8<br>16<br>24<br>32<br>40      |                | 12             | 7. 8.<br>95 39.9<br>96 41.6<br>97 44.1<br>98 44.8<br>99 46.0<br>10 47.5 | 81. 0             | 30. 0                  | 57. 2                    | т. в.   |   |  |
| 80<br>88<br>96<br>104<br>112<br>120 |                |                | 5 54. 9<br>6 56. 4<br>17 58. 2<br>18 59. 5<br>20 01. 0<br>21 02. 6      | 81. 5             | 34. 1                  | 54. 0                    | 10 15. 0<br>14. 8<br>15. 1<br>14. 7<br>15. 0<br>15. 1 | Observed time of 80 osc<br>Time of one oscillation<br>Correction for rate |  |
|                                     |                | 1              | Means   | 81. 2             |                        |                          | 10 14.95  |   | Log'ma   |
|                                     | Coeffic        | cient of       | torsion   |                   |                        |                          |   | $t' - t = +4^{\circ}.4$ $mH = \frac{\pi^{\circ}M}{T^{\circ}}$             | T* 0.884   |
| Tora.                               | Se             | ale.           | Mean.   | Differ-<br>ences. | Value of<br>division   | 'one scale<br>n =:3', 69 | Logarithms.   | $mH = Tt$ Temp. $t = 76^{\circ}$ . 8                                      | $1 + \frac{h}{f} = 0.0005$ $1 - (t' - t)q = 0.9985$ $T^{2} = 1.7686$ |
| 120<br>210                          | 34. 1<br>29. 1 | 51. 0<br>63. 9 | 46. 50  | 2. <b>4</b> 5     |                        |                          |   |   |  |
| 30<br>120                           | 22. 1<br>22. 9 | 63. 1<br>64. 1 | 42. 60<br>43. 50  | 0. 90             | v 6<br>5400/<br>5400 ( |                          | 8, 73293<br>6, 26761                                  |   |  |
|                                     | M              | ean r          | 1.81  |                   | 1                      | + h                      | 0, 00054  |   |  |

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L.,.. Mass ring not used. Chronometer, Bond No. 188 M. T. Observer, M. Smith.]

| No. of o                               |                                 |       | ono<br>tim                       | met <b>er</b><br>e.                                | Temp.                   | Extren<br>read | ne scale<br>ings.         | Time of 100 os-<br>cillations.                 | Computation.  |                                      |
|--|---------------------------------|-------|----------------------------------|--|-------------------------|----------------|---------------------------|--|---|--------------------------------------|
| 0<br>10<br>20<br>30                    |                                 | 2     | m.<br>58<br>59<br>00             | 8.<br>35. 4<br>29. 1<br>22. 9<br>16. 6             | 76. 5                   | 22. 1          | 67. 1                     | 116. 8.  |   |                                      |
| 40<br>50                               |                                 |       | 02                               | 10. 3  | 78. 0                   | 28.8           | 60. 5                     |  |   |                                      |
| 100<br>110<br>120<br>130<br>140<br>150 |                                 | 3     | 07<br>08<br>69<br>10<br>11<br>12 | 32. 1<br>26. 0<br>20. 1<br>13. 9<br>07. 9<br>01. 9 | 79. 0                   | 34. 1          | 54. 5                     | 8 56.7<br>56.9<br>57.2<br>57.3<br>57.6<br>57.8 | Observed time of 100 oscillations   |                                      |
|  | 1                               |       | M                                | leans  | 77. 8                   | 1              |                           | 8 57.25  | Lo  | g'in                                 |
| Tors.                                  | oeffic<br>Sea                   |       | 1                                | orsion.<br>Mean.                                   | Differ-                 |                | 'one scale<br>u == 3′. 69 | Logarithms.                                    | $mH = \frac{\mathbf{r}^2 M}{T^2} \qquad \qquad \begin{array}{c} T^2 & 1 \\ 1 + f & 0 \\ \mathbf{T} \\ $ | . 7305<br>. 400-<br>. 0003<br>. 0033 |
| 60                                     | 34. 1<br>21. 1<br>21. 8<br>9. 8 | 70. 8 |                                  | 44. 3<br>45. 95<br>43. 50<br>44. 45                | 1. 65<br>2. 45<br>0. 95 |                | + v' [ar. co.)            | 3. 73277<br>6. 26761                           |   | . 4642                               |
|  | Mı                              | an v  | = 1                              | . 26   |                         | 1 -            | + 1                       | 0. 00038                                       |   |                                      |

Observations to determine the moment of mass of the long magnet  $L_{\prime\prime}$  &c.—Continued.

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L.,. Mass ring suspended. Chronometer, Bond No. 188. Observer, M. Smith.]

| No. of oscil-<br>lations.                       | Chronometer<br>time.   | Temp.                   | Extrem                  |                  | Time o |  | Compu   | tation.  |   |
|---|--|-------------------------|-------------------------|------------------|--------|--|---|--|---|
| 0<br>8<br>16<br>24<br>32<br>40                  | h. m. a.<br>3 26 53.5<br>27 55.2<br>28 56.9<br>29 58.7<br>31 00.3<br>32 02.1 |                         | 19. 8                   | 72. 4<br>68. 0   | m.     |  |   |  |   |
| 80<br>88<br>96<br>104<br>112<br>120             | 3 37 11.1<br>38 12.9<br>39 14.7<br>40 16.4<br>41 18.1<br>42 19.9<br>Means    | 82. 5                   | 30. 9                   | 61. 1            |        | 17. 6<br>17. 7<br>17. 8<br>17. 7<br>17. 8<br>17. 8 | Observed time of 80 oscilla<br>Time of one oscillation<br>Correction for rate | T'   | +0.000<br>=7.722<br>Log'ma                          |
|   | ient of torsion  |                         | Value of division       |                  | Loga   | rithms.  | $t'-t=-5^{\circ}.5$ $mH=\frac{\pi^{2}M}{T^{2}}$ Temp. $t=87^{\circ}.0$        | $T^{2}$ $1 + \frac{h}{f}$ $1 - (t'-t) q$ $T^{2}$ | 0. 8877<br>1. 7755<br>0. 0006<br>0. 0020<br>1. 7782 |
| 330 30. 9<br>60 33. 1<br>240 14. 9<br>330 31. 3 | 61. 1 46. 0<br>64. 9 49. 00<br>74. 4 44. 65<br>61. 9 46. 60                  | 3. 00<br>4. 35<br>1. 95 | v = 8'. 5400' - 5400 (c | + v'<br>ar. co.) |        | 3. 73308<br>6. 247 <b>61</b><br>0. 00069           |   | 7.   | 1.1102  |

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, Ly, Mass ring not used. Chronometer, Bond No. 188. Observer, M. Smith.]

| lations.  | Chro                             | nome<br>ime.                             | eter                                       | Temp.                           | Extren<br>read        | no scale<br>ings.       | Time of<br>cillat |  | Comp   | outation.   |
|---|----------------------------------|--|--|---------------------------------|-----------------------|-------------------------|-------------------|--|--|---|
| 0<br>10<br>20<br>30<br>40<br>50                     | 4                                | 59 4:<br>00 3:<br>01 3:<br>02 2:<br>03 2 | 8.<br>5. 5<br>9. 4<br>3. 3<br>7. 2<br>1. 1 | 84. 0                           | 16.1                  | 70. 8                   | m.                | #.<br>   | •  |   |
| 100<br>110<br>120<br>130<br>140<br>150              | •                                | 09 39<br>10 35<br>11 26<br>12 20         | 1.9<br>9.0<br>2.9<br>1.7<br>9.8            | 86.5                            | 31.1                  | 56.1                    | 8                 | 59. 4<br>59. 6<br>59. 6<br>59. 5<br>59. 7<br>59. 9 | Observed time of 100 or<br>Time of one oscillation.<br>Correction for rate | cillations  |
|   |                                  | Mea                                      | ns.  | 85. 3                           |                       |                         | 8                 | 59. 62   | $t'-t = -1^{\circ}.7$  | Log'ms<br>T 0.73214   |
| Coodi.  | ient o                           | l tors                                   | -  | Differ ences                    | Value of divisio      | one scale<br>a = 3′. 69 | Loga              | rithms.  | $mH = rac{\pi^2 M}{T^2}$<br>Temp. $t=87^\circ.0$                          | $ \begin{array}{ccc}  & T^{*2} & 1.46427 \\  & 1 + \frac{h}{f} & 0.00045 \\  & 1 - (t' - t) & q & 0.00065 \end{array} $ |
|   |                                  |  |  |                                 |                       |                         | 1                 |  |  | T <sup>3</sup> 1. 46532   |
| 330 31, 1<br>60   22, 0<br>240   17, 3<br>330 #9, 1 | 56. 1<br>69. 0<br>68. 4<br>54. 6 | 45.<br>12.                               | 60<br>.50<br>.85<br>.85                    | 1, 90<br>2, <b>6</b> 5<br>1, 00 | v = 5<br>5400<br>5400 |                         |                   | 3. 73281<br>6 20761                                |  |   |
| M   | ean t.                           | ± 1. 38                                  | è  |                                 | 1                     | , h                     |                   | 0.00042  |  |   |

tinued.

Chronometer,

....617.78 ....7.7216 ....+0.0009 T'=7.7225 ....Log'ms.

T' 0.88776

T'2 1.77552

h 0.00069

0.0 0.00203

T = 1.77824

Chronometer,

6. 539.62 5.3962 +0.0006 = 5.3968

Log'ms. 0. 73214— 1. 46427 0. 00042 0. 00063 1. 46532 Co-creations to determine the moment of mass of the long magnet  $L_n$  &c.—Continued. .

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, Ly. Mass ring suspended. Chronometer, Bond No. 188. Observer, M. Smith.]

| No. of c<br>lation                  |                                  |         | nometer<br>ime.   | Temp.                   | Extren               | ings.                   | Time o  |   | Compo   | itation.  |
|-------------------------------------|----------------------------------|---------|---|-------------------------|----------------------|-------------------------|---------|---|---|---|
| 0<br>8<br>16<br>24<br>32<br>40      |                                  | 4       | n. s.<br>24 48.1<br>25 49.9<br>26 51.9<br>27 54.0<br>28 55.9<br>29 57.9 | 86. 5                   | 30. 5                | 61. 9<br>5s. 9          | 171.    | g.  |   |   |
| 80<br>88<br>96<br>104<br>112<br>120 |                                  | 50.00   | 35 10, 2<br>36 12, 1<br>37 14, 1<br>38 16, 2<br>39 18, 1<br>40 20, 0    | 88. 0                   | 39. 9                | 50. 9                   | 10      | 22. 1<br>22. 2<br>22. 2<br>22. 2<br>22. 2<br>22. 2<br>22. 1 | Observed time of 80 oscil<br>Time of one oscillation<br>Correction for rate |   |
|                                     | Coeffic                          | cient o | Means<br>f torsion  | 87. 3                   |                      |                         | 10      | 22. 17  | t'-t=+0.3   | T Log'ms 0.8908 T 1.7817  |
| Tors.<br>circle.                    | Sea                              | ale.    | Mean.   | Differ-<br>ences,       | Value of<br>division | one scal<br>on == 3'.69 | 0. Loga | rithms.   | $mH=rac{\pi^2M}{T^2}$<br>Temp. $t=87^\circ$ . 0                            | $1 + \frac{h}{f} = 0.0007$ $1 - (\nu - t)q = 9.9998$ $T^2 = 1.7823$ |
| 330<br>60<br>240<br>330             | 39. 9<br>34. 2<br>16: 9<br>31. 1 | 69.8    | 45, 40<br>48, 05<br>43, 35<br>45, 45                                    | 2. 65<br>4. 70<br>2. 10 | v = 8 $5400'$        |                         |         | 3. 73309<br>6. 26761  |   | 1.100   |
|                                     | М                                | ean v = | = 2.36  |                         | 1-                   | + h                     | -       | 0.00070   |   |   |

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L. Moss ring not used. Chronometer, Bond No. 188. Observer, M. Smith.]

| No. of oscil-<br>lations.              | Chronometer<br>time.   | Temp.                   | Extren<br>read               | io scale<br>ings.       | Time of 100 or-<br>cillations.                 | Com  | putation  |
|--|--|-------------------------|------------------------------|-------------------------|--|--|---|
| 0<br>10<br>20                          | h. m. s.<br>4 51 52.2<br>52 46.1<br>53 40.2                      | 87. 0                   | 22. 1                        | 64. 9                   | m. s.  |  |   |
| 30<br>40<br>50                         | 54 34.3<br>55 28.4<br>56 22.5                                    | 87. 5                   | 27. 5                        | 59. 1                   |  |  |   |
| 100<br>110<br>120<br>130<br>140<br>150 | 5 00 52.9<br>01 47.0<br>02 41.0<br>03 35.1<br>04 29.3<br>05 23.2 | 88. 5                   | 32. 9                        | 53. 3                   | 9 00.7<br>00.9<br>00.8<br>00.8<br>00.9<br>00.7 |  | Second Content   Sec |
| 1                                      | $M_{\rm Call8}$  | 87.7                    |                              |                         | 9 00.80  |  | Log ma  |
| Coeffic<br>Tors. Sea                   | cient of torsion.  | Differ-<br>ences.       | Value of<br>divisio          | one scal<br>u=3'.69     | 6 Logarithms.                                  | $t-t = +0.7$ $mH = \frac{\pi^2 M}{T^2}$ Temp. $t = 87^\circ$ . 0 | $\begin{array}{c} T^{*} & 0.7330 \\ T^{*3} & 1.4661 \\ 1+\frac{h}{2} & 0.0004 \\ 1-(t^{\prime}-t)_{q} & 9.9997 \\ T^{\prime 2} & 1.4663 \end{array}$  |
| 1                                      | 53. 3 43. 10<br>75. 8 45. 00<br>50. 9 42. 00<br>65. 9 43. 20     | 1. 90<br>3. 00<br>1. 20 | v = 5/<br>5400′ -<br>5400′ ( | .61<br>+ v'<br>ar. co.) | 3, 73284<br>6, 26761                           |  |   |
| ·                                      | e in v = 1.52  |                         | 1                            | (- h                    | 0.00045  |  |   |

· Observations to determine the moment of mass of the long magnet L,, &c.-Continued.

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L<sub>II</sub>. Mass ring suspended. Chronometer, Bond No. 188. Observer M. Smith.]

| h. m. s.<br>5 17 45.1<br>18 47.1<br>19 49.0<br>20 51.1<br>21 53.2<br>22 55.3<br>5 28 05.9<br>29 08.0<br>30 09.9<br>31 11.9<br>32 14.1<br>33 10.2 | 89. 5<br>89. 5                                     | 28. 1  | 70. 1                                       |   | 20. 8<br>20. 9<br>20. 9<br>20. 8               | Observed time of 50 osci<br>Time of one oscillation   |  | 8.<br>620. 87<br>7. 7609   |
|--|--|--|---|---|--|---|--|--|
| 29 08.0<br>30 09.9<br>31 11.9<br>32 14.1<br>33 16.2  | 89. 5  | 33. 9  |   |   | 20. 9<br>20. 9<br>20. 8                        | Time of one oscillation   |  | 620, 87<br>7, 7609   |
| Means  | 89. 3  |  | 59. 2                                       |   | 20. 9<br>20. 9<br>20. 87                       | Correction for rate   | <b>T</b>   | + 0. 0000<br>7. 7618<br>Log'ms   |
|  | Differ-  | Value of or division   | no scale-<br>== 3'.69                       | Logar   | ithms.   | $t'-t=+2.°3$ $mH=\frac{\pi^2M}{T^3}$ Term, $t=879.0$  | $T = \frac{T^2}{1 + \frac{h}{f}} = 1 - (t' - t q)$   | 0. 8890<br>1. 7790<br>0. 0003<br>0. 0001<br>1. 7793  |
| 59. 2   46. 55<br>52. 8   47. 35<br>52. 9   48. 40  <br>73. 8   50. 65   | 0 80<br>1.05<br>2.25                               | 5400' +<br>5400 (at  | v'<br>r. co.)                               | 6   | . 26761  |   |  | 2. 1170  |
| 6.<br>36<br>35<br>73   | Mean.  2. 2   46. 55  2. 8   47. 35  2. 9   48. 40 | Mean Differences.  2 46.55 0 50  8 47.35 1.05  9 48.40 2.25  8 50.65 | Mean. Differ-<br>ences.  2.2   46.55   0.50 | Mean   Differ-<br>  Differ-<br>  Cinces   Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ-<br>  Differ- | Mean   Difference   Value of one acade   Logar | Mean   Differences   Differ | Mean.   Differences   Value of one scale division = 3',69   Logarithms.   $mH = \frac{\pi^2 M}{T^2}$   Temp. $t = 87^\circ$ , 0   0, 2   46,55   0, 50   1, 25   0, 5400' + x'   3, 73276   5400' + x'   5400' + x'   5400' + x'   3, 73276   5400' + x'   5400' + x'   3, 73276   5400' + x'   5400' + x'   3, 73276   5400' + x'   3, 73276   5400' + x'   54 | to of torsion. Value of one scale division = 3°,69 Using the second of |

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L. Mass ring not used. Chronometer, Bond No. 188. Observer, M. Smith.]

| No. of o                               |  | nometer<br>ime.  | Temp.                   | Extreme s                             |                | Time of<br>cillat |  | Con   | oputation.                              |   |
|--|--|--|-------------------------|---------------------------------------|----------------|-------------------|--|---|---|---|
| 0<br>10<br>20<br>30<br>40<br>50        | 5  | 78. 8. 61 43.1 52 37.2 53 31.1 54 25.3 55 19.4 56 13.5         | 89. 5<br>90. <b>0</b>   | 1                                     | 73. 4<br>34. 0 | m.                | 8.   |   |   |   |
| 100<br>110<br>120<br>130<br>140<br>150 |  | 00 44.5<br>01 38.9<br>02 33.0<br>03 27.1<br>04 21.1<br>05 15.1 | 91. 0                   | 29.8 5                                | 56. 4          |                   | 01. 4<br>01. 7<br>01. 9<br>01. 8<br>01. 7<br>01. 6 | Observed time of 100 o<br>Time of one oscillation<br>Correction for rate  | ****************                        | 541. 68<br>5. 416<br>. 000<br>5. 417<br>Log'ms<br>0. 7337 |
| Tors.                                  | Scale.   | torsion.<br>Mean.  | Differ-<br>ences.       | Value of one                          |                | Loga              | rithms.  | $t' - t = +3, \circ 2$ $mH = \frac{\pi^3 M}{T^2}$ Temp. $t = 87^\circ, 0$ | 1 - t - t - t - t - t - t - t - t - t - | 1. 4075<br>0. 0004<br>9. 9988<br>1. 4668                  |
| 60<br>240                              | 29. 8   56. 4<br>32. 6   57. 1<br>13. 5   70. 9<br>32. 9   53. 7 | 43. 10<br>44. 85<br>42. 20<br>43. 30                           | 1. 75<br>2. 65<br>1. 10 | v = 5′, 96<br>54′90′ + v<br>5400 car, | 30             |                   | 3, 73280<br>8, 26761                               |   |   |   |
|  | Mean v =   | 1. 37  |                         | $1+\frac{h}{f}$                       |                |                   | 0.00041  |   |   |   |

## Observations to determine the moment of mass of the long magnet L,, &c.-Continued.

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L<sub>iv</sub>. Mass ring auspended. Chronometer, Bond No. 188. Observer, M. S. ]

| No. of<br>latio                     |                                  |          | nometer<br>ime.   | Temp.                   | Extren                 | ne scale<br>ings.      | Time o  | f 80 os-<br>ions.                         | Com  | putation.   |
|-------------------------------------|----------------------------------|----------|---|-------------------------|------------------------|------------------------|---------|---|--|---|
| 0<br>8<br>16<br>24<br>32<br>40      |                                  | 6        | m. #.<br>18 39.9<br>19 42.0<br>20 44.1<br>21 46.0<br>22 48.0<br>23 50.1       | 91. 0                   | 18. 9                  | 74. 1<br>68. 2         | 276.    | 8.  |  |   |
| 80<br>88<br>96<br>104<br>112<br>120 |                                  | 200      | 29 01. 1<br>30 03. 2<br>31 05. 4<br>32 07. 5<br>33 09. 7<br>34 11. 9<br>Means | 92.5                    | 37.1                   | 55. 8                  | 10      | 21. 2<br>21. 3<br>21. 5<br>21. 7<br>21. 8 | Observed time of 80 osc<br>Time of one oscillation.<br>Correction for rate | ######################################  |
| Tors.                               | -                                | cient of | f torsion.<br>Mean.   | Differ-<br>ences.       | Value of<br>divisio    | one scal<br>n == 3'.69 | e- Loga | rithms.                                   | $t'-t=+4.8$ $mH=\frac{\pi^2M}{T^2}$  | $T = 0.8903$ $T^{12} = 1.7807$ $1 + \frac{h}{f} = 0.6006$ $1 + (t' - t) \frac{f}{q} = 9.0085$ |
| 60<br>240                           | 31. 7<br>29. 1<br>12. 2<br>15. 5 | 69. 6    | 46, 45<br>49, 35<br>45, 05<br>46, 70  | 2. 90<br>4. 30<br>1. 65 | v == 8<br>5400<br>5400 |                        |         | <b>3.</b> 73305<br><b>6.</b> 26761        | Temp. $\ell = 87^{\circ}$ . 0  | T* 1.7796   |
|                                     | Me                               | ean v=   | 2. 21   |                         | 1+                     | ٨                      |         | 0.00066                                   |  |   |

[Date, June 17, 1881. Station, Washington, D. C. Instrument, No. 11. Magnet, L<sub>II</sub>. Mass ring not used. Chronometer, Bond No. 188. Observer, M. S.]

| No. of o                               |                      |     | ono:<br>tim    | meter<br>e.  | Temp.             |          | ne scale<br>lings. | Time o | 100 os-<br>ions,   | Con  | iputation.                         |                    |
|--|----------------------|-----|----------------|--|-------------------|----------|--------------------|--------|--|--|------------------------------------|--------------------|
| 0<br>10<br>20<br>30                    | ,                    | 6   |                | 52. 9<br>47. 2<br>41. 1                            | 91. 0             | 32, 1    | 58. 1              | m.     | 8.   | 1  |                                    |                    |
| 30<br>40<br>50                         |                      |     | 52<br>53<br>54 | 35, 2<br>29, 3<br>23, 4                            | 92. 0             | 85. 1    | 50. 9              |        |  |  |                                    |                    |
| 100<br>110<br>120<br>130<br>140<br>150 |                      | 7   |                | 54. 0<br>48. 1<br>42. 3<br>36. 4<br>30. 5<br>24. 7 | 92, 5             | 32. 9    | 48.1               | 9      | 01. 1<br>00. 9<br>01. 2<br>01. 2<br>01. 2<br>01. 3   | Observed time of 100 o<br>Time of one oscillation<br>Correction for rate |                                    | 5, 411.            |
|  | 1                    |     | M              | leans  | 91.8              |          |                    | 9      | 01. 15   |  | T                                  | Log'ms<br>0, 7333  |
| (                                      | Coefficie            | nto | f to           | orsion.  |                   | Value of | one seal           |        |  | t'-t=+4.8  | $T^{r_2}$                          | 1.4667             |
| Tors.<br>circle.                       | Scale                | ٥.  | 3              | dean.  | Differ-<br>ences. | divisio  | n == 3'.69         | Loga   | rithms.  | $mH=rac{\pi^2 M}{T^2}$  | $1 + \frac{h}{f}$ $1 - (t' - t) q$ | 0. 0000<br>0. 9982 |
| 330<br>60                              | 32.9 4<br>27.2 6     |     |                | 40. 50<br>44. 95                                   | 4. 45             |          |                    |        | - Parameter - Para | Temp. t = 87°. 0   | $T^{q}$                            | 1.4655             |
| 240<br>330                             | 16.1   6<br>32.9   5 |     | 1              | 42. 05<br>43. 15                                   | 1, 10             |          | + v'<br>(ar. co.)  |        | 3, 73302<br>6, 26761   |  |                                    |                    |
|  | Mear                 | 12: | - 2.           | 11   |                   | 1+       | h<br>F             |        | 0. 00063   |  |                                    |                    |

ontinued.

ronometer, Bond

 $T^{r2}$  1.77902 + f 0.00631 - tq) 0.99015  $T^2$  1.77938

conometer, Bond

T' = 5.4174

T\*2 1.46758 + h 0.00041 -t) q 0.99882 T\*2 1.46681

Observations to determine the moment of mass of the long magnet L,, do.-Continued.

[Date, January 28, 1884. Staton. Washington, D. C. Instrument, theodolite magnetometer, No. 11. Magnet,  $L_{\rm in}$ . Sidoreal chronometer, Kessals No. 1237; daily rate, 4=.09.0, gaining on mean time. Observer, J. K. Maxfield.]

| lations.                 |                | nometer<br>ine.                               | Temp.   | Extrem<br>read       | ie scale<br>ings.      | Time o | f 100 os-<br>tions.              | Сотра   | itation.                          |                                     |
|--------------------------|----------------|---|---------|----------------------|------------------------|--------|----------------------------------|---|-----------------------------------|-------------------------------------|
| 0<br>10<br>20            | 6 4            | 8. 8.<br>2 37.5<br>3 31.5<br>4 25.5<br>5 24.6 | 44. 0   | 24.8                 | 59. 2                  | m.     | ø.                               |   |                                   |                                     |
| 31<br>41<br>51           | 4              | 5 24.6<br>6 18.5<br>7 12.5                    | 44. 5   | 25. 0                | 59. 4                  |        |                                  |   |                                   |                                     |
| 100<br>110<br>120<br>131 | 6 5<br>5<br>5  | 2 31.7<br>3 25.6                              | 45, 0   | 27. 0                | 58. 0                  | 9      | 00. 3<br>00. 2<br>00. 1<br>00. 0 | Observed time of 100 osci<br>Time of one oscillation<br>Correction for rate |                                   | #.<br>540, 10<br>5, 4010<br>0, 0153 |
| 141<br>151               | 5              | 5 18.5<br>6 12.5                              | 45. 5   | 29. 9                | 56.3                   |        | 00. 0                            |   | T =                               | 5. 3857                             |
| 1                        |                | Means   | 44, 75  |                      |                        | 9      | 00.10                            |   |                                   | Log'ms.                             |
|                          |                |   | -       |                      |                        |        |                                  | q = -0.00085  | $T^{\circ}$                       | 0. 73124                            |
| Coeffic                  | ient of        | torsion.                                      |         |                      |                        |        |                                  | $t'-t = -1^{\circ}, 25$   | T*1                               | 1. 46248                            |
| ors. Sea                 | le.            | Menn  | Differ- | Value of<br>division | ове scale<br>n = 34.69 | Loga   | rithms.                          | $mH = rac{\pi^2 M}{T^4}$   | $1 + \frac{h}{f}$ $1 - (t' - t)q$ | 0. 00135                            |
| 1100mm.m.m.              |                |   |         |                      |                        |        |                                  | Temp. $t = 46^{\circ}.0$  | $T^2$                             | 1.46429                             |
| 64 29.9                  | 5 <b>6</b> , 3 | 40.1  | 4.8     |                      |                        |        | 1                                |   |                                   |                                     |
| 154 30.0                 | 65. 8          | 47. 9   |         |                      |                        |        |                                  |   |                                   |                                     |
| 334 24. 2                | 55. 8          | 40. 0   | 7. 9    | r =: 10              |                        |        | 3 73374                          |   |                                   |                                     |
| 61 28.0                  | 63. 0          | 45. 5   | 5. 5    | 5400' -<br>5400 (i   | ar. co.)               |        | 6, 26761                         |   |                                   |                                     |
| Me                       | an v           | 4.55  | -       | 1+                   | <u>h</u>               |        | 0. 00135                         |   |                                   |                                     |

[Date, January 28, 1884, Station, Washington, D. C. Instrument, theodolite magnetometer, No. 11. Magnet, Ly., Sidereal chronometer, Kessels No. 1237; daily rate, 4\*\*,06\*.0, gaining on mean time. Observer, J. E. Maxiledi.]

| lation                   |               |        | tim                        |                                    | Temp.             |         | me scale<br>dings.         | Time o  | tions.                  | Com   | putation.                                 |  |
|--------------------------|---------------|--------|----------------------------|------------------------------------|-------------------|---------|----------------------------|---------|-------------------------|---|---|--|
| 0<br>10<br>20<br>31      | 1             | h. 7   | m.<br>16<br>17<br>18<br>20 | 8:<br>12:6<br>30:5<br>44:6<br>13:8 | 45                | 23.4    | 77. 0                      | 101-    | 8.                      |   |   |  |
| 41<br>51                 |               |        | 21<br>22                   | 30. 7<br>43. 2                     | 45                | 25. 0   | 79. 0                      |         | ļ                       |   |   |  |
| 100<br>110<br>120<br>131 |               | 7      |                            | 08, 5<br>25, 9<br>43, 5<br>68, 0   | 45. b             | 30. 0   | 75. 4                      | 12      | 55. 4<br>55, 5<br>54. 7 | Observed time of 100 or<br>Time of one oscillation<br>Correction for rate | cillations                                | #.<br>.775, 13<br>. 7, 751<br>.—0, 622 |
| 141<br>151               |               |        | 34<br>35                   | 25, 3<br>42, 9                     | 46. 0             | 36. 8   | . 72.4                     |         | 54. 6<br>54. 7          |   | T =                                       | 7, 729                                 |
|                          |               |        | M                          | leans                              | 45. 4             | -       | !                          | 12      | 55. 13                  |   |   | Log'ms                                 |
| (                        | Coeffic       | ient ( | of to                      | rsion.                             |                   |         |                            |         |                         | t'-t= -0°.6   | Tra Tra                                   | 1. 7762                                |
| Cors.<br>ircle.          | Sei           | ile.   | 3                          | fean.                              | Differ-<br>ences. | Value o | f one scale<br>on == 3'.69 | 8. Loga | rithms.                 | $mH = \frac{\pi^2 M}{T^2}.$ Temp. $t = 46^2.0$                            | $1 + \frac{h}{f}$ $1 - (t' - t)q$ $T^{s}$ | 0. 0015<br>0. 0002<br>1. 7780          |
| 32                       | 36.8          | 72. 4  |                            | 54. 6                              | 5, 7              |         |                            |         |                         |   |   |  |
| 122                      | <b>55</b> . 0 | 65. 6  | 3 ,                        | 60.3                               | 9. 4              |         |                            |         |                         |   |   |  |
| 302                      | 44. 4         | 57. 4  |                            | 59, 9                              | 5, 2              |         | + 0'                       |         | 3. 73390                |   |   |  |
| 32                       | 54. 6         | 57. 0  | 1                          | 56. 1                              |                   | 5400    | (ar. co.)                  |         | 6. 26761                |   |   |  |
|                          | 11.           | an e   | 5                          | na                                 | '                 | 1       | $+\frac{h}{f}$             |         | 0.00151                 |   |   |  |

nued.

... Sidereal

Log'ms. 0.73124

1. 46248 0.00135

1. 77628

#. ..540, 10 .. 5, 4010 ..—0, 0153

q 0.00046 1.46429

Log'ms. 0.88814

0.001510.00022 1.77801 Observations to determine the moment of mass of the long magnet L,, &c.—Continued.

[Date, January 28, 1884. Station, Washington, D. C. Instrument, theodolite magnetometer, No. 11. Magnet, L<sub>ii</sub>. Sidereal chronometer, Kossels No. 1237; daily rate, 4=05.0, gaining on mean time. Observer, J. E. Maxifeld.]

| No. of oscil-<br>lations.             |          | nometer<br>me.   | Temp.                | Extrem                     | in scale<br>ings. | Time of |  | Con  | putation.                             |  |
|---------------------------------------|----------|--|----------------------|----------------------------|-------------------|---------|--|--|---------------------------------------|--|
| 0<br>10<br>20<br>31<br>41<br>51       | 7        | 94. 8.<br>92. 35. 6<br>93. 29. 6<br>94. 23. 6<br>95. 22. 5<br>96. 16. 5<br>97. 10. 6 | 46. 5                | 25, 0                      | 62. 0<br>58. 0    | 772.    |  |  | _                                     |  |
| 98<br>108<br>118<br>129<br>139<br>149 | 0        | 01 25, 2<br>12 19, 4<br>13 13, 3<br>14 11, 7<br>15 05, 7<br>16 00, 4<br>Means        | 47. 0                | 34. 6                      | 56. 6<br>53. 4    | 8 .     | 49, 6<br>49, 8<br>49, 7<br>49, 2<br>49, 2<br>49, 8 | Observed time of 98 os<br>Time of one oscillation<br>Correction for rate | <i>T</i> =                            | 529, 55 5, 403 -, 015 5, 388 Log'ma      |
| D                                     | cient of | torsion.   | Differ-              |                            | one scale         | Loga    | rithms.  | $t-t=+0.5$ $mH=rac{\pi^2 M}{T^{2}}$                                     | $T$ $1 + \frac{h}{f}$ $1 - (t' - t)q$ | 0. 7314<br>1. 4629<br>0. 0011<br>9. 9998 |
|                                       |          | 44. 0<br>47. 8<br>40. 1<br>44. 6   | 3. 8<br>7. 7<br>4. 5 | n 14<br>5400' -<br>5400 (i |                   |         | 3, 73358<br>6, 26761                               | Temp. t - 18°. 0   | T                                     | 1. 4639                                  |
| <u> </u>                              | lean v=  | 4. 00  |                      | 1+                         | h                 |         | 0. 00119   |  |                                       |  |

[Date, January 28, 1884. Station, Washington, D. C. Instrument, the dollite magnetometer, No. 11. Magnet,  $L_{tt}$ . Sidered chronometer, Kesaels No. 1237, daily rate,  $4^m$  969 0, gaining on mean time. Observer, J. E. Maxfield.]

| No. of os<br>lations                   |        |                 | ono<br>tim                 | meter<br>e.  | Temp.   | Extren<br>read     | no scale<br>lings.      | Time of<br>cillat | 100 os-<br>ions.                          | Com   | putation.                        |                     |
|--|--------|-----------------|----------------------------|--|---------|--------------------|-------------------------|-------------------|---|---|----------------------------------|---------------------|
| 10<br>20<br>31                         |        | <b>λ</b> .<br>8 | 25<br>26<br>27<br>29       | 07. 0<br>25. 0<br>42. 6<br>08. 6                   | 46. 5   | 10.0               | 61. 0                   | m.                | 8.  |   |                                  |                     |
| 41<br>51                               |        |                 | 30<br>31                   | 26. 5<br>44. 1                                     | 46.5    | 06. 0              | 63. 0                   |                   |   |   |                                  |                     |
| 100<br>110<br>120<br>131<br>141<br>151 |        | 8               | 38<br>39<br>40<br>42<br>43 | 03. 6<br>21. 1<br>38. 9<br>04. 6<br>22. 5<br>40. 2 | 46.5    | 9. 0               | 62.0                    | 12                | 56. 6<br>56. 1<br>56. 3<br>56. 0<br>56. 0 | Observed time of 190 or<br>Time of one oscillation<br>Correction for rate |                                  | 7. 761              |
| 101                                    |        |                 |                            | leans  | 46. 5   | 19.0               | 0.0                     | 12                |   |   |                                  | Log ma              |
| C                                      | oeffic | ient            | of t                       | orsion.  |         | -                  |                         | <u> </u>          | - !                                       | t'-t=+0.5   | Tr<br>gra                        | 0. 8887.<br>1. 7774 |
| Tors.                                  | Sci    | ale.            | 1,                         | Mean.  | Differ- | Value o<br>divisie | f one scale<br>on=3'.69 | 9 Loga            | rithms.                                   | $mH \coloneqq rac{\pi^2 M}{T^6}$   | $1 + \frac{h}{f}$ $1 - (t - t)q$ | 9. 9998             |
| 1                                      | 13. 8  |                 |                            | 36. 0<br>42. 4                                     | 5, 5    |                    |                         |                   |   | Temp f 430  | . T <sup>a</sup>                 | 1.7767              |
|  | 14. 4  | 50.             |                            | 32.4   | 10. 0   | v=1:<br>5400'      | 8'. 6<br>               |                   | 3, 73389                                  |   |                                  |                     |
| 43                                     | 19. 2  |                 |                            | 37.1   | 7. 1    | 5100               | (ar. co.)               |                   | 6. 26761                                  |   |                                  |                     |
|  | м      | enn a           |                            | . 05   |         | 1                  | + h                     | 1                 | 0.00170                                   |   |                                  |                     |

### Observations to determine the moment of mass of the long magnet L,,, &c.—Continued:

[Date, January 28, 1884. Station, Washington, D. C. Instrument, theodolite magnetometer No. 11. Magnet, L<sub>ii</sub>. Mass ring, Sidereal chronometer, Kessels No. 1237, daily rate, 4= 69-9, gaining on mean time. Observer, J. E. Maxiled.]

| No. of<br>latio                        | oscil-<br>ns.                    | Chi                              | rono<br>omi*                     | neter  | Temp.                |                               | no scale<br>ings.     | Time of l |  | Comput  | ation.                                    |
|--|----------------------------------|----------------------------------|----------------------------------|--|----------------------|-------------------------------|-----------------------|-----------|--|---|---|
| 0<br>10<br>20<br>81<br>41<br>51        |                                  | À,<br>9                          | 02<br>03<br>04<br>05             | 8,<br>39, 0<br>33, 3<br>27, 5<br>25, 6<br>19, 5<br>13, 3 | 46. 5                | 21. 0<br>30. 0                | 73. 0<br>67. 4        | 191.      | •  |   |   |
| 100<br>110<br>120<br>181<br>141<br>151 |                                  |                                  | 11<br>12<br>13<br>14<br>14<br>15 | 39. 5<br>33. 7<br>28. 0<br>25. 3<br>19. 3<br>13. 4       | 46, 5<br>46, 5       | 30. 0                         | 65. 8                 | 8 5<br>5  | 0. 5<br>0. 4<br>0. 5<br>9. 7<br>0. 8<br>0. 1 | Observed time of 100 oscill<br>Time of one oscillation<br>Correction for rate | 5.40                                      |
| Tors.                                  | Coeffic<br>Sc                    | ale.                             |                                  | ean.   | Differ-<br>ences.    | Value of<br>division          | one scal<br>a = 3'.69 | Logari    | thms.  | $t-t = +0^{\circ}.5$ $mH = \frac{\pi^{2}M}{T^{3}}$                            | T <sup>18</sup> 1. 462<br>1 + h 0. 000    |
| 48<br>133<br>313<br>43                 | 35. 0<br>42. 6<br>36. 0<br>34. 0 | 63. 0<br>62. 0<br>56. 4<br>64. 4 |                                  | 49. 0<br>52. 3<br>46. 2<br>49. 2                         | 3, 3<br>6, 1<br>3, 0 | v == 11<br>5400′ -<br>5400′ ( |                       |           | 73331<br>26761                               | Temp. t = 46°.0   | 1—(!'—t)q 9.999;<br>T <sup>2</sup> 1.463; |
|  | Me                               | an v=                            | - 3. 1                           | 0  |                      | 1-4                           | h.                    | 0.        | 00002  |   |   |

#### Observations for dip and relative intensity.

(Date, January 30, 1884. Station, Magnetic Observatory, near corner of B and First streets southeast, Washington, D. C. Dip circle No. 23 (Kew). Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 1<sup>h</sup> 20<sup>m</sup> p. m.; time of ending, 40<sup>m</sup> p. m (75th meridian time).)

|    |                 |     |    |    | F   | olo | arit            | y e  | ĺ  | ma             | rke | d en           | d∠   | L n            | ort | À. |       |      |                |     |                |    |    | P   | ola | rity            | of  | ma              | rke | d   | ene               | l E  | 3 no         | rth  |       |      |    |                 | - 1 |   |     |
|----|-----------------|-----|----|----|-----|-----|-----------------|------|----|----------------|-----|----------------|------|----------------|-----|----|-------|------|----------------|-----|----------------|----|----|-----|-----|-----------------|-----|-----------------|-----|-----|-------------------|------|--------------|------|-------|------|----|-----------------|-----|---|-----|
| •  | Circ<br>fac     |     |    |    |     |     | Cire            |      |    |                | 1   | Circl<br>fac   |      |                | ,   |    | ircle |      |                |     | Circ           |    |    |     |     | irel<br>face    |     | rest,           |     |     |                   |      | nat<br>e/ 6. |      |       |      |    | ant,            |     | Circle in magn<br>prime vertica   |     |
|    | 8.              |     |    | N. | -   |     | 8.              |      | 1  | N.             |     | 8.             |      | N              |     |    | 8.    |      | N.             |     | 8.             |    | N. |     |     | 8.              |     | N.              |     | 8   | 3.                | 1    | N.           |      | 8.    |      | !  | N.              |     |   |     |
| 70 | 17<br>16<br>16. | 5 ( | 60 | 57 | . 5 |     | 16<br>15<br>15. | 5 6  | 9  | 55<br>55<br>55 |     | 48<br>48<br>48 | 71   | 25<br>24<br>24 |     | 70 | 43    | 70   | 24<br>24<br>24 |     | 56<br>54<br>55 | 70 | 31 | . 5 | 70  | 51<br>50<br>50. | 70  | 34<br>33<br>33. |     | 0 8 | 58<br>57<br>57. 6 | 70   |              |      | 0 40  | 6. 5 | 70 | 35<br>34<br>34. |     | Circle N,<br>Needlo N, 54°<br>Needle S, 55<br>Circle N,<br>Needle N, 55<br>Needle S, 52 | 81  |
| _  |                 |     | _  | 70 | ю   | 06′ | . 1             | _    |    |                |     |                |      | 71             | 0 ( | Μ. | 9     | _    |                |     |                |    | 70 | ,0  | 42' | 6               |     |                 |     |     |                   |      | 70           | 0 41 | 3'. 5 | _    |    |                 | i   | Mag. mer. 54  | 27. |
|    |                 |     |    |    |     |     | λ               | l ea | n. |                |     | 70°            | 35′. | 5              |     |    |       |      |                |     |                |    |    |     |     | M               | ear | ١               | ••• | 70  | 00 4              | 13′. | 1            |      |       |      |    |                 | İ   |   |     |
|    |                 |     |    |    |     |     |                 |      | _  |                |     |                |      |                |     |    | Res   | ulti | ng             | dip | , 70           | 39 | .3 |     |     |                 |     |                 |     | _   |                   |      |              |      |       |      |    |                 | Ī   |   |     |

[Date, January 30, 1884. Station, Washington, D. C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 2<sup>h</sup> 05<sup>m</sup> p. m.; time of ending, 35<sup>m</sup> p. m.]

|          |               |      |     |          | P   | ог      | lar         | ity | oi  | mi       | rk | ed  | en   | d i | Впо         | rth   |               |     |       | T    |              |    |          | Po  | ola | rity         | of  | ma       | rk  | ed e | end  | Λ       | nor           | th. |             |       |     |    | 1  |
|----------|---------------|------|-----|----------|-----|---------|-------------|-----|-----|----------|----|-----|------|-----|-------------|-------|---------------|-----|-------|------|--------------|----|----------|-----|-----|--------------|-----|----------|-----|------|------|---------|---------------|-----|-------------|-------|-----|----|--|
|          | Circl<br>face |      |     |          |     |         | lire<br>fac |     |     | st,      |    |     | rele |     | est,<br>st. |       |               |     | west, |      | irci<br>face |    |          |     |     | irel<br>face |     | rest     |     |      |      |         | ast,          | 1   | Circ<br>fac |       |     |    | Circle in magnetic prime vertical.           |
|          | 8.            |      |     | N.       |     |         | s.          |     |     | N.       |    | 8   |      |     | N.          |       | 8.            |     | N.    |      | S.           |    | N.       |     | 1   | 8.           | L   | N.       |     | 8    |      |         | N.            |     | 8.          | I     | 2   | ď. |  |
| 0<br>7 l | 20<br>20      | - 11 |     | 01<br>00 |     | o<br>71 | 01<br>00    |     | -   | 42<br>42 |    | 0 2 |      |     | 10<br>08    | 70    | ,<br>19<br>19 |     | 0 00  | 70   | 48<br>48     | 70 | 28<br>27 |     | 70  | 12<br>12     |     | 46<br>46 | 7   | 1 2  | 2    | 0<br>71 | ,<br>00<br>00 | 1 - | 40<br>40    | - 1 - | 0 1 |    | Circle N.  Needle N. 57° 00' Needle S. 55 40 |
| 71       | 20            | 7    | 71  | 00       | . 5 | 71      | 00          | . 5 | 70  | 42       | 7  | 0 8 | 29   | 70  | 09          | 70    | 19            | 7   | 0 00  | 70   | 48           | 70 | 27.      | 5 7 | 70  | 12           | 60  | 46       | 7   | 1 2  | 2    | 71      | 00            | 70  | 40          | 7     | 0 1 | 18 | Circle S.                                    |
| _        | 710           | 1    | 0'. | 3        | -   |         | 70          | 0   | 51' | 2        | 1  | 7   | 700  | 19  | . 0         | -   - | 70            | 0   | 9', 5 | -    | 700          | 37 | . 8      | i   | -   | 690          | 59  | . 0      | - - | 7    | 10   | u       | . 0           | -   | 700         | 21    | у.  | 0  | Needle N. 54 36<br>Needle S. 53 38           |
|          |               | _    | _   |          |     | _       |             |     | _   |          | 1  |     |      |     |             |       |               |     |       |      |              |    | 700      | 1   | 8'. | 4            |     |          | - - |      |      |         | 700           | 50  | ·. 0        |       |     |    | Mag. mer. 55 13. 5                           |
| _        |               |      |     |          |     |         |             | M   | ear | 3        |    | 7   | 00   | 37  | . 5         |       |               | -   |       | -    |              |    |          |     |     | М            | tea | n        |     | . 70 | 30 2 | 4'      | 2             |     |             |       |     |    |  |
|          |               |      |     | _        |     |         |             |     |     |          |    |     |      |     |             |       | Re            | sul | ting  | lip, | 700          | 35 | .9       | _   |     |              |     |          |     | _    |      | _       |               |     |             | _     | _   | _  |  |

[Date, January 30, 1884. Station, Washington, D. C. Needle No. 3 (extra) used in place of needle No. 1, which was broken in transitu from Point Barrow to Washington. Observer, J. E. Maxfield. Time of beginning, 2\* 50\* p. m.; time of ending, 3\* 20\* p. m.)

ed.

lass ring.

6. 40. 17 5. 4017 -0. 0153 5. 3864

og'mn. 0. 73130 1. 46260 0. 00092

9. 99982 1. 40334

Dip circle No. 23 lian time).}

le in magnetic ime vertical.

Circle N. He N. 54º 30º He S. 55 31

Circle 8, He N. 55 00 He S. 52 40 g. mer. 54 27, 5

p. m.; time of

e in magnetic me vertical.

Circle N.
le N. 57° 00'
le S. 55 40
Circle S.
le N. 54 36
le S. 53 38
. mer. 55 13.5

|       |     |    |          | P   | olı | rit        | y o         | fn   | ar | kec | l eu         | d A | t no          | rth. |          |         |               |     |             |    |          | Po   | la         | rity          | of       | mai         | ke | d en         | d I  | g n      | orti | ١.  |     |     |             |  |
|-------|-----|----|----------|-----|-----|------------|-------------|------|----|-----|--------------|-----|---------------|------|----------|---------|---------------|-----|-------------|----|----------|------|------------|---------------|----------|-------------|----|--------------|------|----------|------|-----|-----|-----|-------------|--|
| Circ  |     |    |          |     |     | ire<br>fac |             |      |    |     | irel<br>face |     | roat,<br>int. |      | lirel    |         | reat,         |     | Circ<br>fac |    |          |      |            | rele          |          | est,<br>it. |    | lire<br>face |      |          |      |     |     | e e | ast,<br>st. | Circle in magnetic<br>prime vertical.        |
| 8.    |     |    | N.       |     |     | в.         |             | N    |    |     | 8.           |     | N.            |      | 8.       |         | N.            | -   | 8.          | Ī  | N.       |      | 8          |               |          | N.          |    | В.           |      | N.       |      | 1   | 3.  | 1   | N.          |  |
| 1 06  |     |    | 46<br>45 |     |     | 00<br>40   |             | 9 3  |    |     | 56<br>56     | 70  | 31            | 711  | 31<br>31 | -       | ,<br>09<br>09 | 70  | 29<br>29    |    | 05<br>05 |      | 0 (        | ,<br>50<br>50 | 70       | 31<br>31    | 70 | 50<br>50     | 70   | 94<br>24 | 1    | 71  | 11  | _   | 51<br>51    | Circle N. Needlo N. 56° 40' Needle S. 56° 09 |
| 1 05. | . 5 | 70 | 45       | . 6 | ú9  | 54.        | 5 6         | 8 0  | H  | 70  | 56           | 70  | 31            | 170  | 31       | 70      | 09            | 70  | 29          | 17 | 0.05     | 17   | 0 (        | 30            | 70       | 31          | 70 | 50           | 76   | 24       |      | 71  | 11  | 70  | 51          | Circle S.                                    |
| 70    | 0 1 | 35 | 5        | -   | -   | 69         | 4           | y. 8 | -  |     | 70°          | 43  | 7.5           |      | 700      | 20      | . 0           | -   | 70          | 17 | . o      | -    | -          | 100           | !<br>40' | 5           | -  | 700          | 37   | '. O     |      | -   | 710 | 01  | . 0         | Needle N. 55 36<br>Needle S. 55 95           |
|       |     | -  | 70       | 0 5 | 10  | 9          |             |      |    |     | dream. And   |     | 709           | 31   | . 7      | -       | alphaner .    | Ī   |             |    | 70       | 10 g | B'.        | 8             |          |             |    | -            |      | 7        | 10 4 | 19. | 0   |     |             | Mag. Mer. 55 52.                             |
|       |     |    |          |     |     | λ          | <b>L</b> ea | a.   |    |     | 700          | ж.  | 3             |      |          |         |               | -   |             | -  |          |      | djada. sro | M             | eAll     |             |    | 70°          | 38′. | 9        |      |     |     |     |             |  |
|       | -   | -  | ~        |     |     |            |             |      |    |     |              |     | -             |      | R        | <br>68u | lting         | di: | υ. 7        | 00 | 12'.     | 6    |            |               |          | _           |    |              |      | -        |      |     |     |     |             |  |

#### Observations for relative total intensity.

[Date, January 30, 1884. Station, Washington, D. C. Observer, J. E. Maxfield. Time of beginning, 35 30m p. m.; time of ending, 50m p. m. Magnetic meridian reads 550 52'.0]

| N  | veille              | 0 3 | Nε | . 3,     | No. | 4 de                 | tlee | ting            |     |               |     |          |     |              | No. | 4, w     | reig | htee          | l.  |          |     |               |    |          |
|----|---------------------|-----|----|----------|-----|----------------------|------|-----------------|-----|---------------|-----|----------|-----|--------------|-----|----------|------|---------------|-----|----------|-----|---------------|----|----------|
| •  | Circi<br>mi<br>face | e.  | D  | ,        |     | lirel<br>mic<br>face | u. H | t, '            |     | lirel<br>face |     |          |     | irel<br>face |     |          |      | lirel<br>face |     |          |     | Circl<br>face |    |          |
| _  | В.                  | 1   |    | N.       | 8   | ł.                   | 2    | Ň.              |     | 8.            | 1_  | N.       |     | В.           |     | N.       | 1    | s.            |     | N.       |     | 8.            |    | N.       |
| o  | ,                   |     | 0  | ,        | 0   | ,                    | 0    | ,               | . 0 | ,             | 0   | ,        | 0   | ,            | 0   | ,        | 0    | ,             | 0   | ,        | 0   | ,             | 0  | ,        |
| 71 | 52<br>48            | 1   |    | 54<br>50 | 33  | 55<br>53             | 33   | $\frac{04}{02}$ | 41  | 30<br>26      | 40  | 56<br>52 | 41  | 38<br>34     |     | 02<br>58 | 42   | 07<br>11      | 41  | 01<br>05 | 44  | 06<br>10      | 42 | 50<br>54 |
| 71 | 50                  | 7   | 1  | 52       | 33  | 54                   | 33   | 03              | 41  | 28            | 40  | 54       | 41  | 36           | 41  | 00       | 42   | 09            | 41  | 03       | 44  | 08            | 42 | 52       |
|    | 710                 | 5   | 1  | 0        | -   | 330                  | 28   | . 5             | 1   | 410           | 11/ | . 0      | 1   | 410          | 18  | . 0      | 1    | 410           | 36' | . 0      | 1   | 430           | 30 | . 0      |
|    | _                   | _   |    |          |     |                      | _    |                 | ;   | -             |     | 410      | 14' | . 5          |     |          | 1    | -             | _   | 420      | 33' | . 0           | -  |          |
|    | Mea                 | m   |    | •••      | 870 | 20%                  | 2=   | 14'a            | 1   |               |     |          |     | Mea          | n   |          | 419  | 831           | 8== | ηo       | -   |               |    |          |

[Date, January 31, 1884. Station, Washington, D.C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 9<sup>b</sup> 55<sup>m</sup> a. m.; time of ending, 10<sup>b</sup> 22<sup>m</sup> a. m.]

|   |    |            |     | 1        | Pol  | arit     | y   | í   | mai      | ke | i en         | d ⊿  | 110      | rth. |           |      |     |             |     |              |     |          | Pol | ır. l       | y o | f I  | ոսել  | ker | l en        | d I | 3 1101   | th. |          |    |       |    |                                 |          |
|---|----|------------|-----|----------|------|----------|-----|-----|----------|----|--------------|------|----------|------|-----------|------|-----|-------------|-----|--------------|-----|----------|-----|-------------|-----|------|-------|-----|-------------|-----|----------|-----|----------|----|-------|----|---------------------------------|----------|
|   |    | ile<br>e e |     | ut,      |      |          |     |     | st,      |    | ircl<br>face |      |          | 1    | Cir<br>fa | cle  | We  | est,<br>st. |     | Circ<br>face |     |          | 1   | Circ<br>fac |     |      | st,   |     | lire<br>fac |     | est.     |     | Circ     |    |       |    | Circle in magn<br>prime vertice |          |
|   | 3. |            | 1   | N.       |      | S.       | 1   | 1   | N.       |    | в.           | i    | N.       |      | 8.        |      | 1   | N.          | -   | s.           | 1   | N,       | -   | 8.          | 1   | N    | Γ.    | -   | 8.          | 1   | N.       |     | 8.       | -  | N     |    |                                 |          |
| _ | 55 |            | _   | 37<br>36 |      | 18<br>12 | j   | _   | 49<br>49 |    | 30<br>29     | _    | 10<br>10 | _    | 4         |      | _   | 26<br>25    |     | 31<br>31     | _   | 13<br>13 |     | 44          | 7   |      | 23    |     | 58<br>57    | 1   | 98<br>87 |     | 08<br>08 | 17 | _     | 13 | greente Di thi                  | 53<br>13 |
| 0 | 55 | ľ          | 70  | 36.      | 5 71 | 12       | . 5 | 70  | 49       | 70 | 29.          | 5,70 | 10       | 7    | 0 4       | 1    | 70  | 25.         | 70  | 31           | 7   | 9 13     | 70  | 43          | . 5 | 70 : | 23, 5 | 70  | 57.         | 5 7 | 0 37.    | 5.7 | L 08     | ď  | 70 4  | 13 | Circle S.<br>Needle N. 56       | 91       |
| - | 70 | 0 4        | 5'. | 7        | -    | 71       | 0 0 | 0'. | 7        | -  | 700          | 19   | . 8      | -    | 70        | )o 3 | 64. | 2           | Γ   | 700          | 25  | ·. 0     |     | 70          | 3   | 34.  | 5     |     | 700         | 47  | '. 5     |     | 70       | 5  | 5'. ! | 5  | Needle S. 53                    |          |
|   | _  |            |     | 70°      | 58   | 2        |     |     | _        | -  |              |      | 700      | 28   | . 0       |      |     |             | Γ   |              |     | 700      | 27  | 7           |     |      |       | T   |             |     | 700      | 51  | . 5      |    |       | _  | Mag. mer. 54                    | 3        |
|   |    |            | -   |          |      |          | Me  | aı  | l        | 7  | 00           | 10'. | 6        |      |           |      |     |             | -   |              |     |          |     |             | M   | 681  | 1     | ••• | 70°         | 39  | . 6      |     |          | _  |       |    |                                 |          |
| - | _  | -          | _   |          |      |          |     | -   | -        |    |              | _    |          |      | ]         | Res  | ult | ing         | dir | p. 70        | 0 4 | 0'. 1    |     |             | _   |      |       |     |             |     |          | -   |          | _  |       |    |                                 |          |

(Date, January 31, 1884. Station, Washington, D. C. Observer, J. E. Maxifeld. Time of beginning 10-44- a. m.: time of ending 56- a. m. Magnetic mendian reads 540 33.;

| -       | lire     | ele<br>ic | es<br>U | mt  |      |    |    | CI | re<br>mi | lo  |      |     |    |    | ireb<br>face |    |            | 1  |     | ire!     | le- | we   | nt,      | -   |    | glite<br>Sirci<br>face | 41 4 66 |     |      | Cire<br>fac | de e |     |     |
|---------|----------|-----------|---------|-----|------|----|----|----|----------|-----|------|-----|----|----|--------------|----|------------|----|-----|----------|-----|------|----------|-----|----|------------------------|---------|-----|------|-------------|------|-----|-----|
| -       | 8.       |           |         | N.  |      | 1  |    |    |          |     |      | N.  | 1  |    | 8.           | 1  | N.         | 1  | į   | В.       | -   | -    | N.       | 1   |    | 5.                     |         | N.  | 1    | в.          |      | N   |     |
| o<br>72 | 24<br>20 |           | 73      | 1.0 |      |    | 30 |    | 9        |     | 33   | 11  |    | ĕ  | 06<br>04     | 4  | 0 22<br>24 |    | 61  | 45<br>44 |     | 40   | 39<br>58 |     | 41 | 48<br>41               | 40      | 54  | 42   | 45<br>48    | 4    | 1   | 18  |
| 72      |          | -         | 73      | 1   | 0. 8 | 5  | 33 | 3  | 7.       | 5   | 83   | 09. | 5  | 41 | 05           | 4  | 0 28       | -  | 61  | 44.      | ,5  | 40   | δ8.      | . 6 | 41 | 42                     | 40      | 58  | 42   | 44          | , 4  | 1   | 17. |
|         | 72       | 1         | 6'.     | 3   |      |    |    | 30 | 30       | 2:  | P. ( | 3   | 11 |    | 401          | 44 | . 0        | Ì  |     | 41       | 2   | 1. ( | 3        | i   |    | 410                    | 17'.    | 8   | 1    | 420         | 15   | . 7 | -   |
| -       | -        |           |         |     |      |    |    |    |          |     |      |     | -  |    |              |    | 41         | 0: | ď., | gi       |     |      |          | 1   |    |                        |         | 410 | 46'. | 6           |      |     | _   |
| -       | M        | on        | n.      |     |      | 37 |    | 10 | 4, 1     | las | ti'  |     | I  | *  |              |    |            |    |     | M        | es  | m.   |          | . 4 | 10 | 26'.                   | 7 may   | 9   |      |             |      | _   | _   |

[Date, January 31, 1884. Station, Washington, D. C. Observer, J. E. Maxfield. Time of beginning, 1ch 57° a.m.: time of ending, 115 a.m. Magnetic meridian reads 54° 33′.]

| Circle ens<br>mic. R,<br>face cast<br>8. N |  | mee                  | west,  | face  | cust.   | face   | west.  | face   | e east.  |
|--|--|----------------------|--|---|---|--|--|--|--|
| 8. N                                       | . 1  | 8.                   | N.   | 68  | 20  |  | 97   | 1  |  |
|  |  |                      |  | ۵.  |   | 8.   | N.   | 8.   | N.   |
| . 0  | ,  | 0 /                  | 0 /  |   | 2 1   | 0 /  | 0 /  | 0.7  | 0 /  |
|  |  | 41 12<br>68          | 40 39<br>35  | 41 57<br>53   | 41 18<br>14   | 41 35<br>38  | 40 40<br>43  | 41 40<br>44  | 40 37<br>41  |
| 33 39 33 0                                 | 1  | 41 10                | 40.37  | 41 55   | 41 16   | 41 36.   | 5 40 41. 8   | 5.41 42  | 40 39  |
|  | a resident                                     |                      |  |   |   |  |  | _1   |  |
| 38° 20′, 0                                 | •  | 40                   | 53′. ú   | 417   | 35/. 5  | 410  | 094. 0   | 410  | 10', 5   |
|  | - 1  |                      | 410  | 14'. 5  |   | 1  | 410  | 09'. 7   |  |
|  | 33 40 33 0<br>38 0<br>33 39 33 0<br>38° 20′. 0 | 33 40 33 02<br>38 00 | 33 40 33 02 41 12 08<br>33 39 33 01 41 10<br>33° 20′ 0 40° | 33 40 33 02 41 12 40 30 35 33 39 33 01 41 10 40 37 33 20. 0 40 53. ú 41 0 | 33 40 30 02 41 122 40 39 41 57 53 13 39 33 01 41 10 40 37 41 55 33 20 40 53 41 56 33 20 40 53 4 4 5 5 | 33 40 33 02 41 12 40 39 41 57 41 18 39 39 33 01 41 10 46 37 41 55 41 16 33 204.0 40 53.4 1 41 35.5 41 16 | 33 40 33 02 41 12 40 39 41 57 41 18 41 35 33 39 33 01 41 10 40 37 41 55 41 16 41 36 33 20 20'. 0 40 53'. 0 41 55 41 6 41 36. | 33 40 33 02 41 12 40 39 41 57 41 18 41 35 40 40 30 33 30 33 01 41 10 40 37 41 58 41 16 41 36 50 43 30 33 00 40 40 58 0 1 41 58 41 16 41 36 540 41 .  330 20', 0 40 58', 0   41 39', 5   41 00', 0 41 34', 5   41 41 36', 5   41 00', 0 41 36', 5   41 00', 0 41 36', 5   41 00', 0 41 36', 5   41 00', 0 41 36', 5   41 00', 0 41 00', 5   41 00', 5 | 33 40 33 62 41 12 40 39 41 67 41 18 41 35 40 40 41 40 41 40 38 39 33 01 41 10 46 37 41 55 41 16 41 36 5 40 41 54 42 33 20 40 40 53 41 55 41 16 41 36 5 40 41 54 12 65 41 64 12 65 5 40 41 54 12 65 41 64 12 65 5 40 41 54 12 65 61 41 61 41 61 61 61 61 61 61 61 61 61 61 61 61 61 |

[Date, January 31, 1884. Station, Washington, D. C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 2° p. m. Magnetic meridian reads 54° 33°.]

|    |          |        |     |             | Po   | larit           | y of | ma       | rke | d ei     | nd <i>E</i> | i no        | rth. |               |      |          | ,   |              |      |             | Pol  | arit         | of   | ms       | rke  | d en          | l A  | noi      | th.  |               |      |               |
|----|----------|--------|-----|-------------|------|-----------------|------|----------|-----|----------|-------------|-------------|------|---------------|------|----------|-----|--------------|------|-------------|------|--------------|------|----------|------|---------------|------|----------|------|---------------|------|---------------|
| 1  | Cir      |        |     | int,<br>st. |      | Circ<br>fac     |      | ast.     | (   |          | le w        |             |      | Jirei<br>face |      |          | . ( | ircl<br>face |      |             |      | irel<br>face |      |          |      | Circl<br>face |      |          |      | Circl<br>face |      |               |
|    | s.       |        |     | N.          | 1    | в.              |      | N.       |     | 8.       | 1           | N.          |      | S.            | ;    | N.       |     | s.           |      | N.          |      | 8.           | Ĺ    | N.       |      | 8.            | t    | N.       | Ĺ    | s.            | 1    | N             |
| 71 | 06<br>09 |        |     | 28<br>31    | 7    | ,<br>l 01<br>05 | 70   | 29<br>33 | 70  | 37<br>32 | 70          | 32<br>27    | 70   | 31<br>27      | 70   | 25<br>20 | 70  | 30<br>35     | 70   | 28<br>23    | 70   | 28<br>23     | 70   | 24<br>19 | 71   | 10<br>15      | 70   | 31<br>36 | 70   | 45<br>50      | 70   | 7<br>10<br>15 |
| 71 | 07       | . 5    | 70  | 29.         | 5 71 | 03              | 70   | 31       | 70  | 34.      | 5 70        | 29.         | 5 70 | 29            | 70   | 22.      | 570 | 32.          | 3 70 | 25.         | 5 70 | 25.          | 5 70 | 21.      | 5 71 | 12.           | 70   | 33.      | 5 70 | 47.           | 5 70 | 12.           |
|    | 70       | )<br>) | 484 | 5           | -    | 709             | 47   | . 0      |     | 70       | 32          | . 0         | ,    | 700           | 25   | . 8      | 1   | 760          | 29   | . 0         |      | 700          | 23   | . 6      | (    | 700           | 53   | . 0      | -    | 700           | 30   | . 0           |
|    |          |        |     | 70°         | 47   | . 7             |      |          |     |          | _           | <b>70</b> ° | 28   | . 9           |      |          |     |              |      | <b>70</b> ° | 26   | . 3          |      |          |      | -             |      | 700      | 41'. | 5             |      |               |
|    |          |        |     |             |      | 3               | fear | a        | 7   | 00       | 384.3       | -           |      |               |      |          |     |              |      |             |      | 3            | [ear | n        | 7    | 0° 3          | 3′.6 | -        |      |               |      | -             |
| -  | -        | _      | _   |             | -    |                 |      |          |     |          |             |             |      | Re            | nult | ing      | dip | . 700        | 36   | .1          | -    |              |      | -        |      |               |      |          |      |               |      | -             |

[Date, January 31, 1884. Station, Washington, D. C. Observer, J. R. MaxSeld. Three of beginning, 25 480 p. m.; time of ending, 35 600 p. m. Magnetic meridian reads 540 331.]

| Needle No. 3, N                       | o. 4 defic  | cting.      |    |          |     |          |         | Ne       | odle | No.      | 4, W | oigi     | ife | ).   |      |              |      |          |
|---------------------------------------|-------------|-------------|----|----------|-----|----------|---------|----------|------|----------|------|----------|-----|------|------|--------------|------|----------|
| Circle east,<br>Mic. D,<br>face cast. |             | onat,<br>R. |    | iroid    |     |          |         | ireli    |      |          |      | irei     |     | ant. |      | Circi        | 088  |          |
| B. N.                                 | 8.          | N.          |    | B.       | 1   | N.       |         | 5.       | 1    | N.       |      | 8.       | 1   | N.   |      | В.           | 1    | N.       |
| 71 58 71 51<br>48 46                  | 34 05<br>08 | 33 10<br>08 | 41 | 36<br>34 | 44  | 48<br>46 | o<br>41 | 41<br>43 | 40   | 50<br>52 | 42   | 17<br>15 | 4   | 1 30 | 4    | 3 00<br>2 56 | 48   | 12<br>10 |
| 71 50.5 71 48.5                       | 34 04       | 33 69       | 41 | 35       | 60  | 47       | 41      | 43       | 40   | 51       | 42   | 16       | . ( | 1 2  | 4    | 2 58         | . 49 | 11       |
| 71° 49′.5                             | 330         | 86'.5       | 1  | 410      | 11' | .0       | -       | 410      | 16'. | 5        |      | 610      | 82  | 1.5  |      | 420          | 34'. | 5        |
|                                       | -           |             |    | / 198001 |     | 410      | 18%     | 1        |      |          | 1    |          |     | 45   | e 13 | .6           |      |          |
| Mean3                                 | 70 17'. 0   | . 44'0      | ~  |          |     |          | -       | Me       | an.  |          | 410  | 43'.     | 6== | 794  |      | *****        |      |          |

(Date, January 3), 1884. Station, Washington, D. C. Observer, J. E. Maxifeld. Time of beginning, 3<sup>th</sup> 32<sup>th</sup> p. m.; time of ending, 3<sup>th</sup> 32<sup>th</sup> p. m. Magnetic meridian reads 54° 33'.)

| Nord        | le No. 3, 1          | No. 4 defic | ecting.     |                    |             | Ne                 | edle No.           | 4, weigh           | ted.                |                    |                    |
|-------------|----------------------|-------------|-------------|--------------------|-------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| Mic         | eant,<br>D.<br>cast. | Mic         | enst,<br>R  | Circ               | le west,    |                    | west,              |                    | e cast,<br>west.    |                    | o cost,            |
| 8.          | N.                   | 8.          | N.          | 8.                 | N.          | 8.                 | N.                 | 8.                 | N.                  | 8.                 | N.                 |
| 72 02<br>00 | 71 42<br>40          | 34 10<br>13 | 93 06<br>10 | 0 /<br>40 53<br>49 | 40 13<br>08 | 0 /<br>41 19<br>15 | 0 /<br>40 45<br>41 | 0 /<br>41 46<br>50 | 30 /<br>40 39<br>43 | 0 /<br>42 23<br>27 | 0 /<br>41 20<br>24 |
| 2 01        | 71 41                | 34 11.5     | 33 08       | 40 51              | 40 10. 5    | 41 14              | 40 43              | 41 48              | 40 41               | 42 25              | 41 2               |
| 710         | 51'. 0               | 330 €       | 39'. 8      | 400                | 30'. 7      | 400                | 58'. 5             | 410                | 14'. 5              | 410                | 53′. 5             |
|             |                      |             |             |                    | 400         | 44'.6              |                    |                    | 410                 | 34'.0              |                    |
| Mo          | AD                   | 870 14'. 6  |             | 1                  |             | Me                 | an                 | 41° 09'. 3         | i mo                |                    |                    |

[Date, February 1, 1884. Station, Washington, D. C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 2\* 05\* p. m.; time of ending, 2\* 23\* p. m. Magnetic meridian read\* 55° 00'.]

|                            | Polarity of mark           | ked end A north.                |                                 |                            | Polarity of mar            | ked end B north.           |                            |
|----------------------------|----------------------------|---------------------------------|---------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Circle cast,<br>face cast. | Circle east,<br>face west. | Circle west,                    | Circle west,<br>face west.      | Circle west,<br>face west. | Circle west,<br>face east. | Circle east,<br>face west. | Circle east,<br>face cast. |
| 8. N.                      | 8. N.                      | 8. N.                           | 8. N.                           | 8. N.                      | 8.   N.                    | 8. N.                      | S. N.                      |
| 71 08 70 45<br>07 44       | 71 23 71 05<br>22 04       | 0 / 0 /<br>70 22 70 03<br>22 02 | 0 / 0 /<br>70 44 70 24<br>44 24 | 70 15 69 55<br>15 55       | 70 46 70 19<br>46 19       | 70 50 70 30<br>50 30       | 71 09 70 49<br>00 49       |
| 71 07.5 70 44.5            | 71 22.5 71 04.5            | 70 22 70 02                     | 70 44 70 24                     | 70 15 69 55                | 70 46 70 19                | 70 50 70 30                | 71 09 70 49                |
| 70 - 564. 0                | 71° 13′. 5                 | 700 12'. 0                      | 70° 34′. 0                      | 70° 05′. 0                 | 70° 82′. 5                 | 70° 40′. 0                 | 70° 59′, 0                 |
| 710 (                      | 04'. 8                     | 700                             | 28'. 0                          | 700                        | 18'. 7                     | 700                        | 49', 5                     |
|                            | Mean                       | . 70° 43′. 9                    |                                 |                            | Mean                       | 70° 34′. 1                 |                            |
|                            |                            |                                 | Resulting di                    | ip. 70° 39′. 0             |                            |                            |                            |

N 70 10

70 12.5 80'. 0 [Date, February 1, 1884. Station, Washington, D.C. Needle No. 8 (extra). (theoryer, J. E. Maxfield. Time of beginning, 2<sup>h</sup> 25<sup>m</sup> p. m., f. time of ending, 2<sup>h</sup> 25<sup>m</sup> p. m. Magnetic merudian reads 50<sup>+</sup> 00<sup>+</sup>.)

|          |       | Polarit,                | y of marl                        | ked end  | A north             | ia .   |    |      |    |    |                |       |                | Po   | inrit                 | y ni | BIAR | ked | #B4   | B     | north              | ١.   |    |        |    |
|----------|-------|-------------------------|----------------------------------|----------|---------------------|--------|----|------|----|----|----------------|-------|----------------|------|-----------------------|------|------|-----|-------|-------|--------------------|------|----|--------|----|
| Circle e |       |                         | le vast,<br>west.                |          | le went,<br>n ennt. |        |    | e We |    |    |                | le we |                |      | livel<br>face         |      |      |     | Cire! |       | unt.               | -    |    | o enni |    |
| 8.       | N.    | 8.                      | N.                               | В.       | N.                  | 1 8    | 4. |      | N. |    | 8.             |       | N.             |      | И.                    |      | N.   | 1   | В.    |       | N.                 | 1    | я. | N      |    |
|          |       | 70 04<br>70 04<br>70 04 | 69 44<br>43<br>69 43.5<br>89', 8 | 70 30    | -                   | 70     | 87 | -    | 14 | 70 | 50<br>80<br>80 | 70    | 25<br>25<br>25 | 79   | 02<br>03<br>03<br>71° | 71   | 40   | 70  | 58    | 7     | 0 30<br>30<br>0 80 | 71   | 13 | -      | 50 |
|          | 700 4 |                         | leau                             | . 700 33 |                     | 21'. 0 |    |      |    |    | _              |       | 70°            | 44'. | 3                     | -th- |      | . 7 | 0~ 4° | 7′. 9 |                    | 51'. | 5  |        |    |

[Date, February I, 1884. Station, Washington, D.C. Observer, J. E. Maxfield. Time of beginning, 2° 54° p. m.; time of ending, 3° 10° p. m. Magnetic meridian reads 55° 00°.]

| Needle No. 3,                         | No. 4 | dei      | decti                    | ug.      |         |          |         |         |          |    |         | N             | 964 | He | No       | i. 4, 10 | reij     | anı | PU         |          |            |        |                |         |          |
|---------------------------------------|-------|----------|--------------------------|----------|---------|----------|---------|---------|----------|----|---------|---------------|-----|----|----------|----------|----------|-----|------------|----------|------------|--------|----------------|---------|----------|
| Circle cast,<br>Mic. D,<br>face cast. |       | M        | le en<br>ic. R,<br>s can |          |         | ircl     |         |         |          |    |         | irele<br>face |     |    |          |          |          |     | eni<br>Red |          | 1          |        | Circle<br>face |         |          |
| 8. N.                                 | 1 6   | š.       | 1 7                      | V.       | 1       | 4.       | v 100 m | 1       | ٧.       |    | 1       | 8.            |     | 1  | N.       |          | 5.       | -   |            | N.       |            | -      | в.             |         | N.       |
| 72 05 71 53<br>03 50                  | 34    | 09<br>07 | 93                       | 16<br>14 | o<br>40 | 53<br>48 |         | 0<br>60 | 19<br>15 |    | 0<br>41 | 43<br>38      | 1   |    | 01<br>57 | 61       | 50<br>55 |     | 40         | 52<br>56 |            | 42     | 97<br>93       | 0<br>41 | 20<br>25 |
| 72 04 71 51. 5                        |       |          | 415                      |          | 40      | 80.      |         | 10      | 17       | !  | 41      | 40. 8         |     |    |          | 41       |          |     | 40         | 54       | -          | 42     | 24. 5          |         |          |
| 110 81.1                              | -     | 11.3     | 94'                      |          |         |          | -       |         | 40°      | 84 | 0'.6    |               |     |    |          | -        |          |     |            |          | . !<br>e g | 18'.4  | -              | A.F. (1 | _        |
| Mean                                  | 17º 1 | nz. 4    | = H <sup>t</sup> a       |          |         |          |         |         | a contr  |    |         | M             | eni | 1. |          | .410     | 17       | .6  | 190        |          |            | - inde |                | -       |          |

[Date, February 2, 1884. Station, Washington, D.C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 11<sup>h</sup> 50<sup>m</sup> a.m., itime of ending, 6<sup>h</sup> 12<sup>m</sup> p.m.; magnetic meridian reads 55<sup>o</sup> 60<sup>s</sup>.]

|               |      |          | Po   | larit          | y o  | ma       | ked  | ene         | l A  | нот         | th.  |         | -            |      | w/10- 4  |        |          |          |          | Po   | larit       | y of | mar      | ked | end      | Bn    | orth     | 9     |          |       |          |
|---------------|------|----------|------|----------------|------|----------|------|-------------|------|-------------|------|---------|--------------|------|----------|--------|----------|----------|----------|------|-------------|------|----------|-----|----------|-------|----------|-------|----------|-------|----------|
| Circl<br>face |      |          |      | lirele<br>face |      |          | •    | Circ<br>fac |      |             |      |         | irch<br>face |      |          |        |          | we<br>we |          |      |             | 0 W  |          |     |          | le ea |          |       |          | lo en |          |
| 8.            |      | N.       | _    | 8.             |      | N.       |      | В.          | Ľ    | N.          |      |         | 3.           | 1    | N.       | 8      | 3,       | 2        | v.       | 1    | В.          |      | N.       |     | 8.       | I     | N.       |       | 5.       | į :   | N.       |
| 73 43<br>42   |      | 23<br>22 |      |                | 70   | 40<br>39 | 70   | 10          |      | 0 5<br>50 5 |      | °<br>70 | 45<br>45     | 70   | 21<br>21 | 70     | 35<br>35 | 70       | 15<br>15 | 70   | 39<br>39    |      | 14<br>14 |     | 53<br>53 | 76    | 35<br>35 | 71    | 20<br>20 | 70    | 58<br>58 |
| 0 42.5        | 70   | 22. 5    | 70   | 59. 1          | 70   | 89.      | 5 70 | 10          | 1    | 19 5        | 0    | 70      | 45           | 70   | 21       | 70     | 35       | 70       | 15       | 70   | 39          | 70   | 14       | 70  | 53       | 70    | 35       | 71    | 20       | 70    | 58       |
| 700           | 32′. | 5        | _    | 700            | 49'. | 5        | 1    | 70          | 00   | .0          |      | -       | 70°          | 83'. | 0        | 1      | 70°      | 25/.6    | )        |      | <b>70</b> ° | 26', | 5        |     | 700      | 44'.  | 0        | 1     | 710      | 094.  | )        |
|               |      | 700      | 41'. | 0              |      |          |      |             |      | 7           | 00 1 | 6'.8    |              |      |          | 1      |          |          | 700      | 25'. | 7           |      |          |     |          |       | 700      | 56'.  | 3        |       |          |
|               |      |          |      | 2              | 1ea  | n        | 7    | 00 2        | 81.8 | _           | -    |         |              |      | -        | 1      |          |          |          |      | 1           | Mea  | n        | 70  | 0 4      | 1.1   |          |       |          |       |          |
|               | · ·  |          |      |                |      |          |      | -           |      | -           |      | _       | Re           | eult | ing      | dip, 7 | 00 :     | 35'. O   | _        |      |             |      |          |     |          |       | -        | ***** |          |       | _        |

[February 2, 1884. Station, Washington, D. C. Needle No. 2, catra (this needle now takes the place of the broken needle 1). Observer, J. H. Manfield. Time of beginning, 10° 30° a.m., time of ending, 10° 50° a.m. Magnetic meridian result 50° 00°.]

|    |    |               |    |          |    |       | P  | nlı | rii            | y   | of            | rea (a)  | lke  | d e | nd       | B         | or     | th.     |      |     |          |      |          | 1    |          |     |         |          | 1 | Pol  | nrit,        | y e | ıf   | 10548 [  | ke  | d  | end      | A            | Pl C  | rth         |        | _   |     |                 |    |
|----|----|---------------|----|----------|----|-------|----|-----|----------------|-----|---------------|----------|------|-----|----------|-----------|--------|---------|------|-----|----------|------|----------|------|----------|-----|---------|----------|---|------|--------------|-----|------|----------|-----|----|----------|--------------|-------|-------------|--------|-----|-----|-----------------|----|
|    |    | rel           |    |          |    |       |    |     |                |     | ena<br>Cal    |          |      |     | reli     |           |        |         | •    |     |          | We   |          |      |          |     | we      |          | - |      | irel<br>face |     |      |          |     |    |          | lu o<br>n wi |       |             |        | Ch  | ela | irijai<br>Daini |    |
| 1  | M. |               | 1  | 1        | N. |       |    |     |                | Ī   | 2             | ſ.       |      | н   |          |           | N.     |         |      | s.  |          | 1    | ¢.       |      | ß.       | 1   | 2       | ¢.       | 1 | 1    | 5.           | L   | 2    | ζ.       |     | 5  | à.       | L            | 3     | ¢,          |        | Ħ,  |     | 1               | N. |
| 71 |    | ,<br>15<br>16 |    | 70<br>71 |    |       | ١, | 0 1 | ,<br>345<br>61 | 1   | 0<br>60<br>70 | 57<br>03 |      | 0   | 13       | 70        |        |         | 66   | 9 5 |          | 60   | 48<br>58 | 70   | 56<br>51 |     | 0<br>70 | 46<br>41 | - | 70   | 10<br>05     |     |      | 03<br>56 |     |    | 42<br>46 |              |       | 08<br>12    | 71     | 3   |     | 70              | 85 |
| 18 | 3  | 7. 8          | В  | 71       | 0  | 1. 8  | 1  | 0 3 | 36,            | 8   | 60.           | 564      | 5 1  | 0   | 10. 8    | 70        | 0      | 2. 8    | - 61 | 9 5 | 0. 8     | 60   | 40, 1    | 70   | 88       | 3   | 70      | 43.      | 8 | 70   | 07.          | 8   | 70   | 00.      | 8 ' | 71 | 44       | -            | 71    | 10          | 71     | 1 8 | 3   | 70              | 67 |
|    | 7  | 10            | 81 | DF.      | ä  |       |    |     | 700            | 1   | ν, (          | )        | 1    | 4   | 100      | ,<br>00'. | ā      |         |      | 6   | go (     | 15', | 5        | 1    | 70       | 0 4 | W. I    | 5        | i |      | 70°          | 04  | v. ( | )        | 1   |    | 719      | 97           | ٧,    | 1           |        | 7   | 0 1 | 14.             | 8  |
|    |    |               |    |          | 7  | 90    | 49 | . 2 |                |     |               |          | -    | -   |          |           | 6      | 00      | 564  | . 0 |          |      |          |      |          | -   | -       | 70       | 9 | w. : | 1            |     |      |          |     |    |          |              |       | 710         | 20%    | 8   |     | -               | -  |
|    |    |               |    |          |    |       |    |     | 3              | i e | an            |          |      | 70  | 22       | . 1       | mile s | of make |      |     | W/11-40- |      |          |      |          |     | **      | -00      |   |      | 3            | đe  | n 81 |          |     | 70 | ) o      | 53′.         | ó     |             | MAT 11 |     |     |                 |    |
| _  | -  | -             |    | m.reip   |    | beste | -  |     |                |     |               |          | 1949 | -   | here e e |           | mpun   | *****   | _    |     | Res      | mit  | ing e    | lin. | 709      | a   | 7'. 8   |          |   |      |              |     | -    |          | -   | -  |          |              | t-tu- | ula suprefi |        |     |     |                 |    |

(Date, February 2, 1884. Station, Washington, D. C. Needle No. 2. Observer, J. E. Maxfield. Time of beginning, 10<sup>h</sup> 55<sup>m</sup> a. m.; time of ending, 11<sup>h</sup> 15<sup>m</sup> a. m. Magnetic meridian reads 55° 00°.)

|         |    |           |       |     | ì  | ol   | mrit     | y of        | 11 | 1148 | ked  | one      | 1 11  | 3841 | rth.     |     |     |             |      |          |    |    |          |     |     |          | Po   | lari     | ty. | of    | mar      | ked | en      | rd d        | d n  | orth       |      |          |      |     |
|---------|----|-----------|-------|-----|----|------|----------|-------------|----|------|------|----------|-------|------|----------|-----|-----|-------------|------|----------|----|----|----------|-----|-----|----------|------|----------|-----|-------|----------|-----|---------|-------------|------|------------|------|----------|------|-----|
|         |    | cle<br>co |       |     |    |      |          | e en<br>Wei |    |      |      |          | e 10  |      |          |     |     | ele<br>cu t |      |          |    |    | irel     |     |     |          |      | ire      |     |       | nt,      | :   |         | els<br>ee t |      |            |      |          | le e |     |
| -       | В. |           | 2     | ٧.  | ĺ  | 2    | 8.       | 1           | N. |      |      | ß.       |       | N    |          |     | 8.  | - 1         |      | N.       | 1  | -  | ś.       |     | N   | ř.       |      | Б.       |     | 2     | ¢.       | 1   | 8.      | .           |      | N.         |      | s.       |      | N.  |
| 0<br>71 |    | 8         | 70    |     |    | 0    | 13<br>17 | 70          |    |      | 70   | 35<br>31 | 1     |      | 23<br>18 | 7   | 9 1 |             |      | 00<br>55 |    | 70 | 30<br>25 | , , |     | 19<br>14 | 70   | 22<br>17 |     |       | 10<br>05 | 71  | 15      |             | 70   | 38<br>43   | 70   | 52<br>56 | 7    | 0 2 |
| 71      | 10 | -         | 70    | 32. | 5  | 71   | 18       | 70          | 4  | 1    | 70   | 33       | 1     | 0    | 20. 8    | 7   | 0 0 | 7. 5        | 69   | 57       | 8  | 70 | 27.      | 5 7 | 0   | 16. 5    | 70   | 19.      | 5   | 70    | 07.      | 3 7 | 14      | 6. 5        | 17   | 40.        | 5 76 | 54       | 7    | 0 2 |
|         | 70 | 90 5      | 14. 2 | 1   | i  |      | 700      | 594.        | 5  |      |      | 70       | 26    | . 7  |          | ı   | 7   | 0° (        | 024. | 5        |    |    | 700      | 22  | . 0 | )        |      | 709      | 1   | 3', 1 | 5        |     | 70      | No E        | 57'. | 5          |      | 70       | 38   | . 0 |
|         |    |           |       | 700 | 56 | 4. 4 |          |             |    |      | -    |          |       |      | 700      | 14' | 6   |             |      |          |    | -  | - 4      |     |     | 700      | 17'. | 8        |     |       |          |     | day v v |             |      | 700        | 47'. | 8        |      |     |
|         |    |           |       |     | -  |      | k        | leau        |    |      | . 70 | 90 8     | 54. ( | 1    |          |     |     |             |      |          | -  |    |          |     |     |          |      |          | Me  | 14 13 |          | 7   | 00      | 32/         | 8    | a pa 14 mg |      |          |      |     |
|         |    |           | _     | -   | _  |      |          |             |    | -    | _    | -        |       |      | -        | _   |     | Reu         | mlt  | ine      | di | n. | 700      | 93/ | 0   | -        |      |          |     |       |          |     |         | •           |      |            |      | -        |      |     |

[Date, February 2, 1884. Station, Washington, D. C. Observer, J. E. Maxfield. Time of beginning, 11<sup>h</sup> 20<sup>m</sup> a. m.; time of ending, 11<sup>h</sup> 45<sup>m</sup> a. m. Magnetic meridian reads 55° 00′].

| Circle east,<br>Mic. D.<br>face east. | Circle e<br>Mic. I<br>face ca | R,         | Circle<br>face v   |                    | Circle<br>face |                    | Circle<br>face v | enst,<br>vest.     | Circle<br>face o   |             |
|---------------------------------------|-------------------------------|------------|--------------------|--------------------|----------------|--------------------|------------------|--------------------|--------------------|-------------|
| 8. N.                                 | 8.                            | N.         | В.                 | N.                 | 8.             | N.                 | 8.               | N.                 | 8.                 | N.          |
| 71 52 71 34<br>52 34                  |                               | 3 14<br>18 | 0 /<br>42 28<br>27 | o /<br>41 37<br>86 | 42 18<br>12    | 0 /<br>41 28<br>27 | 41 38<br>33      | 0 /<br>40 41<br>41 | 0 /<br>42 18<br>18 | 61 40<br>40 |
| 1 52 71 84                            | 34 06   3                     | 3 16       | 42 27. 5           | 41 36.5            | 42 12.5        | 41 27.5            | 41 33            | 40 41              | 42 18              | 41 40       |
| 710 43'. 0                            | 830 42                        | . 0        | 420 (              | 02'. 0             | 410            | 50'. 0             | 410 (            | 77'. 0             | 410                | 50'. 0      |
|                                       | and the same                  |            |                    | 410                | 564,0          | -                  |                  | 410                | 33'.0              |             |

H. Ex. 44---74

N.

0 80

Set 1.

[Date, February 15, 1844. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting, Observer, J. R. Maydeld. Time of beginning, 95 45% a. m. (75th meridian time.) Magnetic meridian reads 559 29 .]

| (  | M        | le ea<br>ic, D<br>e eas |                 | i |    | M        | le ea<br>ic. R<br>p eas |          |             | west,       |             | e west,     |             | e cant,<br>west. | face        | e east,   |
|----|----------|-------------------------|-----------------|---|----|----------|-------------------------|----------|-------------|-------------|-------------|-------------|-------------|------------------|-------------|-----------|
|    | н.       | 1                       | N.              | 1 |    | 8.       | 4                       | N.       | S.          | N.          | S.          | N.          | S.          | N.               | S           | N.        |
|    | ,        | :                       | ,               |   | 2  |          | ,                       |          |             | 0 /         | 0.7         | 0 /         | 0 1         | 0 /              | 0 /         | 0 1       |
| 33 | 08<br>06 | 34                      | $\frac{20}{18}$ | 1 |    | 62<br>58 | 71                      | 50<br>46 | 40 22<br>24 | 39 50<br>52 | 41 13<br>15 | 40 24<br>26 | 42 14<br>16 | 41 26<br>24      | 42 44<br>42 | 41 5<br>5 |
| 33 | 07       | 34                      | 19              |   | 72 | 00       | 71                      | 48       | 40 23       | 39-51       | 41 14       | 40-25       | 42 15       | 41 25            | 42 43       | 41 5      |
|    | 33       | 43/                     |                 | 1 |    | 71       | 54                      |          | 40          | 07          | 402         | 491.5       | 410         | 50'              | 420         | 17'.5     |
|    |          |                         |                 |   |    |          |                         |          |             | 400         | 287.2       | -           |             | 420              | 031.8       |           |

Set 2.

[Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting, Observer, J. E. Maxifeld. Magnetic meridian reads 55 29 .]

| Circle<br>Mic<br>face | . D. |          | . ( | 'irel<br>Mi<br>face | e. R. |          |    | ircle<br>face |     |          | •   |          | e We<br>8 <b>eas</b> |          |    |          | e eau<br>Wes |          |       | irel<br>face |         |          |
|-----------------------|------|----------|-----|---------------------|-------|----------|----|---------------|-----|----------|-----|----------|----------------------|----------|----|----------|--------------|----------|-------|--------------|---------|----------|
| s.                    | 1    | N.       | _   | 8.                  |       | N.       |    | s.            | 1   | N.       | ,   | 8.       |                      | N.       |    | 3.       | 1            | N.       | 8     | 3.           | 1       | N.       |
| 0 /<br>14 06<br>04    | 33   | 06<br>04 | 71  | 59<br>55            | 71    | 51<br>47 | 40 | 52<br>48      | 40  | 16<br>12 | 41  | 10<br>06 | 40                   | 30<br>26 | 42 | 12<br>10 | o<br>41      | 11<br>15 | 42    | 25<br>23     | o<br>41 | 20<br>18 |
| 4 05                  | 33   | 05       | 71  | 57                  | 71    | 49       | 10 | 50            | 40  | 14       | 41  | 08       | 40                   | 28       | 42 | 11       | 41           | 13       | 42    | 24           | 41      | 16       |
| 33                    | 35   |          |     | 71                  | 531   |          |    | 40            | 32' |          |     | 40       | 0 484                |          |    |          | 42/          |          |       | 410          | 51'.    | 5        |
|                       |      |          |     |                     |       | ****     |    |               |     | 40       | 40' |          |                      |          | -  |          | -            | 410      | 46'.8 |              |         |          |

Set 3.

†Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting. Observer, J. E. Maxfield. Magnetic meridian reads 555 29'.]

| Defl        | ecting nec                    | dle | faci     | ng o            | ut.             |    |    |                 |      |            |   |    |              | Nee          | lle 4                                   | , wei | ghte            | d.    |              |      |                 |       | _  |
|-------------|-------------------------------|-----|----------|-----------------|-----------------|----|----|-----------------|------|------------|---|----|--------------|--------------|---|-------|-----------------|-------|--------------|------|-----------------|-------|----|
| 31          | le east,<br>c. D.,<br>e east. |     | Mi       | e eas<br>c. R., |                 | ŀ  |    |                 | le w |            |   | (  |              | le we<br>eas |   |       |                 | le ea |              |      | Jircl<br>face   | e eas |    |
| S.          | N.                            | į   | ŝ.       | 1               | N.              |    | 1  | S.              |      | N.         | 1 |    | 3.           |              | N.                                      |       | S.              | 1     | N.           |      | 8.              |       | N. |
| 0 ,         |                               | 0   | ,        |                 | ,               | ij | 5  | ,               | 0    | , ,        |   | 0  | ,            | . 0          | ,                                       | 0     | ,               |       | ,            | 0    | ,               | . 0   | ,  |
| 33 55<br>59 | 32 56<br>33 00                | 71  | 51<br>53 | 71              | $\frac{32}{30}$ |    | 41 | $\frac{15}{13}$ | 4    | 0 28<br>26 |   | 40 | $^{44}_{46}$ | 39           | $\begin{array}{c} 57 \\ 59 \end{array}$ | 42    | $\frac{03}{01}$ | 41    | $^{17}_{15}$ | 42   | $\frac{14}{12}$ | 41    | 20 |
| 33 57       | 32.58                         | 71  | 52       | 71              | 31              |    | 41 | 14              | 4    | 0 27       | , | 40 | 45           | 39           | 58                                      | 42    | 02              | 41    | 16           | 42   | 13              | 41    | 11 |
| 33          | 27.5                          |     | 710      | 41/.            | 5               |    |    | 100             | 50'. | 5          | T |    | 400          | 21'.         | 5                                       |       | 419             | 39    | -            | 1    | 419             | 46    | ,  |
| -           |                               |     | -        | -               |                 |    |    |                 |      | 1          | 0 | 36 |              |              |   |       |                 |       | 410          | 42'. | 5               |       | _  |
| -           | 377 251                       | . 5 | // ()    |                 |                 | il |    |                 | -    |            |   |    | Me           | an           |   | 410   | 094.            | 2 n   | a            |      |                 | _     |    |

Set 4.

[Date, February 15, 1884. Station, Washington, D. C. Noedle No. 3 suspended, 4 deflecting. Observer, J. E. Maxfield. Magnetic meridian reads 550 29%]

| Mi          | e enst,<br>c. D.,<br>east. | Sin         | e cast,<br>c. R.,<br>ceast. |          | west,       |             | west,          |             | e east,<br>west. |             | cast,  |
|-------------|----------------------------|-------------|-----------------------------|----------|-------------|-------------|----------------|-------------|------------------|-------------|--------|
| S.          | N.                         | 8.          | N.                          | 8.       | N.          | S.          | N.             | S.          | N.               | S.          | N.     |
| 34 02<br>00 | 33 te                      | 71 49<br>45 | 71 42<br>38                 | 40 44 40 | 40 15<br>11 | 40 30<br>26 | 40 00<br>30 56 | 41 43<br>47 | 40 46<br>50      | 42 21<br>25 | 41 18  |
| 34 01       | 33 09                      | 71 47       | 71 40                       | 40 42    | 40 13       | 40 28       | 39 58          | 41 45       | 40 48            | 42 28       | 41 20  |
| 339         | 35                         | 710         | 435.5                       | 400      | 27'. 5      | 400         | 13'            | 410         | 16'. 5           | 410         | 51′. 5 |
|             |                            |             |                             |          | 400         | 201.2       |                |             | 410              | 34'         |        |

Set 5.

[Date, February 15, 1884. Station, Washington, D.C. Observer, J. E. Maxfield. Needle No. 3 suspended, No. 4 deflecting. Magnetic meridian reads 55° 29'.]

| Mi               | le east<br>ic. D,<br>east. |          |    | lirele<br>Mic<br>face | R.  |          |    |          | we<br>wea |          | : 0  | Sirel    | Need<br>6 we<br>6 eas | st,      |     | Cir-l<br>face | e ea  |          |      | Zircl<br>face |         |    |
|------------------|----------------------------|----------|----|-----------------------|-----|----------|----|----------|-----------|----------|------|----------|-----------------------|----------|-----|---------------|-------|----------|------|---------------|---------|----|
| s.               | X                          | . '      |    | S.                    | 1   | Ň.       | ,  | ń.       |           | N.       | -    | 8.       |                       | N.       |     | 8.            |       | N.       |      | В.            | 1       | N. |
| o<br>34 28<br>30 | 33                         | 23<br>27 | 71 | 50<br>46              | 71  | 30<br>26 | 42 | 28<br>26 | 41        | 37<br>35 | , 41 | 50<br>48 | o<br>41               | 02<br>00 | 41  | 13<br>15      | 40    | 28<br>26 | 40   | 43<br>43      | o<br>40 | 01 |
| 34 29            | 33 :                       | 25       | 71 | 48                    | 71  | 28       | 42 | 27       | 41        | 36       | 41   | 49       | 41                    | 01       | 41  | 14            | 40    | 27       | 40   | 43            | 40      | 0  |
| 339              | 57'                        |          | _  | 710                   | 38/ |          |    | 420      | 01'.      | 5        | 1    | 41       | 0 25/                 |          | 1   | 400           | 50°,  | 5        | 1    | 40            | 22'     |    |
|                  |                            |          |    |                       |     |          |    |          |           | 410      | 43'. | 9        |                       |          |     |               |       | 400      | 36'. | 2             |         |    |
|                  | 37                         | 12       | 5- | tt'a                  |     |          |    |          |           |          |      | M        | ean.                  |          | 410 | 094.7         | - 790 |          |      |               |         |    |

Set 6.

[Date, February 15, 1884. Station, Washington, D. C. Observer, J. E. Maxfield. ponded, No. 4 deflecting. Magnetic meridian reads 55° 29'.]

| (  | lire     | ele<br>lic | ea<br>D | st,      |     |         | faci<br>Cire<br>Mi | le e | as<br>{, | t,       |   |   | irel<br>ace |   |    |          |     | (   | lire!    | le : | we   | et,      |     | Circ<br>fae | ·le | ea  |          |    | -<br>Sirel<br>face |     |      |
|----|----------|------------|---------|----------|-----|---------|--------------------|------|----------|----------|---|---|-------------|---|----|----------|-----|-----|----------|------|------|----------|-----|-------------|-----|-----|----------|----|--------------------|-----|------|
|    | S.       | _!         |         | N.       | - 1 |         | s.                 |      | N        | r.       | ŀ | 8 | 3.          | 1 | 3  | N.       | 1   |     | S.       | 1    | 1    | N.       | 1   | S.          | 1   | - 7 | N.       |    | 8.                 | 1   | N.   |
| 34 | 03<br>01 |            | o<br>33 | 07<br>05 |     | o<br>71 | 51<br>47           | 7    | 1        | 48<br>44 |   |   | 36<br>38    |   | 39 | 56<br>58 |     | 40  | 57<br>59 |      | 40   | 20<br>22 | 41  |             |     | 41  | 03<br>01 | 42 | 31<br>29           | 1 - | 1 37 |
| 34 | 02       |            | 3.1     | 06       |     | 71      | 49                 | 7    | 1        | 46       | 4 | 0 | 37          |   | 39 | 57       |     | 40  | 58       |      | 40   | 21       | 41  | 48          | _   | 41  | 02       | 42 | 30                 | 4   | 1 36 |
| _  | 33       | <br>C      | 341     |          | ,   |         | 710                | 47   | .5       |          |   |   | 40          | 0 | 17 |          | -   |     | 40       | 3    | 97.1 | 5        | 1   | 41          | 0   | 25/ |          |    | 42                 | 03  |      |
|    |          |            |         |          |     |         |                    |      |          |          |   |   |             |   |    | 40       | > 2 | 8'. | 2        |      |      |          | i   |             |     |     | 411      | 41 |                    |     |      |
|    |          | _          |         | 7.0      | 191 | 2       | H'a                |      |          |          |   |   |             |   |    |          |     |     | м        | e.r  | n    |          | 41. | OG          | ,   |     |          |    |                    |     |      |

Set 7.

[Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting. Observer, J. E. Maxifeld. Time of ending, 11<sup>h</sup> 55<sup>m</sup> a. m.; magnetic meridian reads 550 29'.]

| J  | Dotle              | ect | in  | gno      | ed | le | fa               | cin | ıg   | out.     | j  |    |               |    |     |    |      | N           | eei | lle     | No.      | 4, v | veig        | bte  | d.       |          |     |    |              |      |          |
|----|--------------------|-----|-----|----------|----|----|------------------|-----|------|----------|----|----|---------------|----|-----|----|------|-------------|-----|---------|----------|------|-------------|------|----------|----------|-----|----|--------------|------|----------|
|    | Cire<br>mi<br>face | c.  | D,  |          |    |    |                  | nie | . В  |          |    | (  | lirel<br>face |    |     |    |      | Dire<br>fac |     |         |          |      | Circ<br>fac | le e | 08<br>08 | st,      |     | (  | lire<br>face | e ea |          |
| 1  | S.                 | 1   | 2   | ₹.       | 1  | 1  | 3.               |     |      | N.       |    |    | 8.            |    | N   |    |      | 8.          | 1   | 1       | N.       |      | ß.          | i    | 1        | Ň.       |     | 1  | S.           |      | N.       |
| 33 | 50<br>48           | 3   |     | 02<br>00 | 7  |    | 0 <b>6</b><br>02 |     | 71   | 53<br>49 | 1  | 40 | 30<br>26      | 39 | 5 4 |    | 41   | 31<br>27    | !   | 0<br>40 | 47<br>43 | 11   | 36<br>32    | 1    | 60       | 47<br>43 | 1   | 62 | 24<br>20     | 41   | 37<br>38 |
| 33 | 49                 | 3   | 3   | 01       | 1  | 2  | 04               | 1   | 71   | 51       | 1  | 40 | 28            | 38 | 4   | 9  | 41   | 29          | -   | 40      | 45       | 41   | 34          | 1    | 10       | 45       | 1   | 42 | 22           | 41   | 35       |
| -  | 330                | 2   | 51  |          | į- | -  | 71               | 0 [ | 57'. | 5        | ij |    | 400           | 08 | .5  |    | -    | 41          | 0   | 07      |          | 1    | 410         | 01   | ۲.       | 5        | İ   | _  | 410          | 58′. | 5        |
|    |                    |     | _   |          |    |    |                  |     |      |          | i  |    |               |    | 4   | 00 | 37′. | В           | -   |         |          | -    |             |      |          | 41       | 0 3 | 4' |              |      |          |
|    |                    | 2   | 379 | 18/      | .8 |    | 11/0             |     |      |          |    | -  |               |    |     | -  |      | M           | cai | n       |          | 410  | 05'.1       | 9    | ηe       | ,        |     |    |              |      |          |

Set 8.

[Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting, Observer, J. E. Maxileld. Time of beginning, 1<sup>h</sup> 00<sup>m</sup> p. m.: magnetic meridian reads 55° 29'.)

|    | Defl     | ecti                 | ng n     | eedl  | e fac    | ing           | in.      |      |    |                |     |          |       | Nε       | edle | No.      | 4, v | reig     | hted             |          |       |          |       |          |
|----|----------|----------------------|----------|-------|----------|---------------|----------|------|----|----------------|-----|----------|-------|----------|------|----------|------|----------|------------------|----------|-------|----------|-------|----------|
| •  |          | le ea<br>c. D<br>eas | , '      |       |          | le ea<br>c. R | , '      |      |    | lirele<br>face |     |          | (     |          | e we |          |      |          | lo ea            |          |       |          | e eas |          |
|    | 8.       | ] :                  | N.       |       | S.       |               | N.       | ľ    |    | 8.             |     | N.       |       | 8.       |      | N.       |      | 8.       | 1                | N.       |       | 8.       | 2     | N.       |
| 34 | 00<br>58 | 33                   | 11<br>09 | 71    | 48<br>44 | 71            | 42<br>46 |      |    | ,<br>00<br>56  | 40  | 26<br>22 | 41    | 06<br>02 | 40   | 25<br>21 | 40   | 49<br>53 | 39<br>40         | 57<br>01 | 41    | 18<br>22 | 42    | 19<br>23 |
| 33 | 59       | 33                   | 10       | 71    | 46       | 71            | 44       | - :  | 40 | 58             | 40  | 24       | 41    | 04       | 40   | 23       | 40   | 51       | 39               | 59       | 41    | 20       | 42    | 21       |
|    | 330      | 34'.                 | 5        | -     | 710      | 45            |          | - !- | _  | 400            | 41' |          |       | 400      | 43'. | 5        | 1    | 40       | 25               |          |       | 410      | 50'.8 | 5        |
|    |          |                      |          |       |          |               |          | 1    |    |                |     | 400      | 42'.: | 2        |      |          |      |          |                  | 410      | 07'.8 |          |       |          |
| _  |          | 37                   | ° 20     | .2 == | 14'0     | •             |          |      | -  |                | -   |          |       | М        | ean. |          | .400 | 55' :    | - η <sub>0</sub> | - '      |       |          |       |          |

Set 9.

(Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting. Observer, J. E. Maxfield. Magnetic meridian reads 55° 29'.)

| Circle<br>mic.<br>face | . D,           | 1              | cele enst,<br>nic R,<br>ce east. |             | o west,<br>west. |                | e west,<br>east. |                    | e east,<br>west.   |             | e east,<br>east. |
|------------------------|----------------|----------------|----------------------------------|-------------|------------------|----------------|------------------|--------------------|--------------------|-------------|------------------|
| 8.                     | N.             | S.             | N.                               | S.          | N.               | S.             | N.               | 8.                 | N.                 | S.          | N.               |
| 3 30<br>32             | 32 30<br>32 32 | 72 25<br>72 27 |                                  | 41 21<br>23 | 39 59<br>40 01   | 41 00<br>40 58 | 40 25<br>40 27   | 0 /<br>41 17<br>15 | 0 /<br>40 24<br>22 | 41 20<br>18 | 40 34            |
| 3 31                   | 32 31          | 72 20          | 72 03                            | 41 22       | 40 00            | 40 59          | 40 26            | 41 16              | 40 23              | 41 19       | 40 33            |
| 330                    | 01′            | 1 7            | 20 14'.5                         | 40          | 41'              | 400            | 42'.5            | 400                | 49'.5              | 400         | 56'              |

Set 10.

[Date, February 15, 1884. Station, Washington, D. C. Needle No. 3 suspended, No. 4 deflecting. Observer, J. E. Maxfield. Magnetic meridian reads 55° 29'.]

|               | D  | efle | etir      | ıg ne    | eedle | n fac    | ing           | in.      | 1  |               |      |          |         | Ne            | edlo | No.      | 4, w | eigh          | terl.            |          |       |          |       |          |
|---------------|----|------|-----------|----------|-------|----------|---------------|----------|----|---------------|------|----------|---------|---------------|------|----------|------|---------------|------------------|----------|-------|----------|-------|----------|
|               | п  | mie. | eas<br>D, |          | 1     |          | e ea<br>c. R. |          |    | irole<br>face |      |          | (       | ircl<br>face  |      |          |      | Circl<br>face |                  |          |       |          | 0 08s |          |
| 1             | 8. |      | 1         | ٧.       |       | 8.       |               | N.       |    | В.            | 1    | N.       |         | 8.            | 1    | N.       | 1    | 3.            | 1                | N.       | 1     | 8.       | 1     | N.       |
| 0<br>34<br>33 |    | 0    | o<br>83   | 06<br>04 | 71    | 50<br>46 | 71            | 41<br>37 | 40 | 28<br>26      | 39   | 47<br>45 | o<br>41 | ,<br>48<br>46 | 40   | 56<br>54 | 42   | 09<br>13      | 41               | 07<br>11 | 42    | 18<br>22 | 41    | 15<br>19 |
| 88            | 51 | 9    | 83        | 05       | 71    | 48       | 71            | 39       | 40 | 27            | 89   | 46       | 41      | 47            | 40   | 55       | 42   | 11            | 41               | 09       | 42    | 20       | 41    | 17       |
|               |    | 330  | 32/       |          | 1     | 710      | 43'           | 5        | -  | 400           | 06'. | 5        | -       | 41            | 21/  |          | 1    | 419           | 40               |          |       | 410      | 48'.  | ő        |
|               |    |      |           |          |       |          |               |          |    |               |      | 400      | 43'.    | В             |      |          |      |               |                  | 410      | 44/.5 | 2        |       |          |
|               |    |      | 3         | 70 22    | . 2=  | :16'0    |               |          |    |               |      |          |         | M             | [ean |          | .410 | 14'=          | = η <sub>0</sub> |          |       |          |       |          |

Set 11.

[Date, February 15, 1884. Station, Washington, D.C. Needle No. 3 suspended, No. 4 deflecting. Observer, J. E. Maxfield. Magnetic meridian reads 55° 20'.]

| Defie       | cting no                  | edle faci   | ng out.                   |                    |                    | Ne                 | edle No.           | 4, weigh           | ted.               |             |                    |
|-------------|---------------------------|-------------|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|--------------------|
| mic         | e east,<br>b. D,<br>east. | mie         | e east,<br>c. R,<br>east. |                    | e west,<br>west.   |                    | west,              |                    | east,<br>west.     |             | e east,            |
| 8.          | N.                        | S.          | N.                        | 8.                 | N.                 | 8.                 | N.                 | 8.                 | N.                 | S.          | N.                 |
| 83 54<br>52 | 0 /<br>32 58<br>56        | 72 10<br>08 | 0 /<br>72 04<br>02        | 0 /<br>40 42<br>38 | 0 /<br>40 06<br>02 | 0 /<br>41 04<br>00 | 0 /<br>40 27<br>23 | 0 /<br>41 83<br>37 | 0 /<br>40 34<br>38 | 42 07<br>11 | 0 /<br>41 08<br>12 |
| 33 53       | 32 57                     | 72 09       | 72 03                     | 40 40              | 40 04              | 41 02              | 40 25              | 41 35              | 40 36              | 42 09       | 41 10              |
| 330         | 25'                       | 720         | 06'                       | 400                | 22'                | 400                | 43'. 5             | 410                | 05', 5             | 410         | 39'. 8             |
|             |                           |             |                           |                    | 400                | 32'. 8             |                    |                    | 410                | 22'. 5      |                    |
|             | 370 14                    | . 5=u'0     |                           | 1                  |                    | Me                 | au                 | 40° 57′. 6         | = ŋn               |             |                    |

Set 12

[Date, February 15, 1884. Station, Washington, D. C. Needle No. 8 suspended, No. 4 deflecting. Observer, J. E. Maxfield. Time of ending, 28 20 p. m.; magnetic meridian reads 55 28 (4)

| Deffe                 | cting ne           | edle   | faci     | ng ii          | n.       | ļ                   |    |     |      |    |    |    | N        | ee | dle     | No. | 4, 15 | eigl     | hte | d. |          |      |                    |          |    |     |          |
|-----------------------|--------------------|--------|----------|----------------|----------|---------------------|----|-----|------|----|----|----|----------|----|---------|-----|-------|----------|-----|----|----------|------|--------------------|----------|----|-----|----------|
|                       | east,<br>D,        |        | mie      | eas<br>R, east |          | Account of the last |    |     | e we |    |    |    |          |    |         |     | (     |          |     |    |          |      |                    |          |    |     |          |
| S.                    | N.                 | S      |          | N              | v.       |                     | 8  | i   |      | N. |    | 1  | 3.       | i  | 1       | ₹.  | 1     |          | -   | 1  | V.       | 1    | 2                  | 3.       |    | 7   | ٧.       |
| 9 /<br>33 58<br>34 00 | 9 /<br>32 56<br>58 | 71     | 48<br>52 | 71             | 30<br>34 |                     | 40 |     | 39   |    |    | 41 | 15<br>17 |    | o<br>40 |     |       | 43<br>41 |     |    | 55<br>58 |      |                    | 17<br>15 |    | 42  | 07<br>05 |
| 33 59                 | 32 57              | 71     | 50       | 71             | 32       | 11                  | 40 | 37  | 89   | 54 | Ţ  | 41 | 16       |    | 40      | 29  | 41    | 42       | -   | 10 | 54       |      | 41                 | 16       | -, | 42  | 06       |
| 330                   | 28'                | -      | 710      | 41'            |          | ١,                  |    | 400 | 15'. | 5  | i  |    | 400      | 5  | 27, 8   | 5   |       | 41       | 0 1 | 81 |          | -  - |                    | 41       | 0  | 41' | _        |
|                       |                    |        |          |                |          |                     |    |     |      | 40 | 10 | 34 |          |    |         |     |       |          |     |    | 410      | 29   | ) <sup>'</sup> , ! | 5        |    |     | _        |
|                       | 370 25             | ′. 5=t | 4°0      |                | ~        | 1                   |    |     |      |    | -  |    | М        | на | n       |     | 410   | 01/.     | 8=  | ηο |          |      |                    |          |    |     |          |

DETERMINATION OF THE MOMENT OF MASS (M<sub>1</sub>) OF THE MASS RING ACCOMPANYING THEODO. LITE MAGNETOMETER NO. 11.

The mass ring accompanying theodolite magnetometer No. 11 is of brass or gun metal, and bas no distinguishing mark on it. Its weight was determined at the Coast and Geodetic Survey Office, by E. B. Lefavour, April 29, 1881, and found to be 300.767 grains.

The following measurements to determine the inner and outer diameters were made at the Coast and Geodetic Survey Office by Assistant C. A. Schott:

| 1881, April 29.  | Temp. 77° F.                                      | . 1881, April 30.                     | Темр. 78° Г.         |
|------------------|---|---------------------------------------|----------------------|
| Outer diameter.  | Inner diameter.                                   | Outer diameter.                       | Inner diameter       |
| 3.778***         | 2. 95 tcm   | 1. 489m                               | 1. 160 <sup>th</sup> |
| . 778            | 2, 954<br>2, 952                                  | . 489                                 | . 159                |
| 780              | 2.952   | . 490                                 | . 161                |
| . 780            | 2. 952  | . 490                                 | . 160                |
| 3 779            | 2, 953  | 1. 4895                               | 1. 1600              |
| 3. 77            | 9cm=1, 4878m                                      | g=0. 529cm ±0. 208m<br>1 2. 95        | 3cm=1. 1626ia        |
|                  | 1. 4895   |                                       | 1. 1600              |
| Outer diame      | ter=1.4886  | Inner diame                           | ter == 1. 1613       |
| M <sub>1</sub> = | $= \frac{1}{2} (r^2 + r_1^2) w = \frac{(.74)}{2}$ | $\frac{48)^2 + (5807)^2}{288} < 300.$ | 767                  |
|                  | 10.0 0 55000                                      | 0.89119                               | 9, 94997             |
| 6.74             | (3)*··· 0, 55398                                  |                                       |                      |
|                  | 17)2 - 0. 33721                                   | 300, 767                              | 2.47823              |
|                  | 17)2 - 0. 33721                                   | 300, 767<br>288 (av. co.)             | 2. 47823<br>7. 54061 |
|                  |   |                                       | 7, 54061             |
|                  | 17)2 - 0. 33721                                   |                                       |                      |

Moment of Mass (M<sub>1</sub>) of the mass ring accompanying theodolite magnetometer no. 11.  $M_1 = 0.93070 \text{ at } 75^{\circ} \text{ Fah.}$ 

 $M_1$  at any temperature t will be

0.93070 [1+.06002(t-75)]

| Temperature. Log M <sub>1</sub> .  10° F. 9.06824 20 33 40 42 40 50 50 60 68 70 77 80 9.06824 |                      |             |
|---|----------------------|-------------|
| 30 33 34 42 40 51 50 59 60 68 70 77 80 85   | ${\bf Temperature}.$ | Log $M_1$ . |
| 30 33 34 42 40 51 50 59 60 68 70 77 80 85   | 102 17               | 0.08894     |
| 30 42<br>40 51<br>50 59<br>60 68<br>70 77<br>80 85  |                      |             |
| 50 59 68 70 77 80 85  | 30                   |             |
| 60 68<br>70 77<br>80 85   |                      |             |
| 70<br>80 77<br>85   |                      |             |
| 80 85   |                      |             |
|   |                      |             |
| 90 9. 96894   |                      |             |
|   | 90                   | 9. 96894    |

COMPUTATION OF THE MOMENT OF MASS (M) OF THE LONG MAGNET  $L_n$  ACCOMPANYING THE THEODOLITE MAGNETOMETER YO, 11.

[Station, Magnetic Observatory, Washington, D. C. Observer, M. Smith. Date, June 10, 1881.]

|               | Log's. Log's. | T12 | - | <br>28.016<br>29.657 (a. c.)<br>M <sub>1</sub>   | 1. 44741<br>8. 52787<br>9. 96871 |
|---------------|---------------|-----|---|--|----------------------------------|
| $T^2$ $T_1^2$ | 1. 76097      |     |   | $M \text{ at } 63.^{\circ}4 \text{ Fah.} = 0.87900 \\ (63.4-62) \times .0000136 = .00001904$ | 9. 94399<br>5. 27967             |
| 1             | 1             |     |   | Reduction to $62^{\circ}$ Fah. $\approx -0.00092$  | 5, 22366                         |
| :             |               |     |   | M at 62° Fah.=0.87898; w=  | at .                             |

NG THEODO-

ı metal, and letic Survey

made at the

METER NO. 11.

ANYING THE

[Date, June 11, 1881.]

| 1 |                           | Log's.                           | Log's. | T12                | $T^2$              | $T_1^2 - T^2$     | 28 496<br>30.214 (a. v.)  | 1. 45478<br>8. 51979             |
|---|---------------------------|----------------------------------|--------|--------------------|--------------------|-------------------|---|----------------------------------|
| 1 | $T^2$ $T_1^2$ $T^2$ $T^2$ | 1. 45494<br>1. 70893<br>1. 45472 |        | 58, 730<br>58, 680 | 28, 499<br>28, 492 | 30, 210<br>30 188 | M₁<br>M at 762.8 Fab. 0.87779<br>(76.8-62) × .0000136 = .00020118   | 9. 96882<br>9. 94339<br>6. 30380 |
| 1 | 11.                       | 1. 76805                         |        |                    | 28. 496            | 30. 214           | Reduction to 62° Fah. = +, 00018 $\label{eq:matter} \textbf{\textit{M}} \text{ at } 62° \text{ Fah.} = 0, 87761  ; \ m=2$ | 6. 24719                         |

[Date, June 17, 1881.]

|   | Log's.   | Log's.   | T12   | $T^2$   | $T_1^g - T^g$   |  |  |
|---|--|--|---|---|---|--|--|
| $T^2$ $T_1^2$ $T^2$ $T^2$ $T^3$ $T^2$ $T^3$ $T^2$ $T^2$ $T^2$ | 1, 46422<br>1, 77824<br>1, 46532<br>1, 7833<br>1, 4656<br>1, 77938<br>1, 46681<br>1, 77962 | 1. 46477  <br>1. 78028  <br>1. 46584  <br>1. 78086  <br>1. 46658  <br>1. 779 ° 0  <br>1. 40620 | 60, 012<br>60, 295<br>60, 580<br>60, 575<br>60, 170<br>60, 187<br>60, 203 | 29, 159<br>29, 196<br>29, 231<br>20, 266<br>29, 281<br>29, 296<br>29, 235 | 30, 853<br>31, 099<br>31, 349<br>31, 103<br>30, 889<br>30, 894<br>30, 948 | $\begin{array}{lll} 29.241 & & & \\ 31.020 \; (a.c.) & & & \\ M_1 & & & \\ M & & & \\ M & 1.879 \; \mathrm{Fah}, & = 0.87751 \\ (87-62) \; \; .0000136 & = 0.003400 \\ & & & \\ \mathrm{Reduction to } \; 629 \; \mathrm{Fah}, =00030 \end{array}$ | 1. 46599<br>8. 50306<br>9. 90891<br>9. 93326<br>6. 75148<br>6. 47474 |
| $T^2$   | 1.46559  |  |   |   |   | M at 62° Fah. = 0. 87723; ≈ 2 = 7  |  |
| 1   |  |  |   | 29 241  | 31, 020   |  |  |

[Date, January 28, 1884. Observer, J. E. Maxifeld.]

|                   | Log's. Log's.       | $T_1^2$ | $T^2$   | $T_1^2 - T^2$ | 20                             | 1 4000  |
|-------------------|---------------------|---------|---------|---------------|--------------------------------|---------|
|                   | nog a ang a         | 4.6     |         | 111           | 20.099                         | 1. 4638 |
|                   |                     |         |         |               | 30.935 (a. c.)                 | 8, 5098 |
|                   |                     |         |         |               | 1/1                            | 9. 9683 |
| $T_{ab}$          | 1. 46429            |         |         |               |                                | -       |
| $T_1^{i}$ $T^{i}$ | 1, 77801 . 1, 46410 | 59, 980 | 29, 114 | 30. (4)       | M at 46° Fah. = 0.87496        | 9, 941  |
| Tra               | 1. 46391 1. 77840   | 60 034  | 29. 10° | 30, 9 3       | (62-46)0000136 = .0002176      | 6 337   |
| $T_1^{z}$         | 1. 77878   1. 46362 | 60. 087 | 29, 082 | 31, 005       | (0 10) . ((0 10)               | 0 11111 |
| $T^2$             |                     | 00.001  | 20,002  | 31.003        | D. I. al man Fl. I man to      | 0.020   |
| 2.                | 1. 46334            |         |         |               | Reduction to 62° Fah.=+. 00019 | 6, 279  |
| - 1               |                     |         |         |               |                                |         |
| ì                 |                     |         | 29, 099 | 30.935        | M at 62° Fah. = 0. 87515; w=   | =3      |

#### RECAPITULATION.

| Date.   | M at 62° Fah. | w |
|---------|---------------|---|
| 1881.   |               |   |
| June 10 | 0.87898       | 1 |
| June 11 | 0.87761       | 2 |
| June 17 | 0.87723       | 7 |
| June 28 | 0.87515       | 3 |
|         | 0. 87694      |   |
| 1       |               |   |

## **M** at any temperature t will be 0.87694 [1+.0000136 (t-62°)]

| Temperature. | Log M.   |
|--------------|----------|
| 60°          | 9. 94296 |
| 50           | 30       |
| 40           | 84       |
| 30           | 78       |
| 20           | 72       |
| 10           | 66       |
| 0            | 60       |
| -10          | 54       |
| -20          | 48       |
| -30          | 9. 94242 |

[Base Station, Washington, D. C. Year, 1884. Kew Dip Circle No. 23. Observer, J. E. Maxfield.]

| Jan. 30, Needle 2<br>Needle 2<br>Needle 3 (extra) | 35.9   | Jan. 30, Needle 3, needle 4 deflecting 37 Jan. 31, Needle 3, needle 4 deflecting 37 | 20. 2<br>10. 1<br>21. 9<br>17. 0 | Feb. 15, Needle 4 weighted.   | 41 16.<br>41 13.<br>41 09.<br>40 57.<br>41 00.<br>41 06   |
|---|--|---|----------------------------------|---|---|
| Jan. 31, Needle 2<br>Needle 2                     | 70 40.1<br>36.1<br>70 38.1                               |   | 14. 6                            |   | 41 05,<br>40 55,<br>40 47,<br>41 14,<br>40 57,  |
| Feb. 1, Needlo 2<br>Needlo 3 (extra)              | 70 39.7  |   |                                  |   | $\eta e = \begin{array}{c} 41 & 01. \\ \eta e = \begin{array}{c} 41 & 04. \\ 0 & = \begin{array}{c} 70 & 39. \end{array}$ |
| Feb. 2, Needle 2                                  | 37. 8<br>33. 9<br>70 35. 6                               | Feb. 2, Needle 3, needle 4 deflect-   | 10. 4                            | 1   | u o = 20 35.  |
| Recapitulation.                                   | 35, 9<br>38, 1<br>39, 7<br>35, 6                         | Recapitulation.   |                                  | Feb. 15, Needle 3, needle 4 deffect   | 16,<br>25,<br>20<br>12,   |
|   | 37, 3=θ <sub>0</sub> 0 / 41 53, 8 41 24.7 12.1 43.6 09.3 | Jan. 30. 37 20. 3 Jan. 31. 15. Feb. 1. 10. Feb. 2. 17. 37                           | 5                                | ,   | 19<br>18,<br>20,<br>22,<br>22,<br>14,<br>25,<br>y'o == 37 19,   |
| eb. 1, Needle 4 weighted                          | 41 22.4<br>41 17.6<br>41 44.5                            | Sin $u_0 = \sin 29^\circ$ 02'. 7 9.<br>Sin $u'_0 = \sin 37$ 16.0 9.                 | og's.<br>68619<br>78213<br>12696 | Sin $u_0 = \sin 29^\circ$ 35'. 0<br>Sin $u_0 = \sin 37$ 19.1<br>See $\eta_0 = \sec 41$ 04.4 | Log's<br>9, 693<br>9, 782<br>0, 122   |
| Jan. 31<br>Feb. 1<br>Feb. 2                       | 22. 4<br>17. 6<br>44. 5<br>34. 6=ηο<br>37. 3=θο          | 2) 9.<br>Sec 60 = sec 70° 37′, 3 0.   | 59438<br>79719<br>47912<br>64128 | Sec $\theta_0 = \sec 70^{\circ} 39'.4'$<br>$H_0 = 4.378'$                                   | 2) 9, 598   |
| -   | 02. 7  | A = 8. 2716 0.  | 91759                            | A = 8. 3282†  | 0, 9203   |

<sup>\*</sup> Deduced from annual observations for 18 years, 1867-'84.

This value of A is to be used only in connection with observations made at Uglaamie, Alaska, previous to September, 1882, a different weight having been employed after August, 1882.

### APPENDIX No. 3.

OBSERVATIONS MADE AT UGLAAMIE, ALASKA, IN 1881-282-283, FOR DETERMINING THE ABSOLUTE MAGNETIC DECLINATION, TOGETHER WITH THE COMPUTATION AND A RECAPITULATION OF RENULTS.

[Computer, E. H. Constensy.]

| Time.  | Mean<br>senle-<br>readings.  | Computation.  | Time.  | Mean<br>scale-<br>readings.   | Computation.   |
|--|--|---|--|---|--|
| 1 a. m.<br>2 a. m.   | d.<br>21, 70<br>27, 63   | Line of detorsion 18° 00' Azimuth circle \$\begin{cases} A. 232 & 11 \ B. 52 & 13 \end{cases}\$   | 1 a. m.<br>2 a. m.   | 39, 69  | Line of detorsion  |
| 3 a. m.<br>4 a. m.<br>5 a. m.<br>6 a. m.   | 25, 14<br>27, 04<br>28, 27<br>24, 02   | Reading of mark.  At beginning of a. m. observa (A. 99 59 tions B. 280 01   | 3 a. m.<br>4 a. m.<br>5 a. m.<br>6 a. m.   | 36, 54<br>41, 47  | Reading of mark   At beginning of a. m. observa-   |
| 7 a. m.<br>8 a. m.<br>9 a. m.  | 23, 96<br>19, 91<br>23, 15   | At end of p. m. observations \  | 7 n. m.<br>8 n. m.<br>9 n. m.  | 40 83<br>37 57<br>36, 46  | At end of p. m. observations   |
| 0 a. m.<br>1 a. m.<br>2 m.   | 25, 39<br>20, 95<br>21, 32   | Value of one division of scale = 3.09   | 10 a. m.<br>11 a. m.<br>12 m.  |   | Value of one division of scale = 37.63   |
| p. m.<br>2 p. m.<br>3 p. m.  | 22. 53<br>16. 90<br>24. 43   | Scale-reading of axis   | 1 p. m.<br>2 p. m.<br>3 p. m.  | 37, 96<br>35, 12  | Scale-reading of axis  |
| p. m.<br>p. m.<br>p. m.  | 24, 09<br>24, 74<br>24, 36<br>24, 62   | diff. = 11.73  Reduction to axis0° 43'.3  | 4 p. m.<br>5 p. m.<br>6 p. m.  | 32, 11<br>44, 61<br>45, 59  | diff =   3,88<br>  Reduction to axis   |
| p. m.<br>p. m.<br>p. m.<br>p. m.   | 24, 71<br>23, 68<br>23, 04   | Azimuth circle reads         232         12.0           Magnetic meridian reads         231         28.7  | 7 p. m.<br>8 p. m.<br>9 p. m.<br>10 p. m.  | 40. 14<br>35, 01<br>35, 33  | Azimuth circle reads         220         24.0           Magnetic meridian reads         220         35.3   |
| p. m.  | 21. 82<br>23. 00   | Mean reading of mark  | 11 p. m.<br>12 p. m.   | 38, 71<br>37, 70  | Mean reading of mark   95   53.4   |
|  | = 566, 40<br>= 23, 60  | Magnetic declination 35 15.71   | Sum<br>Mean  | = 941. 10<br>= 32. 21   | Magnetic declination 37 28.  |
| Dark.  | Mean<br>scale-   | ended. Observers: Cassidy, Murdoch, Smith, and Computation.   | Date,<br>Magi<br>Dark<br>Time.   | Mean scale-   | nded. Observers: Cassidy, Murdoch, Smith,  Computation.  |
| Dark.  | ]<br>  Mean  | Computation.  Reading of mark.  | Maga<br>Dark   | et L <sub>ii</sub> suspe<br>-] Mean   | Computation.  Reading of mark.   |
| l'ime.  1 a. m. 2 a. m. 3 a. m. 4 a. m.  | Mean<br>scale-<br>readings.<br>d.<br>30, 28<br>43, 93<br>48, 56<br>58, 30  | Computation,  | Magi<br>Dark<br>Time.<br>1 a. m.<br>2 n. m.<br>3 a. m.<br>4 n. m.  | met L <sub>0</sub> suspe<br>  Mean scale-<br>readings.<br>  d.<br>  30, 54<br>  39, 37<br>  39, 66  | Computation.  Reading of mark.  At beginning of a. m. observa: { A. 276 2 tions}  At out of n. m. observations.  |
| 1 a. m.<br>2 a. m.<br>3 a. m.<br>4 a. m.<br>5 a. m.<br>6 a. m.<br>7 a. m.  | Mean scale-readings.  d. 30, 28 43, 93 448, 56 38, 30 40, 90 42, 60 44, 90   | Computation.     Reading of mark.   At beginning of a. m. observa   A. 275° 54' tions   | Time.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 7 a. m.   | Mean scale-<br>readings.  d. 36.54 39.37 39.77 39.66 39.11 39.45 40.37  | Computation.  Computation.  Reading of mark.  At beginning of a. m. observa { A. 276 at tions  |
| Cime.  La. m.  | Mean scale-readings.  d. 30, 28, 43, 93, 48, 56, 38, 30, 40, 90, 42, 60, 47, 91, 45, 40, 42, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50  | Computation.     Reading of mark.   At beginning of a. m. observa.   A. 275° 54'   1018   | Time.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 6 a. m. 7 a. m. 8 a. m. 9 a. m.   | Mean scale-readings.  d. 30.54 39.77 39.77 39.66 39 11 39.48 39 18 30.37  | Reading of mark.  At beginning of a. m. observa { A. 276 2 tions. } B. 96 3  |
| Time.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 6 a. m. 8 a. m. 9 a. m. 1 a. m. 2 m.  | Menn scale-readings.    d. 30, 28  | Computation.     Reading of mark.   At beginning of a. m. observa.   A. 275° 54'   B. 05 53   At end of p. m. observations.   | Magg Dark  Time.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 7 a. m. 8 a. m. 9 a. m. 10 a. m. 11 a. m. 12 m. 1 b. m. 11 a. m. 12 m. 1 b. m. 1 | et L., suspe-<br>land scale-<br>readings.  d. 36, 54 39, 37 39, 77 39, 66 39, 11 39, 45 40, 37 30, 48 39, 18 33, 17 31, 14 37, 18   | Computation.  Reading of mark.  At beginning of a. m. observe (A. 276 2 tions  |
| Time.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 6 a. m. 7 a. m. 9 a. m. 1 a. m. 2 m. 1 p. m. 2 p. m. 4 p. m. 5 p. m. 6 p. m. 7 p. m.  | Mean scale-readings.  d. 30, 28 43, 93 48, 56 38, 30 40, 99 44, 60 44, 91 45, 49 42, 15 48, 28 42, 15, 55, 61 45, 12 51, 15 61, 52 60, 35  | Computation.     Reading of mark.     At beginning of a. m. observat   A. 275° 54   tions     B. 95° 53   At end of p. m. observations  | Magg Dark  Time.  1 a. m. 2 a. m. 3 a. m. 5 a. m. 6 6 a. m. 7 a. m. 12 m. 11 a. m. 12 m. 12 m. 14 p. m. 2 p. m. 15 a. m. 15 a. m. 16 p. m. 16 p. m. 17 p. m. 18 p. m. | red 4.,, suspection and the state of the sta            | Computation.  Computation.  Reading of mark.  At beginning of a. m. observa A. 276 tions.  At end of p. m. observations.  Mean tions.  Determination of axis of magnet.  Scale. Scale-readings. Mean. Altn'te mean.  |
| Cime.  1 a. m. 2 a. m. 3 a. m. 4 a. m. 5 a. m. 6 a. m. 9 a. m. 9 a. m. 1 a. m. 2 m. 1 p. m. 2 p. m. 3 p. m. 4 p. m. 5 p. m. 6 p. m. 6 p. m. 6 p. m. 6 p. m. 7 p. m. 7 p. m. 8 p. m. 9 p. m. 9 p. m.  | Menu scale-readings.  d. 30, 28, 48, 56, 48, 56, 44, 50, 44, 50, 47, 94, 45, 40, 42, 32, 42, 15, 56, 61, 55, 61, 50, 51, 51, 51, 51, 51, 51, 51, 51, 51, 51  | Computation.   Reading of mark.   At beginning of a. m. observa   A. 275° 5½ tions   B. 95 53   At end of p. m. observations  | Magra   Dark   | ed L <sub>0</sub> , suspection and the scale sc | Computation   Computation   Reading of mark  |
| Time.  1 a. m. 2 a. m. 2 a. m. 3 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 1 a. m. 1 a. m. 2 m. 1 p. m. 3 p. m. 3 p. m. 3 p. m. 4 p. m. 5 p. m. 6 p. m. 9 p. m. 1 p. m. 8 p. m. 9  | Menu scale-readings.  d. 30, 28 43, 93 48, 56 38, 30 42, 60 44, 90 47, 91 45, 42, 25 46, 28 45, 79 49, 87 45, 32 55, 61 45, 15 61, 52 60, 53 66, 59 66, 59 66, 59 67, 51, 73   | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  | Magra   Dark     | ed L <sub>0</sub> , suspection and the scale sc | Computation   Computation   Computation   Reading of mark   At beginning of a. m. observa  |
| Time.  1 a. m. 2 a. m. 2 a. m. 3 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 1 a. m. 1 a. m. 2 m. 1 p. m. 3 p. m. 3 p. m. 3 p. m. 4 p. m. 5 p. m. 6 p. m. 9 p. m. 1 p. m. 8 p. m. 9  | Menu scale-readings.  d. 30, 28 43, 93 48, 56 38, 30 42, 60 44, 90 47, 91 45, 42, 25 46, 28 45, 79 49, 87 45, 32 55, 61 45, 15 61, 52 60, 53 66, 59 66, 59 66, 59 67, 51, 73   | Computation.   Reading of mark   A. 275° 54   B. 95 53   At end of p. m. observations.     275 53.   At end of p. m. observations.     275 53.   Determination of axis of magnet.     Computation of axis of magnet. | Magra   Dark     | ed L <sub>0</sub> , suspection and the state of the sta | Computation.   Reading of mack.   At beginning of a, m, observer   A   276   tions   B   06   At end of p, m, observations   B   06   Observations   B   06   Observations   Computation of axis of magnet.   Scale.   Scale-readings.   Moan.   At in te mean.   A   At   At   At   At   At   At   At |
| 1 a. m. 2 a. m. 3 a. m. 3 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 7 a. m. 2 a. m. 2 a. m. 2 a. m. 2 b. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 3 p. m. 2 p. m. 3 p. m. 4 p. m. 2 p. m. 3 p. m. 4 p. m. 2 p. m. 3 p. m. 4 p. m. 4 p. m. 4 p. m. 5 p. m. 6 p. m | Mean scale readings.  d. 30, 28 43, 63 48, 56 38, 30 42, 60 44, 60 44, 60 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 45, 61 46, 61 46, 61 46, 61 46, 61 46, 61 46, 61 46, 61 46, 61 46, 62 47, 62 48, 62 48, 63 48, 6 | Reading of mark   At beginning of a. m. observa   A. 275° 51  | Magrada Magrad | ed 4.,, suspection of the state            | Computation.   Computation.   Reading of mack.   |
| Time.  1 a. m. 2 a. m. 2 a. m. 3 a. m. 4 a. m. 6 a. m. 7 a. m. 6 a. m. 7 a. m. 1 p. m. 2 p. m. 1 p. m. 2 p. m. 2 p. m. 2 p. m. 1 p. m. 2 p. m. 2 p. m. 1 p. m. 2 p. m. 3 p. m. 4 p. m. 4 p. m. 1 p. m. 2 p. m. 3 p. m. 4 p. m. 4 p. m. 4 p. m. 4 p. m. 5 p. m. 6 q. m. 1 p. m. 2 p. m.   | Mean scale readings.  d. 30, 28 43, 93 48, 56 38, 30 42, 60 44, 90 47, 91 45, 42, 55 46, 28 45, 28 45, 28 46, 17 46, 37 47, 67 47, 67 48, 68 48, 68 4 | Computation.   Reading of mark.   At beginning of a. m. observa   A. 275° 54   tions       275° 53   At end of p. m. observations   | Magrada Magrad | ed L <sub>0</sub> , suspection and the scale sc | Computation   Computation   Computation   Computation   Reading of mark  |
| 1 a. m. 2 a. m. 3 a. m. 3 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 5 a. m. 7 a. m. 2 a. m. 2 a. m. 2 a. m. 2 b. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 2 p. m. 3 p. m. 2 p. m. 3 p. m. 4 p. m. 2 p. m. 3 p. m. 4 p. m. 2 p. m. 3 p. m. 4 p. m. 4 p. m. 4 p. m. 5 p. m. 6 p. m | Mean scale readings.  d. 30, 28 43, 63 48, 56 38, 30 42, 60 44, 60 44, 60 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 44, 61 45, 61 46, 61 46, 61 46, 61 46, 61 46, 61 46, 62 46, 62 47, 62 48, 62 48, 63 48, 6 | Computation.   Reading of mark.   At beginning of a. m. observa   A. 275° 54   tions       275° 53   At end of p. m. observations   | Magrada Magrad | ed 4.,, suspection of the state            | Computation.   Computation.   Reading of mark.   |

\* Observations made May 23.

deflecting: 37 11.5 10.0 | 25.5 25.5 25.5 26.5 27.5 28.5 20.2 22.2 | 21.5 25.5

y'0 == 37 19. t

9, 79930 9, 79930 0, 47987 0, 64128 0, 92055

ember, 1882, a different

## Observations for determining the absolute magnetic declination—Continued.

|   | Mean  | rument, theed, magnetometer No. 11. Mag-<br>vers: Cassidy, Murdoch, Smith, and Dark.]  |  | Mean   |   |
|---|---|--|--|--|---|
| Time.   n   | icale-<br>adings.   | Computation.   | Time.  | scale-<br>readings.  | Computation.  |
| 1 a. m  | 61, 80, 80, 54, 80, 57, 82, 61, 50, 62, 55, 60, 34, 57, 60, 68, 15, 15  | Reading of mark.   At heginning of a. m. ob  | 1 p. m   | d.<br>50, 64<br>48, 55<br>61, 38<br>68, 19<br>60, 28<br>73, 94<br>71, 46<br>65, 04   | Reading of mark.  At beginning of n. m. ob { A. 277 on severations. } B. 97 of At end of p. m. observations.  Mean 277 of Determination of axis of magnet.  |
| 9 a m<br>1 b a m<br>11 a m  | 52, 31  | Scale. Scale-read- Mean, Altu'te Axis.   | 9 p. m   | 64. 27<br>64. 32<br>68. 95<br>61. 72   | Scale. Scale-read- Mean. Altn'te nean. Axi  |
| Line of detor- sion 15 Az. circle \$ \$\begin{align*} \begin{align*}          | 707. 84<br>30<br>29   | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | June 18 June 17  Mean  | 757, 74<br>707, 81<br>1465, 55<br>61, 06   | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   |
|   |   | Value of one division of scale = 3'.69 Scale-reading of axis   | Line of deter-<br>sion   | 15<br>51 30<br>231 29  | Value of one division of scale: 3:66 Scale-reading of axis. 35.07 Mean scale-reading of E. and W. magnetic elongation. 61.00 diff.= 25.98   |
|   |   |  |  |  | Reduction to axis +1 35.4 Azimuth circle reads 51 29.   |
|   |   |  |  |  | Magnetic meridian reads         53         05.           Mean reading of mark         277         05.           Azimuth of mark         96         13.           True meridian reads         13         18.6  |
| Date July 19-20 1:  | 882 Is  | nstrum ni theod nagnetometer II. Mag   |  | 10, 1882,  | Instrument, theed, magnetometer No.   |
| Time. 80  | , Obsei<br>fean<br>rale-  | nstrument, theod, magnetometer 11. Mag<br>vers: Cassidy, Mardoch, Smith, and Dark.)<br>Computation.  | Date, August   | 10, 1882.<br>nuspended.<br>Mean<br>scale-  |   |
| net L <sub>i</sub> , suspended.  Time. Secretarial se | , Obsei<br>tean   | Computation.  Reading of mark.  At beginning of a. m. ob (A. 277–28 seventions direct   15–97–26 At end of p. m. observa (A. 97–04 thous, reversed   B. 277–06 Mean   277–16  Determination of axis of magnet.  Scale. Scale-readings. Mean Alta'te' Axis. | Date, August<br>Magnet L <sub>ii</sub> s   | 10, 1982, aspended.  Mean scale-readings.  d. 31, 28 39, 55 37, 64 38, 64 35, 98 39, 10 39, 38 82 37, 46   | Instrument, thead, ranguetometer No. Observer: A. C. Dark.]  Computation.  Reading of mark.  At beginning of a. m. ob 5 A. 359 5 servations  At end of p. m. observa- A. 359 5 tions  Mean. 359 55  Determination of axis of magnet.  Scale. Scale-read- Mean. Alth'te Ax |
| net L <sub>i</sub> , suspended.  Time. Ms sereat  a. m  | . Observation of the control of the | Computation  | Parte, Angust Magnet L <sub>II</sub> & Time.     1 a. m   2 a. m   3 a. m   4 a. m | 10, 1282, mappended Mean wealth Mean wealth and Mean wealth and Mean Mean Mean Mean Mean Mean Mean Mean  | Instrument, thead, magnetometer No. Observer: A. C. Dark.   |
| net L., suspended.  Time.   M   88   real   1 a. m.   | . Observed the control of the contr | Computation  | Parte, August Magnet L., s   | 10, 1282, mappended Menn scale readings.  d. 31, 28 39, 55 38 39, 55 38 39, 55 38 39, 55 38 39, 56 39, 57 46 35, 69 37, 746 35, 69 38, 82 20, 11 37, 28 49, 47, 60 52, 41 32 41, 35 41, 35 | Instrument, thead, ranguetometer No. Observer: A. C. Dark.  |

### Observations for determining the absolute magnetic declination—Continued.

d.

11.77 35.08
30.42 35.10
31.92 35.01
31.95 33.55 rej.
38.75 35.07

alo: 3'.69

35.07

T.= 25.90

etometer No. 11.

B. A. 359 56 B. 54 A. 359 53 B. 52 359 53.8

38, 43 33 19 1qi. 28, 57 14 15 41, 05 31 92 28, 83 31 79 41, 13 34, 99

cale = 5, 60 34, 92 and 41, 35 F. 6, 43 - 0, 23, 7 351 09, 0 sads 354 32, 7 353 53, 8 40 30, 6 313 17, 8 tion 41 11, 9 E.

Altn'te Axis.

| magnetor<br>and Max  | pust 31, 188<br>neter No. 1<br>field. j  | 2. Göttin<br>1. Magne                        | gen time. In $\mathbf{t}  \mathbf{L}_{tt}$ suspende  | strument,<br>d. Obser   | theodulite<br>vers: Dark   | Date, Septem<br>unifilar mag<br>Dark and M   | ber 14, 1882,<br>netometer  <br>axfield.   | local time. Instrument, U. S<br>No. 11. Magnet L <sub>II</sub> suspended.  | C. and G. E<br>Observers   |
|--|--|--|--|---|--|--|--|--|--|
| Time.  | Mean<br>scale-<br>readings.  |  | Compute  | tion.   |  | Time.  | Mean<br>scale-<br>readings.  | Computation.   |  |
| 8, 00 a. m.<br>8, 15 a. m.<br>8, 30 a. m.<br>8, 45 a. m.<br>9, 00 a. m.  | d.<br>56, 40<br>42, 25<br>43, 60<br>43, 40<br>46, 50   | tions .                                      | Reading quing of a.m. of   | serva- { A  | . 53   | 8 s. m<br>9 s. m<br>10 s. m<br>11 s. m   | . 46. 90<br>53. 70<br>. 36. 10   | Reading of mark.  At beginning of a. m. ob. servations   | A. 359 51<br>B. 52<br>A. 359 51<br>B. 52   |
| 9, 15 a. m.<br>9, 80 a. m.<br>9, 45 a. m.<br>10, 0 th m.   | 45. 00   |  | none division of   |   | 359 52.0<br>=3', 69  | l p. m<br>Readings of the  | 41.75  | Mean Value of one division of scale.   | 359 51.<br>=3', 69   |
| 10, 15 a. m.<br>10, 30 a. m.<br>10, 45 a. m.<br>11, 00 p. m.<br>11, 15 p. m.<br>11, 30 p. m.<br>11, 45 p. m.   | 45, 30<br>42, 30<br>44, 20<br>38, 50   | Scale-read<br>Mean sca                       | ding of axis<br>le-reading of<br>agnetic clongs  | east and  | 34. 92<br>42. 89<br>7. 97  | 10, 11 a. m.,<br>and at 1 p. n<br>9 a. m<br>10 a. m<br>11 a. m   | and 12 m.<br>596<br>553<br>510<br>521  | Scale-reading of axis  Mean scale-reading of east and west magnetic elonga- tion   | 41. 67   |
| 12. 00 p. m.<br>12. 15 p. m.<br>12. 30 p. m.<br>12. 45 p. m.<br>1. 00 p. m.  | 39, 90<br>40, 60   | Asimuth                                      | n to axis<br>orcle reads<br>agnetic merid  | -   | 0 20.4<br>854 10.0   | d.<br>43. 85   | 529. 0<br>521. 7   | Reduction to axis  |  |
| Sum<br>Mean  | = 900, 60  | Mean rea<br>Azimuth                          | ding of mark.  |   | 359 52.0<br>46 30.0<br>313 10.0  | -1. 98<br>41. 87   | 7. 8   | Mean reading of mark<br>Azimuth of mark<br>True meridian reads   |  |
| Line of d<br>torsion .<br>Az. cir- { A   |  |  | Magnetic de  | _   | 41 23.4 E.   | Line of det sion   | 15   | Magnetic declination   | 41 19.7  |
| Date, Sepunifilarr<br>Dark and<br>Time.  | Mea<br>Maxield.  | in   | ime. Instrum<br>Magnet I.,, su<br>Comp   | ont IT G  | C. and G. S.<br>Observers:   | Date Octobe  | r 14, 1882, le<br>netometer l<br>daxiield.]<br>Mean<br>scale-  | of August 10 and September<br>ceal time. Instrument, U. S.<br>No. 11. Magnet L.,, suspended<br>Computation.  | C. and G.  |
| Dark and   | Maxifeld.  Mea  scal  readin   | in   | ime. Instrum<br>Magnet I.,, st<br>Comp   | ent, U.S.<br>sspended.<br>utation.  | C. and G. S.<br>Observers:   | [Date, Octobe<br>untillar may<br>Dark and M  | or 14, 1882, le<br>metometer l<br>daxield.)<br>Mean<br>scale<br>readings.  | ceal time. Instrument, U. S. No. 11. Magnet $L_{ij}$ , suspended Computation.  | C. and G.<br>Observer  |
| Dark and   | Measured    | in congs.  At be series At c                 | ime. Instrum<br>Magnet I.,, st<br>Comp   | ent, U. S., spended. utation, of mark. m. ob. { 2 { 1 bbserva- { 2 { 1  | A. 350 52<br>3. 50<br>A. 359 50  | [Date, Octobe<br>untillar may<br>Dark and M  | r 14, 1882, henctometer laxifeld.]  Mean scale readings.  d. 49, 00 50, 55 32, 00 32, 10 34, 40  | ceal time. Instrument, U. S. No. 11. Magnet L., suspended  Computation.  Reading of mari  At beginning of a. m. ob- servations   | A. 359 52<br>B. 50<br>A. 359 52<br>B. 50   |
| 8 a. m 9 a. m 10 a. m 11 a. m 12 m 1 p. m Readings of ial uniff it a. m., at 1 p. m.   | Menield.   Menield.   Menield.   Menield.  | er No. 11.    10                             | Comp  Reading eginning of a. vations d of p. m. o  | ent, U. S., spended. utation. utation. utation. i ob § 2  | Observers:  A. 350 52 3. 50 A. 359 50 3. 52 359 51 magnet. ltn/te Axis.  | [Date, Octobe untillar map Dark and Map Dark | r 14, 1882, benetometer laskield.]  Mean seale- readings.  d. 40.00 32,00 33,40 33,70 he differenciat 8, 9, 10, dt 2 m, and  | ceal time. Instrument, U. S. No. 11. Magnet L., suspended  Computation.  Reading of mari  At beginning of a. m. ob- servations   | C. and G. A. 359 52 A. 359 56 B. 56 56 B. 359 51 B. 359 51   |
| 8 a. m 9 a. m 10 a. m 11 a. m 1 p. m Readings c. tial uniff  | usgnetoned I Maxield I Max | er No. 11.    10                             | Comp  Reading eginning of a vations  Mean  Mean  Scale-read  | ent, U. S. spended.  utation.  y of mark. m. ob. \ \ \frac{1}{2} \]  bserva: \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \  | Obset vers:  1. 399 52 3. 399 52 3. 399 52 3. 399 50 4. 359 50 3. 359 51 magnet.  1th te Axis.  d.  d.  3. 35 35 35 36 36 36 36 36 36 36 36 36 36 36 36 36   | Date, Octobe   Unitidar may   Dark and \$\frac{8}{9} \text{ n. m.}   \]  | r 14, 1882, b metometer daxheld.)  Mean seale readings.  d. 40, 00 - 32, 00 - 32, 00 - 33, 10 - 33, 70 - 33, 70 - 11 - 12 m. and 12 m. and 548, 564, 564, 569, 568, 569, 568, 568, 568, 568, 568, 568, 568, 568  | ceal time. Instrument, U. S. No. 11. Magnet L <sub>ij</sub> suspended  Computation.  Reading of mari  At beginning of a. m. ob- servations.  At end of p. m. observa- tions.  Mean  Value of one division of scal Scale-reading of axis.  Mean scale-reading of E. an  | A. 359 32 A. 359 35 B. 359 31 350 31 350 31 350 31 350 31 350 31 350 31  |
| unitlary Dark an  Time.  8 a. m 9 a. m 10 a. m 11 a. m 12 m 1 p. m 1 a. m 14 a. m 16 a. m 19 a. m 10 a. m 11 a. m 11 a. m 10 a. m 11 a. m 11 a. m 12 m 11 a. m 12 m 11 a. m 12 m   | usgnetoned I Maxietd.  Men scal readil de de de de de de de de de de de de de  | 1   1   1   1   1   1   1   1   1   1        | Comp  Readin, eginning of a vations  Readin, eginning of a vations  Mean  Scale-readings  Mean  Scale-readings  35.0 30.8 29.0 40.0 29.0 48.0 34.0 42.5 17.0 48.0 34.0 42.5 24.0 40.0 24.0 51.0 eofonedivision-reading of axis | went, U. S., spended. utation.  y of mark. m. ob { 2 bef axis of  Mean, A.  35.90 34.00 ! 37.75 ! | Obset verw:  A. 359 52 3. 50 50 A. 359 50 A. 359 50 B. 50 51 magnet.  Itn te Axia.  d.  d.  6.82 35.45 d.  d.  7.88 34.44  -8.69 35.27   | Date, Octobe untillar ma, Dark and M   | r 14, 1882, hertometer liaxifield, laxifield,  cal time. Instrument, U. S. No. 11. Magnet L., suspended  Computation.  Reading of mari At beginning of a. m. ob- servations. At end of p. m. observa- tions.  Value of one division of scal Scale-reading of axis. Mean W. magnetic clongation diff.=  Reduction to axis. A simuth circle reads  Magnetic meridian read Mean reading of mark Azimuth of mark. Azimuth of mark. True meridian reads. | C. and G. Observer  A. 359 34 B. 55 B. 55 B. 55 B. 55 B. 67 C. 369 51 C. 369 |
| 8 a. m 9 a. m 19 a. m 19 a. m 19 a. m 19 a. m 19 a. m 19 b. m 19 b. m 11 a. m 12 b. m 11 a. m 11 a. m 11 a. m 11 a. m 12 b. m 11 a. m 12 b. m 11 a. m 12 b. m 12 b. m 12 b. m 12 b. m 12 a. m 14 a. m 14 b. m 14 | unignetonic 1 Maxietd 1 Ma | ser No. 11. j  ne ceggs.  40 At b. 20 Aser 1 | Comp Reading genining of a. wattom of p. m. of a. Mean Scale-readings.  35.0 36.8 29.0 30.0 29.0 46.5 17.0 48.0 24.0 51.0 of one division-reading of axis scale-reading magnetic clon  | went, U. S., spended. utation.  y of mark. m. ob { 2 bef axis of  Mean, A.  35.90 34.00 ! 37.75 ! | Obset vers:  1. 30 52 3. 30 52 3. 30 52 3. 30 50 4. 359 50 3. 30 51  magnet.  Itn'te Axis.  d.  6.82 35.43 3.25 35.50 8.00 35.52 2.25 35.55 8.00 35.57 41.10 5.83  | Date, Octobe untilibar map   Dark and \$\frac{5}{2}   Dark and and and and and and and and and and   | r 14, 1882, h netometer libratiled. Mean seale readings of the seale sea | Computation.  Computation.  Reading of mark  At beginning of a. m. ob- servations.  At end of p. m. observa- tions.  Value of one division of scal Scale-reading of axis.  Mean scale-reading of E. an W. magnetic clongation  diff.=  Reduction to axis.  Magnetic meridian read  Magnetic meridian read  Magnetic meridian read  Magnetic meridian read  Magnetic meridian read                    | C. and G. Observer  A. 359 34 B. 55 B. 55 B. 55 B. 55 B. 67 C. 369 51 C. 369 |
| ### Bank and #### Bank and ###################################   | unignetonic 1 Maxietd 1 Ma | 1  | Comp  Readin, eginning of a vations  Readin, eginning of a vations  Mean  Scale-readings  Mean  Scale-readings  35.0 30.8 29.0 40.0 29.0 48.0 34.0 42.5 17.0 48.0 34.0 42.5 24.0 40.0 24.0 51.0 eofonedivision-reading of axis | Mean, A   | Obset vers:  A. 350 52 3. 50 A. 359 50 A. 359 50 B. 50 | Date, Octobe untillar map   Dark and \$\frac{8}{2} \]  | r 14, 1882, hertometer liaxifield, laxifield,  cal time. Instrument, U. S. No. 11. Magnet L., suspended  Computation.  Reading of mari At beginning of a. m. ob- servations. At end of p. m. observa- tions.  Value of one division of scal Scale-reading of axis. Mean W. magnetic clongation diff.=  Reduction to axis. A simuth circle reads  Magnetic meridian read Mean reading of mark Azimuth of mark. Azimuth of mark. True meridian reads. | C. and G. Observer  A. 359 35 B. 50  |

# Observations for determining the absolute magnetic declination-Continued.

| Dark and Ma   | setometer 2<br>exfield j                                       | ocal time. Instrument, U. S. C. and G. S. vo. 11. Magnet L., suspended. Observers:   | Dark, Smith, and Max  | clocal time. Instrument, U. S. C. and G. S.<br>No. 11. Magnet L., nuapended. Observers:<br>iield.)   |
|---|--|--|---|--|
| Time.   | Mean<br>scale-<br>readings.                                    | Computation.   | Time. Mean nealest readings.  | Computation.   |
| 8 n m   | d.<br>39, 20<br>40, 00<br>50, 50<br>39, 20<br>55, 80<br>35, 60 | Remaining of mark  |   | Reading of mark   At heginning of a, m, ob (A 350 50 servations   B 52 At end of p, m, observas (A 350 52 tions   B 50 Mean 3-0 51   |
| teadings of the tirl uniting to 10, 11 s. m., and 1 p. m. | akenat it.   | Determination of axis of magnet.  Scale. Scale read Mean Aitn'te Mxis  | Comparative readings<br>between magnetome-<br>ter No. 11 and the dif-<br>ter atial untillar.  | Value of one division of scale  Scale reading of axis  |
| 8 a m<br>9 a m<br>0 a m<br>1 a m<br>2 m<br>1 p m          | 545  | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 10 a. bi 36 b 414<br>11 a. m 5 c b 414<br>12 m 17. 2 448<br>1 p. m 50 4 560   | diff. 4.68  Reduction to usis  |
| d<br>40.05  | 522 0<br>514. 6  | Value of one division of scale 37, 69<br>Scale tearing of axis 34, 88  | d.<br>33, 67 502, 7<br>480, 8   | Mean reading of mark         379         54,0           Azimuth of mark E. of N         46         26,0           True meridam tends         313         15.0  |
| -2.01 = 38.04<br>Line of deter-                           |  | M: an scale-reading of F: and W: magnetic clongation  d:fl. 3.46  Reduction to 9x0x  | -3 50 12.9<br>- 30.17<br>Line of detorsion 15   | Magnetic sectionation 41 18.71   |
| 04.14.423   | 15   | Azimuth encle reads 354 21.0   | I CA 164 50   | ) '  |
| Non   | 15<br>354 20<br>22   | Magnetic meridian reads  | As, circle \{ \begin{align*} A & 364 & 56 \\ B & 52 \end{align*}   \]  * From observation  [Date, December 14, 18]  | s of Getober 33, 1882, and April 14, 1883.  -2, local time. Instrument, uriflar magne  |
| Date, Noveml  | 15<br>354 20<br>22   | Magnetic meridian reads  | As, circle \ \ \frac{A}{B} \ \ \ \frac{50}{52} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \  | s of October 31, 1882, and April 14, 1883.  62, local time. Instrument, urifilar magnethet L., suspended. Observers: Dark, Maxillar Computation.   |
| Non. Az. circle \ A B B B B B B B B B B B B B B B B B B   | 15<br>354 20<br>22<br>per 30, 1882<br>1. Magnet                | Magnetic meridian reads 354 32.7  Mean rending of mark 359 51, 0  Azimarth of mark E. of N. 46 30, 0  Time no chart rads 313 E. o  Magnetic declination 41 17.7 I  local time. Instrument, unfullar magnet L, suspended. Observers: Dark and Max | * From observation  * From observation  (Date, December 14, 18, 6m ter No. 11, Mag- field, and Smith )  Mean Time, scale-   | c., local time. Instrument, uriflar magnet, the the suspended. Observers: Dark, Max.  Computation.  Residing of nark.  At beginning of a. m. ob { A 359 5a 5a 5a 5a 5a 5a 5a 5a 5a 5a 5a 5a 5a   |
| Moon   Az , circle   A B                                  | 15 22 22 22 22 22 22 22 22 22 22 22 22 22                      | Magnetic meridian reads  | As, circle   A   354   56     From observation  | 2, local time   Instrument, urifilar magnemet L, suspended. Observers: Dark, Masservers: Dark, Masse |
| Non Az, circle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \      | 15 22 22 22 22 22 22 22 22 22 22 22 22 22                      | Magnetic meridian reads  | An circle   A   364   56     * From close tvation   | Computation   Computation   Computation   Computation   Reading of mark   Reading of mark   A 359 50   Computation   A 359 50   Computation   Computation   A 359 50   Computation   C |
| Mon   A   A   A   A   A   A   A   A   A                   | 15 22 22 22 22 22 22 22 22 22 22 22 22 22                      | Magnetic meridian reads   354   32, 7  | As, circle   A   564   56     From observation  | Computation    |
| ### Mon   | 15 20 22 22 22 22 22 22 22 22 22 22 22 22                      | Magnetic meridian reads  | An circle   A   364 | Computation   Computation   Computation   Computation   Residing of mark   Computation   Residing of mark   Computation   Residing of mark   Computation   |

## Observations for determining the absolute magnetic declination—Continued.

7, 8, C, and G S, led. Observers:

h- ( A | 350 | 50 | H | 52 | A | 350 | 52 | A | 350 | 52 | 50 | 50

0 17.3 254 51.0 ends 254 33.7

379 51. 8 N 46 26. 0 313 15 0 ation 41 18.7 E.

April 14, 1883.

it, ni ifflar magnetivets: Dark, Max-

ob { A 359 50 B 52 tva- { A 359 50 B 52

+ 0 53 8 253 50 0 Freads 354 25.8

14.58

f scale E. and on .

diff

este

..61

34 ×52 50, 17

| and Smith.)  | Magnet L,  | cal time. Instrument, unifilar magnetom-<br>suspended. Observers: Dark, Maxfield,  | cter No. 11.<br>and Smith.]  | Magnet L   | cul time. Instrument, unifilar magnetor,<br>, suspended. Observers: Dark, Maxilei  |
|--|--|--|--|--|--|
| Time.  | Mean<br>scale-<br>readings.  | Computation.   | Time.  | Mean<br>scale-<br>readings   | Computation.   |
| 8 a, m   | d.<br>49. 0<br>50 0<br>43. 0<br>37. 1<br>40. 1<br>41. 0  | Reading of mark.   At beginning of a. m. ob { A 350 50 servations   B 52 At and of p. m. observa-{ A 250 52 tions   B 50 50 Mean   B 50 51   | 8 a. m<br>9 n. m<br>10 a. n<br>11 a. m<br>12 m<br>1 p. m                     | d,<br>56, 0<br>38, 5<br>30, 8<br>80, 0<br>37, 4<br>35, 6             | Reading of mark   At heginning of a, m, ob { A 359 49 50 50 50 50 50 50 50 50 50 50 50 50 50   |
| Brooke declin<br>reading<br>Pa. m                      | 504<br>511<br>511<br>426<br>461<br>1>1   | Value of one division of scale         37,00           Mean scale-reading of axis         35,75           Mean scale-reading of E, and W, magnetic elongation         44,27           drift         5,50           Evaluation to axis         \$6,00           Azimuth circle reads         33,55,0  | Brooke declir<br>reading<br>8 a. m<br>9 a. m<br>10 a. m<br>11 a. m<br>1 p. m | 522<br>487<br>490<br>490<br>490                                      | Value of one division of scale = 3'.00  Scale-tonding of axis  |
| d.<br>41. 27   | 488, 0<br>488 0<br>0, 0  | Magnetic meridian reads   334   30, 1  | d.<br>40, 40<br>←1, 00<br>39, 40   | 401.7<br>466.0   | Magnetic meridian reads         354         24.3           Mean reading of mark         359         50.0           Azimuth of mark         6.0         46         6.0           True meridian reads         313         14         0 |
| Line of detersio<br>Az. circle {                       | n 15<br>A 353 54<br>B 56   | Magnetic declination 41 15, 1 E.   | Lincofdetorsic   | on. 15<br>A 354 06<br>B 08   | Magnetic declination (1 10.3)  |
| Date, January<br>eter No. 11.                          | 31, 1883, loc  | of October 31, 1882, and April 11, 1883.  sal time. — Instrument, unifilar magnetom, suspended. — Observers: Dark, Maxfield.   | [Pate, Februa<br>eter No. 1].  | ry 14, 1883, 1   | of October 31, 1882, and April 14, 1883,<br>ocal time. Instrument, untillar magnete<br>management. Observers: Dark, Maxile   |
| Date, January  | 31, 1883, loc  | ed time. Instrument, unifiler magneton-  | Date, Februa   | ry 14, 1883, 1   | of October 31, 1882, and April 14, 1883,<br>ocal time. Instrument, untillar magneto,<br>an anspended. Observers: Datk, Maxile<br>Computation.  |
| Date, January<br>eter No. 11,<br>and Smith.}           | 31, 1883, loc<br>Magnet L  | ed time. Instrument, unifilar magnetom, suspended. Observers: Dark, Maxfield.  | [Date, Februa<br>eter No. 11,<br>and Smith.]                                 | ry 14, 1883, Magnet L  Mean scale readings.  d.  45.0 43.0 40.2 42.0 | ocal time. Instrument, unifflar magnete<br>6, suspended. Observers: Dark, Maxile   |
| {Date, January eter No. 11. and Smith.}  Time.  8 a. m | 31, 1883, lob Magnet L, Mean scale-readings.  d. 40, 0 36, 0 36, 5 29, 9 30, 15 30, 15 494 494 484 484 483 470 | al time. Instrument, unliffer magnetom, suspended. Observers: Dark, Maxheki.  Computation,  Reading of mark.  At beginning of a. m. ob. (A. 359-40) servations. (B. 359-41) At and of p. m. observa. (A. 359-40) lions. (B. 359-40)  | Date, Februa   etcr No. 11.   and Smith.                                     | ry 14, 1883, Magnet L  Mean scale tradings.  d                       | ocal time. Instrument, unifilar magnete, auspended. Observers: Dark, Mayde  Computation.  Rending of mark.  At beginning of m. m. ob { A 350 4 servations  |
| Date January eter No. 11, and Smith.                   | 31, 1883, lob Magnet L, Mean scale-readings.  d. 40, 0 36, 0 36, 5 29, 9 30, 15 30, 15 494 494 484 484 483 470 | al time. Instrument, unifilar magnetom, suspended. Observers: Dark, Maxfield.  Computation,  Reading of mark.  At beginning of a. m. ob 5 A 359 49 servations. (B 5 51 At and of p. m. observa 5 A 359 40 tions. (B 5 51 At ond of p. m. observa 5 A 359 40 tions. (B 5 51 At ond of p. m. observa 5 A 359 40 tions. (B 5 51 At and of p. m. observa 5 A 359 40 tions. (B 359 50 Value of one division of scale = 37, 69 Scale reading of axis. 31, 69 Mean scale reading of E, and W. magnetic elongation. 35, 42 diff. 0 73 Reduction to axis. +0 2, 7 | Pate, Februa ettr No. 11. and Smith.     Time,                               | ry 14, 1883, Magnet L  Mean scale tradings.  d                       | coal time. Instrument, unifilar manneter, an appendied. Observers: Dark, Maxile    Computation.  |

## Observations for determining the absolute magnetic declination- Continued.

| Time.   | Mean<br>scale-<br>restings   | Computation.   |   | Time.   | Mean<br>acaie-<br>readings.  | Computation  |
|---|--|--|---|---|--|--|
| 8 a. m  | d.<br>42. 0<br>27. 0<br>40. 0<br>29. 0<br>23. 0<br>24. 0   | At and of p. m. observa-4  | 0 .   | 8 a. m  | d.<br>40. 8<br>40. 0<br>44. 0<br>42. 1<br>78, 9<br>40. 2   | Reading of mark   A1 beginning of a. m. ob. 5 A 359 40   |
| Brooke declir reading # n. m                            | 520<br>405<br>514<br>514<br>505<br>467   | Value of one division of scale Rente-reading of syste. Moor scale reading of K and W magnetic elongation. diff.= Reduction to axis Azumuth circle reads.   | 5, 51<br>0 20, 3<br>303 51, 0   | Brooke declar reading                                 | 498 477 489 480 472  | Value of one division of scale   |
| 30, 88 4  | 6. 3   | Magnetic meridian reads  Mean reading of mark  | 359 50. 0<br>46 36. 0<br>318 14. 0  | 41.83 4<br>+.89                                       | 81. 5<br>84. 8<br>3. 3   | Mean teading of mark         359         50,           Asimuth of mark E. of N         46         38,           True meridian reads         381         14,  |
| Line of detor-<br>sion Az. circle { A B                 | o  | Magnetic declination   | 40 16, 7 E.   | Line of detor- vion  Az. circle   A.                  | 0 /<br>15<br>34N 45<br>17  | Magnetic declination 36 02.4   |
| Prom oba<br>Date, March 3<br>eter No. 11<br>Time.       | H. 1883, loc<br>Magnet<br>Mean<br>scale-   | of October 31, 1882, and April 4  cal time—Instrument, unifilar L., suspended—Observer: Mo   | magnetom-   | From obs  | t, 1983, local<br>tagnet L.,<br>Mean<br>scale  | of October 31, 1882, and April 14, 1883.  al time. Instrument, untillar magnetes suspended. Observers, Dark and Maxiie  Computation.   |
| From oba Date, March 3 ater No. 11 Time.  Ga. to        | Mean scales of cadings.  | cal time — Instrument, unfiller — L., suspended — Observer: Mo — Computation — E ading of mark.  At beginning of a m. ob § A — Server one — ( B  | nugnetom-<br>axtiold.]  | From obs  | t. 1883, localing to the scale rendings.  d. 40.0 30.0 37.0  | al time. Instrument, untillar magnete anspended. Observers, Dark and Maxie  Computation.  Reading of mark.  At beginning of an ab. § A agreetions.   |
| From obs  [Date, Murch 3 ster No. 1]  Time.  3 a. m     | Mean seales tradings.  Mean seales tradings.  d  | Computation  Ending of much  | magnetom-<br>axtioid.j  | From obs  [Date, April 14 etcr No. 11. M  Time  8 a m | i. 1983, localing the first term of the first te | al time. Instrument, untillar magnetos suspended. Observers, Dark and Maxile  Computation.  Reading of mark.  At beginning of a. m. ob- \ A  |
| Prom obs  Date, March 3 ster No. 11  Time.  a. in       | ### 1883, loc.   Mean   Mean   Seales   Pradings   | Computation  Ending of a master   B   At end of p m, observer   A   B   At end of p m, observer   B   Mean   B   | magnetom-aytioid.]  250 49 21 22 22 22 22 22 22 22 22 22 22 22 22         | From obs  | k. 1983, local agree L., Mean scale-readings.  d. 40.0 39.0 37.0 38.5 2 36.9   Dimeter  484 472 482 484 479  | al time. Instrument, untillar magnetosuspended. Observers, Dark and Maxile  Computation.  Reading of mark.  At boginning of a. m. ob. § A 359 servations B A tend of p. m. observa § A 359 tions B B Mean 359  Determination of axis of magnet.  Scale. Scale-lead mean and p. mean.  d  |
| From obs  Date, March 3 ater No. 11  Time.  Time.  In m | ### Mean   Mean   Mean   Sealo | Computation  Entiny of mark  At hegenory of a mobey A servet one. / B At end of p mobey a A tions / B  Mean / B  A tone dynamo of scale Scalest ading of axis.  Mean scale-reading of E, and W magnetic cloud of E. and W magnetic cloud of E. and W magnetic cloud of E. and Reduction to axis. | magnetom-avrioid.]  259 49 251 259 49 251 259 50 -37 60 34.57* 19.50 5.07 | From obs  [Date, April 14 eter No. 11. M  Time  s a m | tervations is 1983, lee lagnet L, 1983, lee lagnet L, Mean scale rendings.  d. 40.0 59.0 59.0 59.5 35.2 36.9 1 1 484 444 444 444 444 444 444 444 444   | al time. Instrument, untillar magnetosuspended. Observers, Dark and Maxiis  Computation.  Reading of mark.  At beginning of a. in. ob. \ \( \) \ |

#### Observations for determining the absolute magnetic declination-Continued.

42.72

\$\frac{9}{10} 30.0 348 46.0

359 50.0 46 36.0 313 11.0 38 02.0 E.

ril 14, 1883.

A 359 57 B 58 A 359 57 B 58 ... 359 57.5

Altn'to Axis.

36, 35 34, 32 33, 25 34, 48 35, 36 34, 75 34, 35 34, 63 34, 50

ds 348 53.2

359 57, 5 46 36, 0 313 21, 5

37.85

| NO. II. Magnet L.,   | oral time - Instrument, uniülar magnetomet<br>ompended. Observers: Dark and Maxield. ] | Date, May 14<br>Mugnet   | . 1868, local<br>L., mapersi   | time. Instrument, unifilar magnetonists<br>ed. Observers: Dark and Maxield. j  |
|--|--|--|--|--|
| Time. Mentreads  | t'ounntation.  | Time.  | Mean<br>acale-<br>readings.  | Computation.   |
| 9 a. m   | 0   Ab hegining of n. n. oh  | 8 a. m<br>9 a. m<br>10 n. m<br>11 a m<br>5 1 p. m  | 31. 7  | Reading of mark   At beginning of a. m. ob (A   350   57   57   57   57   57   57   57   |
| ### 1  | Determination of axis of magnet  | 8 a. m 9 a. m 10 a. m 11 a. m 12 m 12 m 12 m 12 m 12 m 13 m 14 m 15 m .  | 487<br>491<br>491<br>494<br>495<br>497<br>463, 5<br>475, 1<br>176, 1<br>1, 0               | Determination of axis of tongnet.   Scale   Noale-read-ings   Mean   Ain to ings     R   30, 0   30, 2   30, 10         F   29, 0   41, 5   39, 25   29, 05   31, 11     F   29, 1   31, 6   32, 80   39, 61   31, 11     F   28, 1   32, 9   30, 01   46, 65   35     F   28, 1   32, 9   30, 01   46, 65   35     F   28, 1   32, 9   30, 01   46, 65   35     F   28, 1   32, 9   30, 01   46, 65   35     F   28, 1   32, 9   36, 10   48, 65   36     K   28, 1   32, 9   36, 10   48, 65   36     Wann scale-reading of axis   31, 24     Mean tool to axis   -0   4, 8     Azimuth circle reads   348   56, 8     Mean reading of matk   35, 65, 24     Mean reading of matk   35, 65, 24     Mean reading of matk   35, 65, 25     Mean reading of matk   35, 65, 25     Mean reading of matk   35, 65, 25     Magnetic meridian reads   33, 33, 35, 30, 35     Sanguetic declination   35, 30, 30, 30, 30, 30, 30, 30, 30, 30, 30 |
|  |  |  |  |  |
| Date May 31, 1883, 1<br>No. 11. Magnet L <sub>D</sub><br>Time.   Mer<br>seal<br>readn  | Computation.   | et [Date, June 1<br>No. 11. Ma   | 4. 1883, local gnet L <sub>H</sub> sus Mean scale-readings                                 | time. Instrument, untillar magnetone pended. Observers: Dark and Maxueld.  |
| No. 11. Magnet L <sub>ij</sub> Mer  Time. Magnet L <sub>ij</sub>   | Computation.   | 8 a. m   | Mean<br>scale-<br>readings<br>d.<br>44.0<br>43.0<br>30.0<br>34.5<br>34.1                   | time. Instrument, untillar magnetone pended. Observers: Dark and Maxueld.  |
| No. 11   Magnet L <sub>0</sub>   Time   Sen   Tosch   Time   Sen   Tosch   Tos | Computation.   Computation.     Computation.   | 8 a. m. 9 a. m. 10 a. m. 11 a. m. 12 m. 15 m. 16 a. m. 16 a. m. 16 a. m. 17 a. m. 18 a. m. 18 a. m. 18 a. m. 18 a. m. 18 a. m. 18 b. 12 m. 18 b. 12 m. 18 b. 12 m. 18 b. 12 m. 18 b. 12 m. 18 b. 12 m. 18 b. | Mean scale-readings  d. 44.0 43.0 43.0 30.0 30.0 34.5 34.1 34.2 iinometer ngs. 499 470 477 | Computation    Computation   Computation   |
| No. 11   Magnet L <sub>0</sub>   Time   Sen   to sen   t | Computation.   Computation.  | 8 a. m. 9 a. m. 10 a. m. 11 a. m. 12 m   | Mean scale-readings  d. 44.0 43.0 43.0 30.0 30.0 34.5 34.1 34.2 iinometer ngs. 499 470 477 | Competation   Reading of mark.   |

# EXPEDITION TO POINT BARROW, ALASKA.

# Observations for determining the absolute magnetic declination—Continued,

| Time.  | Mean<br>scale-<br>readings.  | Computation.   | Time. Mean scale-readings.   | Computation,   |
|--|--|--|--|--|
| ·-·  |  | Reading of mark.   | , d  | Reading of mark.   |
|  | d.<br>39.0   | At beginning of a. m. ob 5 A. 359 56   | 8 a. m 39. 0   | At beginning of a. m. ob (A. 350 57  |
| 8 a. m   | 48, 0  | approximately and an annual firm   | 9 a. m   | servations   |
| 10 a. m  | 43, 0  |  | 10 a. m  | At end of p. m. observa § A. 350 50<br>tions ( B.  |
| 11 a. m  | 45. 0<br>53. 0   | [10][8 9   | 12 m   |  |
| 12 m   | 50.0   | Mean   | 1 p. m 18. 1   | Mean   |
|  |  | Value of one division of scale == 37, 69   |  | Determination of axis of magnet  |
| Breoke decline   | ometer   | Scalor-ading of axis 34.79   | Brooke declinometer  | A1 - 1   |
| readings   |  | Nicen scale-reading of E, and  |  | Scale, Scale-read- Mean, Altuite As  |
| 8 a. m   | 418  | W. magnetic elongation 43, 13  | 8 a. m   |  |
| 9 a. m   | 41.8   | diff. = 8.34   | 10 3, 10 482   | E 16 6 19.6 18.10  |
| 10 a. m  | 1.1  | Reduction to axis 10 30.8  | 11 d. tit 464  | 1 29.8 72.8 51.30   17.95 33.  |
| 12 m   | 014  | Azimuth circle reads 347 48.5  | 12 m   | E 05.6 30.0 17.80 51.75 34<br>1 46.4 58.0 52.20 17.55 34   |
| 1 p. m   | 400  | Magnetic meridian reads 348 19.3   |  | E 01.0 + 32.7 17.30   52.25 34   |
|  |  | might be the transfer of the t   | .,   | E 02.6 30.0 16.30 16.80 34   |
| d.<br>46.33 487.3  | 5  | Mean reading of mark 359 57, 0<br>Azimuth of mark E. of N 46 36, 0   | 29, 00 478, 5  | E 0 U  |
| 475.   | 7 ,  | Azimuth of mark E. of N  | 473.9  | Scale-reading of axis 34.7   |
| -3.20 = 11.3   | 8  |  | - 1, 25 : 4, 6   | Scale-reading of axis 34.7<br>Mean scale teading of F. and<br>W. magnetic elongation 27.7  |
|  |  | Magnetic declination 34 58.3   | 27, 75   |  |
| 45-13  |  |  | .1.10  | d(t) := 6.5  |
|  |  |  | 0 /  | Reduction to axis  |
| Line of detersion  | . 60   |  | Line of detorsion 324  | Reduction to axis0 25.<br>Azimuth circle reads 349 34.   |
| Line of detorsion<br>Az enele : { A.<br>Line of detorsion  | . 347 48   |  | Az. circle (A. 349 33  | Address on a second  |
| Line of determin   | 62 49  |  |  |  |
|  |  |  | Till 1 p. m., then 950   | Mean reading of mark 350 56.<br>Azimuth of mark E. of N 46 36.   |
|  | ,  |  |  | True meridian reads 313 20.  |
|  |  |  |  | Magnetic declination 35 47.  |
| Date, July 31, 18  | 883, local t   | ot May 3t and July 14, 1983. ime. Instrument, unitlar magnetometer.  | [Pare, August 14, 1883, le   | cal time. Instrument, unifilar magneto   |
| Time.  | Mean   | ime. Instrument, unifilar magnetometer, ended Observer: A. C. Dark.    Computation.  | Time, Mean   | Computation.   |
| Time   | Mean   | ime – Instrument, unifilar magnetometer,<br>ended – Observet : A. C. Dark.)  | Mean   | neal time. Instrument, unitlar magnetosispende l. Observers: Dark and Maxfiel  Computation.  |
| Time.  | Mean<br>scale<br>readings.   | ime – Instrument, unifilar magnetometer,<br>ended – Observet : A. C. Dark.)  | Time. Mean scale-readings  | Computation,  Reading of mark.   |
| Time.  | Mean scale readings.   | ime. Instrument untillar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark At be finning of a. m. ch (A. 359-56)   | Time. Mean scale-readings  8 a. m d. 39, 0   | Computation.  Reading of mark.  At hechology of a problem A. 259.  |
| Time. r  | Mean scale readings.   | ime. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of wark  At beginning of a. m. ob § A. 359 56 accrations. B. 57  | Time.   Mean scale-readings   d.   | Computation.  Reading of mark.  At hechology of a problem A. 259.  |
| Time. r  | Mean scale readings.   | ime. Instrument unifilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob 5 A. 359 56 acryations B. 57 At end of b. m. observe A. 359 56  | Time. Mean scale-readings  8 a. m 30.0 9 a. m 40.0 10 a. m 37.2  | Computation.  Reading of mark.  At beginning of a. m. ob. (A. 359.)  |
| Tune.  8 a un 9  | Mean scale rendings.  d. 39.0 33.0 29.0 46.0   | ime. Instrument unifilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob § A. 259 56 sorvations B. 57  At end of p. m. observa. § A. 39 56 tions B. 57   | Time, Scale-<br>readings 4. 4. 4. 99.0<br>9a.m. 40.0<br>10a.m. 37.2<br>11a.m. 29.4<br>12 m. 18.7   | Computation.  Reading of mark.  At beginning of a. m. ob { A. 359 } B. 4t and of p. m. observa. { A. 359 } B.  |
| **Tame. ************************************   | Mean scale readings.  d. 59.0 33.0 29.0 29.0 29.0  | ine. Instrument unifilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob 5 A. 359 56 arrations IR. 57  At end of p. m. observa A. 359 56  tions S. 57  Mean 359 56.5   | Time. Mean scale-<br>readings d. 29, 0<br>9 a.m. 40, 0<br>10 a.m. 37, 2<br>11 a.m. 29, 1   | Computation.  Reading of mark.  At beginning of a. m. ob { A. 359   servations   B. At and of p. m. observa. } A 359   tions   B. Mean   3.50  |
| Fine.  8 a m 9 . m 9 . m 1 a m 1 a m 1 p m   | Mean scale scale scale of the s | ime. Instrument unifilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob § A. 259 56 sorvations B. 57  At end of p. m. observa. § A. 39 56 tions B. 57   | Time. Searle readings of the searle readings  | Computation.  Reading of mark.  At beginning of a. m. ob { A. 359 } B. 4t and of p. m. observa. { A. 359 } B.  |
| 8 a m 9  | Mean scale rendings.  d. 09.0 93 0 029 0 46.0 45.0 ometer  | ine. Instrument unifilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob. (A. 359 56, arrations R. 4. 359 56, tools R. 57  Mean 359 56, 5  Value of one division of scale 3, 63  | Time, Scale-<br>readings 4. 4. 4. 99.0<br>9a.m. 40.0<br>10a.m. 37.2<br>11a.m. 29.4<br>12 m. 18.7   | Computation.  Reading of mark.  At bealming of a. m. ob (A. 359   10   10   10   10   10   10   10   1   |
| Sam  | Mean scale rendings.  d. 09.0 33.0 29.0 46.0 45.0  | Instrument unifilar magnetometer.  | Time.   Mean   scale   readings  | Computation.   Reading of mark.  |
| Time.  8 a m   | Mean scale rendings.  d. 30.0 . 33.0 . 29.0 . 46.0 . 45.0  | Instrument, unifilar magnetometer, ended   Observet : A, C, Dark.     Computation  | Time.   Mean seade readings   8 a.m   d.   9 a.m   40 o.   11 a.m   22 o.   12 m   40 c.   15 m   15 | Computation.  Reading of mark.  At beginning of a. m. ob \ \(\Lambda\) 359 (servations).  At and of p. m. observa\ \(\Lambda\) 350 (ions).  Mean \(\Lambda\) 350  Determination of axis of magnet.  Scale \(\text{Scale-read}\) Mean \(\lambda\) Min'te man. A   |
| Fine.  8 a m  9 . m  9 . m  1 a m  1 p m  Probe decline  1 a m  8 a m  9 a m   | Mean scale readings.  d. 09.0 33.0 29.0 29.0 46.0 45.0   | Instrument unifilar magnetometer.  | Mean   Search   Freedings   Search      | Computation.  Reading of mark.  At bealining of a. m. ob \ A. 359 servations \ 1. 18.  At end of p. m. observa \ A. 350 tions \ 18.  Mean \ 350  Determination of axis of magnet.  Scale   Scalegrad   Mean   Mrn're mean. A   |
| Time.  7 8 a m 9 . m 9 . m 1 a.m 1 a.m 1 p m 1 p m 1 p m 2 m 8 a.m 9 a.m 1 l l l l l l l l l l l   | Mean scale readings.  d. 59.0 33.0 29.0 29.0 46.0 45.0 45.0 45.0 477 4.55 449 5711   | ine. Instrument unifilar magnetometer, ended Observet: A. C. Dark.)  Computation.  Reading of mark  At beginning of a. m. obs (A. 359 56, 6 servations R. A. 359 56, 6 tions R. S. 57  Mean  | Mean searly   Searl   | Computation  |
| Time.  8 a m 9 . m 9 . m 1 a.m 1 a.m 1 p m 1 p m 1 p m 1 p m 1 p m 1 l l l l l l l l l l l l l l l l l l l   | Mean scale readings.  d. 59.0 33.0 29.0 46.0 45.0 45.0 45.0 477 49.9 49.0 44.0 5.1 44.5 5.1 4 | Instrument, unifilar magnetometer, ended   Observet: A, C, Dark.   | Time.   Mean   seale   readings  | Computation   Reading of mark   At beginning of a, m, ob { A. 359   Servations   B. At and of p, m, observed   A. 359   tions   A. 359   tions   A. 359   tions   A. 359   tions   A. 359   Determination of axis of magnet.   Scale   Scale   Scale   Mean   Mean   Mark   A. 359   Mean   A. 359   Mean   A. 359  |
| Time.  8 a m   | Mean scale readings.  d. 59.0 33.0 29.0 46.0 45.0 45.0 45.0 477 49.9 49.0 44.0 5.1 44.5 5.1 4 | ine. Instrument unifilar magnetometer, ended Observet: A. C. Dark.)  Computation.  Reading of mark  At beginning of a. m. obs (A. 359 56, 6 servations R. A. 359 56, 6 tions R. S. 57  Mean  | Mean searly   Searl   | Computation   Reading of mark   At bealming of a. m. ob (A. 359   Servations of a. m. ob (A. 359   Servations of a. m. ob (A. 359   Servations of a. m. ob (A. 359   Servations of a. m. observes   A. 350   Tour of a servations of axis of magnet   B.   Scale   Scale   Scale   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Monte   Mean   Mean   Monte   Mean   Mea |
| Time.  8 a m   | Mean scale readings.  d. 09.0 33.0 29.0 46.0 45.0 45.0 477 449 449 711 515   | ine. Instrument unitilar magnetometer. ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. ob 5 A. 359 56 servations B. 57  At end of p. m. observ. A. 359 56 tions B. 57  Mean Solve of the servation of scale Scale-reading of axis Selected with the servation of the selected with the selected of the selected with the selected of the selected with the selected of the  | Time.   Mean   scale   readings  | Computation   Reading of mark  |
| Time.  7  8 a m  9 . m  9 . m  10 a m  11 a m  11 p m  11 dings.  8 a m  12 m  13 dings.  8 a m  14 dings.   | Mean scale readings.  d. 20.0 20.0 20.0 20.0 20.0 46.0 45.0 45.0 4 | Computation   Computation  | Time.   Mean seade readings   8 a.m.   d.   9 a.m.   40 o.   10 a.m.   37.2   11 a.m.   224.1   12 m.   18.7   1 p. m.   400.9   8 a.m.   490.9   9 a.m.   490.9   10 a.m.   491.1   12 m.   492.1   12 m.   493.1   12 m.   493.1   12 m.   493.1   13 a.m.   493.1   14 a.m.   493.1   15 a.m.   493.1   1 | Computation   Reading of mark   At beginning of a, m, ob \{A, 359   servations   B, At and of p, m, observa\{A, 359   tions   B, At and of p, m, observa\{A, 359   tions   B, At and of p, m, observa\{A, 359   tions   A, 359   tions   B, At and of p, m, observa\{A, 359   tions   A, 359   tions   B, At and of p, m, observa\{A, 359   tions   A, 359   tions   B, At and of m, observation   A, At and observation   C, At and observation   C, At and observation   A, At and observation   C |
| Time.  7  8 a m  9 . m  9 . m  10 a m  11 a m  11 p m  12 m  13 a m  14 a m  15 a m  1 p m  1 a dings.   | Mean scale readings.  d. 20 0 20 0 20 0 20 0 40 0 45 0 0 45 0 0 45 0 0 45 0 0 6 6 0 6  | ine. Instrument untillar magnetometer. ended Observet: A. C. Dark.    Computation.  Reading of mark  At beginning of a. m. ob § A. 359 56 servations \$ B. 57 At end of p. m. observe § A. 369 56 tions \$ B. 57  Mean \$ \$59 50.5  Mean \$ \$39 50.5  Scale-reading of axis \$ \$35,088  Mean \$ \$35,088  Mean \$ \$35,088  Mean \$ \$35,088  Mean \$ \$40 4.3  Azimatl circle reads \$ \$35 10.0  Magactic interidian reads \$ \$35 10.0  Ma | Time.   Mean searle readings   4.   4.   9.   9.   10. | Computation   Reading of mark   At beginning of a. m. ob \ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   At (ad of p. m. observa-\ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   Determination of axis of magnet.   Scale   Scale read   Mean   \lambda \]   Mean   \(\Lambda \)   |
| Time.  7  8 a m  9 . m  9 . m  10 a m  11 a m  11 p m  12 m  13 a m  14 a m  15 a m  1 p m  1 a dings.   | Mean scale readings.  d. 20.0 20.0 20.0 20.0 20.0 46.0 45.0 45.0 445. 445. 445. 445. 445. 44   | Computation   Computation  | Time.   Mean   seade   readings  | Computation   Reading of mark   At beginning of a, m, ob \{A, 359   servations   B, At and of p, m, observa-\{A, 359   tions   B, At and of p, m, observa-\{A, 359   tions   B, At and of p, m, observa-\{A, 359   tions   B, At and of p, m, observa-\{A, 359   tions   B, At and of p, m, observa-\{A, 359   tions   B, At and of magnet   B, At and of magnet   B, At and of m, observation   B, At and observation   B,  |
| Time.  7  8 a m  9 . m  9 . m  10 a m  11 a m  11 p m  12 m  13 a m  14 a m  15 a m  1 p m  1 a dings.   | Mean scale readings.  d. 20 0 20 0 20 0 20 0 40 0 45 0 0 45 0 0 45 0 0 45 0 0 6 6 0 6  | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of metrk  At beginning of a. m. obs GA 350 56 8 8 reations 18 57 At end of p. m. observa GA 359 56 50 observations 18 57 At end of p. m. observa GA 359 56 50 observations 350 56 57 Mean 359 56 5 Value of one division of scale Scale-reading of axis 35 05 68 Scale-reading of axis 35 05 56 diff.  Reduction 5 o axis 36 26 diff. 1.17 Reduction 5 o axis 35 31 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 4 4 4 3 4  | Time.   Mean searle readings   4.   4.   9.   9.   10. | Computation   Reading of mark  |
| Time.  y 8 a m 9, 90 10 a.m. 11 a.m. 11 p m 12 dings. 8 a. m. 13 a.m. 14 a.m. 15 a.m. 16 a.m. 17 p m 18 a.m. 18 a.m. 19 a.m. 18 a.m. 19 a.m. 19 a.m. 10 a.m. 11 p.m.   | Mean scale readings.  d. 20 0 20 0 20 0 20 0 40 0 45 0 0 45 0 0 45 0 0 45 0 0 6 6 0 6  | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of metrk  At beginning of a. m. obs GA 350 56 8 8 reations 18 57 At end of p. m. observa GA 359 56 50 observations 18 57 At end of p. m. observa GA 359 56 50 observations 350 56 57 Mean 359 56 5 Value of one division of scale Scale-reading of axis 35 05 68 Scale-reading of axis 35 05 56 diff.  Reduction 5 o axis 36 26 diff. 1.17 Reduction 5 o axis 35 31 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 4 4 4 3 4  | Time.   Mean searle readings   | Computation   Reading of mark   At beginning of a. m. ob \ \{\Lambda \} \frac{359}{350} \]   |
| Time.  y 8 a m 9, 90 10 a.m. 11 a.m. 11 p m 12 dings. 8 a. m. 13 a.m. 14 a.m. 15 a.m. 16 a.m. 17 p m 18 a.m. 18 a.m. 19 a.m. 18 a.m. 19 a.m. 19 a.m. 10 a.m. 11 p.m.   | Mean scale readings.  d. 20 0 20 0 20 0 20 0 40 0 45 0 0 45 0 0 45 0 0 45 0 0 6 6 0 6  | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of metrk  At beginning of a. m. obs GA 350 56 8 8 reations 18 57 At end of p. m. observa GA 359 56 50 observations 18 57 At end of p. m. observa GA 359 56 50 observations 350 56 57 Mean 359 56 5 Value of one division of scale Scale-reading of axis 35 05 68 Scale-reading of axis 35 05 56 diff.  Reduction 5 o axis 36 26 diff. 1.17 Reduction 5 o axis 35 31 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 4 4 4 3 4  | Time.   Mean searle readings   8 a.m   20.0 9 a.m   40.0 10 a.m   37.2 11 a.m   29.4 12 m   46.2   Brooke declinemeter readings   8 a.m   490 9 a.m   491 12 a.m   492 11 a.m   493 11 a.m   494 11 a.m   495 11 a.m  | Computation   Reading of mark  |
| Time.  | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time. Seade readings seade readings and do not not not not not not not not not no  | Computation   Reading of mark   At beginning of a. m. ob \ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   At (ad of p. m. observa-\ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   Determination of axis of magnet.   Scale   Scale read   Mean   \lambda \]   Mean   \(\Lambda \)   Mean   \(\Lambda \)   At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)       At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \ |
| Time.  | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time. Mean readings and d. 32.0 9 a.m. 40.0 10 a.m. 37.2 11 a.m. 120.1 12 m. 140.2 Brooke declinometer readings.  8 a. m. 490 9 a. m. 490 9 a. m. 490 10 a.m. 451 12 m. 451 12 m. 451 12 a.m. 452 12 m. 451 13 a.m. 452 12 m. 451 13 a.m. 453 12 a.m.  | Computation   Reading of mark   At beginning of a. m. ob \ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   At (ad of p. m. observa-\ \{\Lambda \} \frac{359}{350} \]   Mean   \{\Lambda \} \frac{359}{1000} \]   Determination of axis of magnet.   Scale   Scale read   Mean   \lambda \]   Mean   \(\Lambda \)   Mean   \(\Lambda \)   At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (a) to \(\Lambda \)     At (a) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)       At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \(\Lambda \)     At (b) to \ |
| Time.  8 a m 9 9 10 a.m 10 a.m 11 p.m 12 p.m 13 p.m 14 p.m 15 p.m 16 a.m 17 p.m 18 a.m 19 a.m 17 p.m 18 a.m 19 a.m 19 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 11 p.m 12 m 15 p.m 16 a.m 17 p.m 18 a.m 19 a.m 19 a.m 19 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 11 a.m 12 m 12 m 13 a.m 14 a.m 15 a.m 16 a.m 17 a.m 18 a.m 19 a.m 19 a.m 19 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 11 a.m 12 a.m 12 a.m 13 a.m 14 a.m 15 a.m 16 a.m 17 a.m 18 a.m 19 a.m 19 a.m 19 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 10 a.m 11 a.m 12 a.m 13 a.m 14 a.m 15 a.m 16 a.m 17 a.m 18 a.m 19 a.m 19 a.m 19 a.m 10 a.m | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time.   Mean searle readings   8 a.m   20.0 9 a.m   40.0 10 a.m   37.2 11 a.m   29.4 12 m   46.2   Brooke declinemeter readings   8 a.m   490 9 a.m   491 12 a.m   492 11 a.m   493 11 a.m   494 11 a.m   495 11 a.m  | Computation   Reading of mark   At bealming of a, m, ob \{ \( \alpha \) 359   Servations \( \sigma \)   At \( \text{atol} \) of \( \alpha \)   A \( \text{atol} \) of \( \text{p. a. 359} \)   \( \text{p. Atol} \) of \( \text{p. A. 359} \)   \( \text{p. Atol} \)   \( p       |
| Time.  | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time. Mean readings and d. 32.0 9 a.m. 40.0 10 a.m. 37.2 11 a.m. 120.1 12 m. 140.2 Brooke declinometer readings.  8 a. m. 490 9 a. m. 490 9 a. m. 490 10 a.m. 451 12 m. 451 12 m. 451 12 a.m. 452 12 m. 451 13 a.m. 452 12 m. 451 13 a.m. 453 12 a.m.  | Computation   Reading of mark   At beginning of a, m, ob \{A, 359   480   48 |
| Time.  | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time. Mean readings and d. 32.0 9 a.m. 40.0 10 a.m. 37.2 11 a.m. 120.1 12 m. 140.2 Brooke declinometer readings.  8 a. m. 490 9 a. m. 490 9 a. m. 490 10 a.m. 451 12 m. 451 12 m. 451 12 a.m. 452 12 m. 451 13 a.m. 452 12 m. 451 13 a.m. 453 12 a.m.  | Computation   Reading of mark   At beginning of a. m. ob \ \{\Lambda} \] \( \text{3.59 f servations} \) \( 3.6 mose of the property of       |
| Time.  | Mean scale s | ine. Instrument, unitilar magnetometer, ended Observet: A. C. Dark.;  Computation.  Reading of mark  At beginning of a. m. obs GA 350 56 8 8 readings of a. m. obs GA 359 56 1008  | Time. Mean readings scale readings    8 a.m  | Computation   Reading of mark   At beginning of a, m, ob \{A, 359   480   48 |

## ned,

unitilar magnetometer : Dark and Maxield.]

| utation.  |             |                        | -                        |
|---|-------------|------------------------|--------------------------|
| m. ob { A.<br>m. ob { A.<br>B.<br>bserva { A.<br>B. | 850<br>850  | 57<br>56<br>56<br>57   | The second second second |
| ******  | 359         | 56, 5                  |                          |
| of axis of n  | lat i di la | t.                     |                          |
| Mean. Alf   | n'te<br>an  | Axis.                  |                          |
| 18. to  <br>51. 10   17<br>17. 80   51              | . 05        | d.<br>81. cs<br>84. cs |                          |
| 59 994 - 17   |             | 21 55                  |                          |

| 16.30 .  |           |
|----------|-----------|
| of F and | 34, 72    |
| gation   | 27, 75    |
| ditt.    | 6.57      |
|          | · o 25, 7 |
| ls       | 349 34.0  |

| ıds        |     | 25. 7<br>34. 0 |   |
|------------|-----|----------------|---|
| ian reads. | 319 | 08.3           | _ |
| ark        | 359 | 56.5           |   |
|            |     |                |   |
| E. of N    | 416 | 36. 0          |   |
| ds         | 313 | 20.5           |   |
| eclination | 35  | 47. 5 I        |   |

### before observation.

|     | -                 |
|-----|-------------------|
|     |                   |
| 359 | 57                |
|     | 58                |
| 350 | 57                |
|     | 58                |
| 359 | 37. 5             |
|     | 359<br>359<br>359 |

| Mean.            | Altn'te Axis. |
|------------------|---------------|
| 02.00            | l d.          |
| 33, 90<br>36, 80 | 33, 78 35, 29 |
| 53, 65           | 37, 35 35 50  |
| 37, 90           | 33.47 35 69   |
| 33 30            | 37, 60 3 15   |
| 37 30            | 33, 40 35 37  |
| 33, 50           |               |
| of scale         |               |
| f E. an          | 25, 46        |
| ation .          |               |
| duif.            | 1, 60         |
|                  |               |

| duff.           |                                    | 1. GO                   |
|-----------------|------------------------------------|-------------------------|
| nds             | - 0<br>348                         | 5. 9<br>57. 3           |
| lian reads      | 348                                | 51.6                    |
| nnik<br>E. of N | $\frac{359}{46}$ $\frac{313}{313}$ | 57. 5<br>36. 0<br>21. 5 |
| leclination     | 35                                 | 30, 1 E.                |

Recapitulation of results for declination.

| 1881.        | 0    | ,     | 1883.       | 0   |      |
|--------------|------|-------|-------------|-----|------|
| December 11  | *35  | 15.7  | January 1   | 41  | 15.1 |
| 1882.        |      |       | January 14  | 41  | 10.  |
| January 24   | 87   | 28. 8 | January 31  | 41  | 24.  |
| April 18     | 39   | 49.9  | February 14 | 41  | 26.  |
| May 24       | 39   | 06. 1 | February 28 | 40  | 16.  |
| June 17, 18  | 39   | 47. 4 | March 14    | 36  | 02.  |
| July 19, 20  | 39   | 54. 0 | March 31    | 825 | 33.  |
| August 19    | 141  | 14. 9 | April 14    | 85  | 31.  |
| August 31    | :41  | 23. 4 | April 30    | 35  | 26.  |
| September 14 | 1141 | 19. 7 | May 14      |     | 30.  |
| September 80 | 41   | 35. 5 | May 31      |     | 26.  |
| Oct ber 14   | 41   | 23. 0 | June 14     | 85  | 25.  |
| October 31   | 41   | 17. 7 | June 30     | 34  | 58.  |
| November 16  | 41   | 18.7  |             |     | 47.  |
| November 30  | 41   | 14.7  | Jily 14     | 35  |      |
| December 14. |      |       | July 81     | 135 | 53.  |
| Decound. 14  | 41   | 08.8  | August 14   | 85  | 30.  |

<sup>&</sup>lt;sup>a</sup> Torsion probably attended to. The first 7 results all refer to the mean of the day, bourly observations being given.

† New assument from here to the first 1 results all refer to the mean of day.

† Threduced to mean of day.

† Reduced to deal to from here to end.

¶ Reduced in mean if from here to end.

¶ Reduced as misreading of as. cir. of 4° assumed

H. Ex. 44---76

## APPENDIX No. 4.

OBSERVATIONS MADE AT UGLAAMIE. ALASKA, IN 1981-'82-'83, FOR DETERMINING THE ABSOLUTE MAGNETIC HOSTZONTAL INTENSITY, TOGETHER WITH THE COMPUTATION AND A RECAPITULATION OF RESULTS.

[Computer, E. H. Courtenay.]
$$\stackrel{m}{H} = \frac{1}{2} r^3 \sin u \left( 1 - \frac{P}{r^2} \dots \right)$$

|            | Circle readings.      |          |                        | Circle readings.             |                |     |     |     | iet.<br>h end. | Circle readings.                 |         |                          |        | Circle readings. |                                  |                |     |        |      |                                      |
|------------|-----------------------|----------|------------------------|------------------------------|----------------|-----|-----|-----|----------------|----------------------------------|---------|--------------------------|--------|------------------|----------------------------------|----------------|-----|--------|------|--------------------------------------|
| Magnet.    | North                 | No.      | Α                      | В                            | Mean.          | No. | A   |     | В              | Mean.                            | Magnet. | North                    | No.    | A                | В                                | Mean.          | No. | A      | В    | Mean                                 |
|            |                       |          | 3 1                    | ,                            | . ,            |     | 0   | ,   | ,              | ,                                |         | -                        |        | 0 /              | ,                                | ,              |     | 0 /    | ,    | ,                                    |
| East.      | E.                    |          | 233 12                 | 14                           | 13.0           | 2   | 228 | 49  | 50             | 49.5                             | 4       | W.                       | 1      | 233 15           | 16                               | 15, 5          | 2   | 228 52 | 53   | 52. 5                                |
| Eas        | E.<br>W.              |          | 233 13                 |                              | 14. 0<br>12. 5 | 4   | 228 | 51  | 52             | 51.5                             | East.   | W.<br>E.                 | 3      | 233 16<br>233 15 | 16                               | 16. 0<br>16. 0 | 4   | 53     | 53   | 53. 0                                |
|            | Mean                  |          | 38 12                  | - 13                         | 13, 17         | 1   |     |     |                | 50, 50                           |         | Mean                     |        | 283 10           | 11                               | 15, 83         |     |        |      | 52.7                                 |
| ,          | W. (                  |          |                        | . ,                          | 13, 17         | 6   | 228 | 10  | 50             | 49. 5                            | l<br>I  | W.                       |        |                  |                                  | 10, 85         | 6   | 228 54 | 1.55 | 54. 5                                |
| West.      | E.<br>W.              | 7 2      | 93 17                  | 15                           | 16.0           | 8   |     | 48  | 47             | 47.5                             | est.    | E.                       | 7      | 233 13           | 15                               | 14.0           | 8   | 55     | 56   |                                      |
| *          | II.                   | 9        | 16                     | 13                           | 14, 5          | 10  |     | 50  | 51             | 50.5                             | E       | E.                       | 9      | 14               | 16                               | 15.0           | 10  | 54     | 55   |                                      |
|            | Mean                  | . 1      |                        |                              | 15, 25         |     |     |     |                | 49. 17                           |         | Mear                     | i i    |                  |                                  | 14.5           |     |        |      | 54. 8                                |
|            |                       |          | -                      | <br>Comp                     | netation       |     |     |     |                |                                  |         |                          |        |                  | Com                              | pulation       |     |        | -    |                                      |
| lazu       | et Ea<br>et We<br>ean | st, 211: | - 11                   | . 08<br>. 38                 |                |     | -   | Sin |                | 9, 69897<br>0, 29073<br>8, 584c2 | Mag     | net Es<br>net We<br>deen | st, 2  | u= 19            | 9. 67<br>1. 58                   |                |     |        | À    | 0 6988<br>0 6988<br>0 2907<br>8 5708 |
| Magii<br>M | et We<br>ean          | nt, 211: | = 4 25<br>= 26<br>= 21 | 2.67<br>5.08<br>5.38<br>5.19 | entation       | 0   | 1   | Sin | . 14           | 9, 69897<br>0, 29973             | Mag     | net We<br>deen           | est, 2 | u= 4 2<br>u= 1   | 3. 08<br>9. 67<br>1. 58<br>0. 65 | pulation       | 0   |        |      |                                      |

#### Observations for determining the absolute magnetic horizontal intensity—Continued.

| ÷  | end.                            |   | Circle 1   | endi  | ngs.   |                      | Circle r                                | endin                      | igs.  | 12                    | end.   |   | Circle r   | eadii                            | ngs.                                       |                     | Circle                    | read                                  | ings.  |
|--|---------------------------------|---|--|---|--|----------------------|---|----------------------------|---|-----------------------|--|---|--|----------------------------------|--|---------------------|---------------------------|---------------------------------------|--|
| Magnet.  | North                           | No.   | A  | В   | Meau.  | No.                  | ٨                                       | В                          | Mean.   | Magnet.               | North  | No.   | A  | В                                | Mean.                                      | No.                 | A                         | F                                     | Mean.  |
| East.  | E.<br>W.<br>E.<br>W.            | 3 5   | 233 13<br>12<br>12   | 15<br>14-<br>14                               | 14. 0<br>13. 0<br>13. 0                                      | 2 4                  | 228 50<br>49                            | 52<br>51                   | 51. 0<br>50. 0  | East.                 | E.<br>W.<br>E.<br>W.   | 1 3 5   | 0 /<br>235 18<br>09<br>12  | 18<br>09<br>12                   | 18. 0<br>09. 0<br>12. 0                    | 2 4                 | 230 8                     | 8 38                                  |  |
|  | Mea                             | 13  |  |   | 13, 33   |                      | 1                                       | !                          | 50.50   |                       | Mea  | n   | 1  | 1                                | 13, 00                                     |                     | 1                         | 1                                     | 36, 00   |
| Werk   | W.<br>E.<br>W.                  | 7   | 233 11   | 13  | 12.0   | 8                    | 228 <b>51 5</b> 2                       | 53<br>54                   | 52. 0<br>53. <b>0</b>   | West.                 | W.<br>E.<br>W.   | 7 9   | 235 29   | 28                               | 28.5                                       | 8                   | 230 3                     | 9   3<br>8   3                        | 1  |
| P  | W.<br>Mea                       | i   | 10   | 13  | 11. 0  | 10                   | 53                                      | 55                         | 54. 0<br>53. 00   | -                     | W.<br>Mea  |   | 24   | 24                               | 26, 25                                     | 10                  | 8                         | 0 3                                   | 35. 6  |
|  | 3464                            | 11  |  |   |  | !                    |   |                            | 53.00   |                       | atea   | п   |  |                                  | 20.25                                      | _                   |                           |                                       | 35.0   |
|  |                                 |   | ,  | Com   | putation   |                      |   | ,                          | Log'ma.   |                       |  |   | 0  | Com                              | putation                                   | ١.                  |                           |                                       | Log'ms   |
| lag  | net E<br>net W<br>dean          |   | $u = 4 \ 2$<br>u = 10<br>u = 20  |   |  |                      | Sin                                     | Å                          | 9. 69897<br>0 29073<br>8. 37867   | Magi<br>Magi          | net E<br>net W<br>dean   |   | $u = 4 \ 3$<br>$u = 4 \ 5$<br>$u = 4 \ 4 \ 4$<br>$u = 2 \ 2$                                 | 3.79                             |  |                     | 8                         | in. u                                 | 9, 65897<br>0, 20073   |
| lim  | of be                           | ginn<br>ding  | ing 15 12 1 3!   | j , !   | l'emp. –<br>l'emp. –   | 27. 5                |   | 978<br>J <sup>7</sup>      | 8. 50837  | Time                  | of be  | ding  | ing 2h 5l<br>3 3l<br>m. 3 1  | 5 1                              | Temp<br>Temp                               | . 18                |                           | H                                     | 8. 60320   |
| ate<br>ode<br>rig<br>Ob  | Janu<br>dite i<br>ht ang        | iary<br>nagn<br>les to                              | 19, 1882.<br>etomoter<br>o Magnet<br>J. Dark                               | No<br>Sus                                     | ittingen<br>b. 11. M<br>uspende                              | time<br>dagn<br>d. I | et L <sub>H</sub> d                     | umei<br>eflec<br>r=1.      | nt, the-<br>ting at<br>25 feet.   |                       |  |   | 20, 1882.<br>etomete<br>Magnet<br>U. Davk.   |                                  | ittingen<br>o. 11.<br>uspende              | tim<br>Mag<br>ed. l | e. In<br>net L,<br>Distan | defi                                  | nent, the<br>ecting a<br>1.25 feet   |
| -  | rth end.                        | , 24, 5   | Circle r   |   |  | 1                    | et L <sub>ii</sub> d Distance: Circle r |                            |   |                       | ntang<br>server  |   |  | , n, e                           |  | eu. 1               | Circle                    | rear                                  | tings.   |
| -  | North end.                      |   | Circle r   | B   | alean.   | 1                    | Circle r                                | eadir                      | ада.  | agnet.                | nt ang<br>set vet  | , A. (  | Circle 1   | reads                            | ngs.                                       | eu. 1               | Circle                    | rear                                  | tings.   |
| - ACCOUNT OF THE PERSON OF THE | North and.                      | No.   | Circle r   | B<br>26                                       | Mean.  | 1                    | Circle r                                | eadin<br>B                 | Mean.   | Magnet.               | E. W.  | No.   | Circle 1   | ead:                             | Mean.                                      | eu. 1               | Circle                    | rear                                  | lings.   |
|  | North end.                      | No.   | Circle r  A   235 26   22  | B<br>26                                       | alean.   | No.                  | Circle r                                | B '                        | Mean.   | agnet.                | North end.   | No.   | Circle 1   | read:                            | ngs.                                       | No.                 | Circle A 230 1            | rear                                  | lings.  Mean 4 24.0  |
| Table to the total of the total | E.W. E.W.                       | No. 1 8 5   | Circle r  A   235 26   22  | B 26 22                                       | hlean. 26.0  | No.                  | A a / 230 38                            | B 38                       | Mean.   | Magnet.               | WE.W.  | No.   | Circle I   | B 54 59                          | Mean.  54. 0 59. 0 56. 0                   | No.                 | Circle A 230 1            | rear                                  | Hings.  Hear  4 24.0   |
| Last. Hattor.  | E W. E W. W. W.                 | No. 1 8 5   | Circle r  A   235 26   22  | B 26 22                                       | alean. 26.0 22.0 24.0  | No. 2                | A 230 38 35                             | B 38                       | Mean.  38.0 35.0  | Magnet.               | Property of the server of the  | No.   | Circle I   | B 54 59                          | Mean.  54. 0  59. 0                        | No.                 | Circle  A  230 1          |                                       | tings.    Mean   |
| East. Magnot.  | E W. E. W. E. W. E. W. E. W. E. | No.   | Circle r  A 235 26 22 24   | 26 22 24 20                                   | 26. 0<br>22. 0<br>24. 0                                      | No. 2 4              | A 230 34 30                             | B 38 35 34 30              | Mean.  38.0 35.0 31.0 30.0  | Magnet.               | Mea W. E. W. | (No.  | Circle 1  A. 234 54  59  | 13 / 54   59   56                | Mean.  54. 0  59. 0  56. 0                 | No. 2 4 6 8         | Circle  A  230 5          | 1   1   1   1   1   1   1   1   1   1 | Uinge.  3   Meau 4   24.0 2   32.0 7   27.0 6   26.0   |
| East. Magnet.  | E W. E. W. E. W.                | No.   1   8   5   9                                 | Circle r  A  235 26  22  24  | 26 22 24 20                                   | 26. 0<br>22. 0<br>24. 0<br>20. 0<br>22. 0                    | No. 2                | A 230 38 35                             | B / 38   35                | Mean.  38.0 35.0 36.50 31.0 30.0 33.0   | est. East. Magnet. Gr | Mea W. E. W. E. W.   | No. 1 3 5 5 nn  | Circle 1  A  234 54  59  56  | B / 54   59   56   58            | Mean.  54. 0 59. 0 56. 0 56. 0 57. 5 52. 5 | No. 2 4 8 10        | Circle  A  230 5          |                                       | Uings.  3   Mean  4   24.0  2   32.0  7   27.0  6   26.0  11   21.0  |
| East. Magnot.  | E W. E. W. E. W. E. W. E. W. E. | No.   1   8   5   9                                 | Circle r  A  235 26 22 24  235 20 22                                       | 26 22 24 20 22                                | 26. 0<br>22. 0<br>24. 0<br>20. 0<br>22. 0<br>24. 00          | No. 2 4 6 8 10       | A 230 34 30                             | B 38 35 34 30              | Mean.  38.0 35.0 31.0 30.0  | est. East. Magnet. Gr | Mea W. E. W. | No. 1 3 5 5 nn  | Circle 1  A  234 54  59  56  | B 54 59 56 58 53                 | Mean. 54. 0 59. 0 56. 0 50. 03 57. 5 52. 5 | No. 2 4 6 8 10      | Circle  A  230 5          | 1   1   1   1   1   1   1   1   1   1 | Uings.  3   Mean  4   24.0  2   32.0  7   27.0  6   26.0  11   21.0  |
| East. Magnet.  | E W. E. W. E. W.                | No.   1   8   5   9                                 | Circle r  A  235 26  22  24  235 20  22                                    | 26 22 24 20 22                                | 26. 0<br>22. 0<br>24. 0<br>20. 0<br>22. 0                    | No. 2 4 6 8 10       | A 230 34 30                             | 38<br>35<br>34<br>30<br>33 | Mean.  38.0 35.0  36.50  31.0 30.0 33.0  32.33                                | West. East. Magnet.   | Mea W. E. W. E. W.   | No. 1 3 5 5 nn  | Circle 1  A. 234 54  234 57  59  234 57  | B 54 59 56 58 53                 | Mean.  54. 0 59. 0 56. 0 56. 0 57. 5 52. 5 | No. 2 4 6 8 10      | Circle  A  230 5          | 1   1   1   1   1   1   1   1   1   1 | 3 Menu<br>4 24.0<br>2 32.0<br>7 27.0<br>6 26.0<br>21.0   |
| West. East. Magnet.  | E. W. E. W. E. W. Mea           | No. 1 8 5 5 1 7 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Circle r  A  235 26  22  24  235 20  22  4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 26 22 24 20 Com                               | 26. 0<br>22. 0<br>24. 0<br>20. 0<br>22. 0<br>21. 00          | No. 2 4 6 8 10       | A 230 38 35 230 34 30 53                | 38<br>35<br>34<br>30<br>33 | Mean.  38.0 35.0 36.50 31.0 30.0 33.0   | West. East.           | E. W. E. W. E. W. Mea  | No.   1   3   5   5   1   7   9   1   1   1   1   1   1   1   1   1 | Circle 1  A  234 54  59  56  234 57  52  4 = 4 2 3 3 4 5 4 5 4 5 4 5 5 5 6 5 6 5 6 6 6 6 6 6 | B                                | Mean. 54. 0 59. 0 56. 0 50. 03 57. 5 52. 5 | No. 2 4 6 8 10      | Circle                    | 1   1   1   1   1   1   1   1   1   1 | Uings.  3   Meau  4   24.0   28.0   28.0   21.0   2 |
| Tage West. East. Magnet.   | E W. E. W. E. W. Mea            | No. 1 3 5 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9       | Circle r  A  235 26  22  24  235 20  22  44  44  44  44  44                | 26 22 24 20 Com 28 67 7, 50 8, 67 8, 08 4, 04 | 26. 0<br>22. 0<br>24. 0<br>24. 0<br>22. 0<br>22. 0<br>21. 00 | No. 2 4 6 8 10       | A 230 38 35 230 34 30 53                | B 38 35 34 30 33           | 38. 0<br>35. 0<br>36. 50<br>31. 0<br>33. 0<br>32. 33<br>4. 0. 6897<br>0. 6897 | West, East.           | E. W. E. W. Mea  | No.   | Augnet A   | 54 59 56 58 33 9. 33 9. 33 4. 67 | Mean. 54. 0 59. 0 56. 0 50. 03 57. 5 52. 5 | No. 2 4 8 10        | Circle                    | 1                                     | Hings.  Hings.  Hings.  House State  |

E ABSOLUTE 4 RECAPITU-

ment, thedecting at = 1.25 feet. dings.

53 | 52.5 53 | 53.0

52, 75 55 - 54, 5 56 - 55, 5

55 54.5 54.83

> 0, 29073 8, 57086 8, 56950

### Observations for determining the absolute magnetic horizontal intensity—Continued.

| ti.                 | end  |   | Circle                                      | read  | ings.  |                         | Circle 1                                 | eadi  | ngs.   | et.  | end  |             | Circie 1  | eadi  | ngs.  |                     | Circle 1   | readi                | nge.  |
|---------------------|--|---|---|---|--|-------------------------|--|---|--|--|--|-------------|---|---|---|---------------------|--|----------------------|---|
| Magnet.             | North  | No.   | A   | В   | Mean.  | No.                     | A  | В   | Mean.  | Magnet.  | North  | No.         | A   | В   | Mean.   | No.                 | A  | В                    | Mean  |
|                     | 72   |   | 230 30                                      | 30  | 30, 0  |                         | 0 /                                      | ,   | ,  |  | R.   | 1           | 230 10  | 12  | 11.0  |                     | 0 /  | ,                    | ,   |
| East.               | W.   | 1 3   | 1   | 49  | 49. 0  | 2                       | 226 12                                   | 13  | 12.5   | East.  | W.   | 3           | 26  | 27  | 26.5  | 2                   | 225 47   | 48                   | 47. 5   |
| . M                 | W.   |   | 49  | 35  | 35. 0  | 4                       | 40                                       | 42  | 41.0   | PĒ.  | W.<br>E.   | 5           | 18  | 20  | 19.0  | 4                   | 20   | 21                   | 20. 5   |
|                     | 1  | 5   | 35  | 35  | 38, 90   |                         |  | ١.,   | 26. 75   |  | Mes  | 1           | 10  | 20  | 18, 83  |                     |  | }                    | 84. 00  |
|                     | Mea  | n   |   |   | 38.90  | 6                       | 226 00                                   | 02  | 01. 0  | ĺ  | W.   |             |   | 1   | 10.00   |                     | 225 35   | 1 36                 | 35. 5   |
| 44                  | E.   | 7   | 230 20                                      | 21  | 20. 5  |                         | 1  | 12  |  | 4  | E.   | 7           | 230 10  | 12  | 11. 0   | -                   |  |                      |   |
| West                | W.   | 9   | 25  | 26  | 25, 5  | 8                       | 10                                       | 20  | 20.0   | West   | E.   | 9           | 30  | 82  | 31. 0   | 8                   | 40   | 41                   | 40.5  |
|                     | W.   |   |   |   |  | 10                      | 20                                       | 20  |  | ,  | 1  |             |   |   |   | 10                  | 59   | 59                   | 59. 0   |
|                     | Mea  | n   |   |   | 23. 60   |                         |  |   | 10. 67   |  | Mei  | an          |   |   | 21.00   |                     |  |                      | 45, 00  |
|                     |  |   |   | Com   | putation   | •                       |  |   |  |  |  |             |   |   | pulation  | •                   |  |                      |   |
| Magr                | net Ea   | st, 2   | u = 4 11                                    | . 25  |  |                         |  |   | og'ms.   | Mag  | net Ea   | st, 2       | u= 4 44<br>u= 86  | 1. 83   |   |                     |  | . 1                  | Log'ma.<br>9. 69897   |
| Magi                | net Wa<br>Jean   | est. 2  | u= 1:                                       | 2. 33<br>1. 79  |  |                         | 1 1                                      |   | 9. 69897<br>0. 29073                                     | Mag  | net We<br>Mean   | est, 2      | 41  | 1.42  |   |                     | ١.,  | 70                   | 0.29073   |
|                     |  |   | u= 2 0                                      | 5. 90   |  | 0                       | Sin                                      | . 16  | 8. 56865   |  |  |             | u= 2 20   | 21  |   | 0                   | Sin  | 1. 16                | 8, 6103   |
| rime                | of be  | ginni   | ng 11 18                                    | 5m   7  | Гетр. —<br>Гетр. —   | 1.4                     |  | H   | 8. 55385   | Time   | of be  | ginni       | ng 11 55<br>2 30  | - 3   | Гемр. —<br>Гемр. —  | 8.0                 |  | $\hat{H}$            | 8. 60008  |
|                     | fean   | uiug  | 1 4   |   | t=-  | -                       |  | -   | i  |  | dean   | arug.       | 2 12  |   |   |                     |  |                      |   |
| Date,<br>eter       | Febr   | nary  | 18, 1882<br>Augnet                          |   |  | _                       | eodolite                                 | mag<br>les t  | netom-<br>o Mag-   | Date<br>No                                     | Mare   | Mag         | 1882. I   | natri   | cting at  | heod                | t augles   | to.                  | Magne   |
| Dai                 | pag.   |   | 18, 1882<br>Magnet<br>ded. D                | 2. Ir<br>L,, d  | nstrumen<br>effecting<br>ice r= 1.                                   | it, th<br>at r<br>25 fe | eodolite<br>ight ang<br>eet. Ob          |   |  | Date<br>No<br>S,,<br>Da                        | Marc. 11.<br>susperk.  | Mag         | 1882. I   | natri<br>lefler<br>ance                             | ument, toting at  | heod                | olite matt augles t. Obse  | rver                 | Magnet<br>, A. C.   |
| Dai                 | pag.   |   |   | 2. Ir<br>L,, d  | effecting ce r= 1.   | it, th<br>at r<br>25 fe |  |   |  | Date<br>No<br>S,,<br>Da                        | Marc. 11. susperk.   | Mag         | 1882. I<br>net L., e<br>. Dist  | natri<br>lefler<br>ance                             | ument, toting at  | heod                | t augles<br>t. Obse  | rver                 | Magnet<br>, A. C.   |
| Dai                 | North end  |   |   | . Ir<br>L,, d<br>istar  | effecting ce r= 1.   | at r.<br>25 fe          | Circle r                                 | adin  | gs.  | Date<br>No<br>S,,                              | Marc. 11. susperk.   | Mag         | 1882. I net L., 4 Dist  | natro<br>leffer<br>ance                             | ument, toting at r=1.25   | heod<br>righ<br>fee | t augles<br>t. Obse  | eadi                 | Magnet, A. C.   |
| Magnet.             | North end.   |   | Circle r                                    | 2. Ir<br>L,, d<br>istar                                       | effecting<br>ace r= 1.   | nt, the at r<br>25 fe   | Circle re                                | B ,   | gs.<br>Mean.   | Date<br>No<br>S,,<br>Da                        | Marc. 11. susperk.   | Mag         | 1882. I net L,, e   | natro<br>defice<br>ance                             | ment, toting at r=1.25  | heod<br>righ<br>fee | t augles t. Obse   | eadin                | Magnet, A. C.   |
| Magnet.             | North end.   | No.   | Circle r                                    | 2. Ir<br>L,, d<br>istar                                       | nstrumen effecting ice r = 1.  | No.                     | Circle r                                 | B /   | Mean.  | Date<br>No<br>S,,<br>Da                        | Marc. 11. susperk.   | Mag<br>nded | 1882. I net L., 4 Dist  | natro<br>defice<br>ance                             | ument, toting at r=1.25   | heod<br>righ<br>fee | Circle r   | eadin                | Magnet, A. C.   |
| Magnet.             | North end  | No.   | Circle r                                    | L, distanteadir   | nstrumen effecting ice $r=1$ .  Mean.  44. 5                         | nt, the at r<br>25 fe   | A 226 16                                 | B ,   | gs.<br>Mean.   | Date<br>No<br>S,,<br>Da                        | Marc. 11. susperk.   | No.         | 1882. I net L,, d. Dist   | natmieficiance                                      | ument, toting at r=1.25  ogs.  Mean.  | heod<br>righ<br>fee | t augles t. Obse   | eadin                | Magnet, A. C.   |
| Magnet.             | North end.   | No. 1 3 5   | A 230 44                                    | B 45  | nstrumen effecting (ce r = J.)  ngs.  Mean.  44.5                    | No.                     | A 226 16                                 | B /   | Mean.  | Date<br>No<br>S,,<br>Da                        | Marc. 11. susperk. E. W. E. W.   | No.         | 1882. I net I.,, 4 . Dist  Circle r  A  0 / 231 54                            | natrideficience ance                                | ument, toting at r=1.25   | heod<br>righ<br>fee | Circle r   | eadin                | Magnet, A. C. ngs. Mean 27. 5 37. 0   |
| East, Magnet.       | W. E. W. E. W. E. W. E. W. E. W. E. W.   | No. 1 3 5   | A 230 44 40 40                              | L,, distanted B   | ngs.  Mean.  44. 5 40. 5 40. 0  41. 67                               | No.                     | A 226 16                                 | B /   | Mean.<br>17. 0   | Magnet.  | Marc. 11. susperk.   | No.         | 1882. I net L,, a net L,, a Dist  Circle r  A  0 / 231 54  54 53              | natri<br>defici<br>ance<br>eadir<br>B               | ment, toting at r=1.25 mgs.  Mean.  , 53.5 55.0 54.0                              | heod<br>righ<br>fee | Circle r   | eadin                | Magnet, A. C. ngs. Mean 27. 5 37. 0   |
| est. East. Magnet.  | Mean W. E. W | No. 1 3 5   | A 230 44 40 40 230 88                       | B / 45 41 40  | mgs.  Mean.  44. 5 40. 5 40. 0  41. 67                               | No.                     | A 226 16 15                              | B<br>'<br>18  | gs.  Mean.  17. 0 15. 0                                  | Date No Da Da Da Da Da Da Da Da Da Da Da Da Da | Marc. 11. susperk. E. W. | No.         | 1882. J net L,, 4 Dist  Circle r  A  0 / 281 54 53                            | natri<br>defice<br>ance<br>B<br>,<br>58<br>56<br>55 | ment, to tring at r=1.25 mgs.  Mean.  / 53.5 55.0 54.0 54.17                      | No.                 | t angles t. Obsect. Circle r  A  227 27 36   | eadin                | Magnet, A. C.  ngs.  Mean  27. 5  37. 0                                       |
| est. East. Magnet.  | Mean W. E. W. E. W. E. W. E. W. E.   | No. 1 3 5   | A 230 44 40 40                              | L,, distanted B   | ngs.  Mean.  44. 5 40. 5 40. 0  41. 67                               | No. 2                   | Circle re  A                             | B / 18 15 10 10   | 17. 0<br>15. 0<br>16. 00                                 | Magnet.  | Marc. 11. susperk.   | No.         | 1882. I net L,, a net L,, a Dist  Circle r  A  0 / 231 54  54 53              | natri<br>defici<br>ance<br>eadir<br>B               | ment, toting at r=1.25 mgs.  Mean.  , 53.5 55.0 54.0                              | No.                 | t angles t. Obse Circle r  A  0 / 227 27 36  | B 28 38              | Magnet, A. C.  ngs.  Mean  27. 5  37. 0  32. 28                               |
| est. East. Magnet.  | Puo quo que Mean W. E. W | No.   1   3   5   | A 230 44 40 40 230 88                       | B / 45 41 40  | mgs.  Mean.  44. 5 40. 5 40. 0  41. 67                               | No. 2 4 8               | Circle re  A                             | B ' 18 15 10 12   | gs.  Mean.  17. 0 15. 0  16. 00  09. 5 11. 0             | Date No Da Da Da Da Da Da Da Da Da Da Da Da Da | Marc. 11. susperk.   | No.         | 1882. J net L,, 4 Dist  Circle r  A  0 / 281 54 53                            | natri<br>defice<br>ance<br>B<br>,<br>58<br>56<br>55 | ment, to tring at r=1.25 mgs.  Mean.  / 53.5 55.0 54.0 54.17                      | No.                 | t angles t. Obset Circle r  A  0 / 227 27 36  227 34 27  | B 28 38 27           | Magnet A. C.  Mean  27. 5  37. 0  32. 25  33. 5  27. 9                        |
| est. East. Magnet.  | Property of the state of the st | No.   1   3   5   | Circle r  A  0 / 230 44  40  40  230 88  39 | B / 45 41 40 40   | matrumen effecting see r = J.  Mean.  44.5 40.5 40.0 41.67 39.0 39.5 | No. 2 4 8               | Circle re  A                             | B ' 18 15 10 12   | gs.  Mean.  17. 0 15. 0 16. 00 09. 5 11. 0 03. 5         | Date No Da Da Da Da Da Da Da Da Da Da Da Da Da | E. W. E. W. E. W. E. W. E. W.  | No.         | 1882. I net L <sub>1,1</sub> 4. Dist  Circle r  A  0 / 231 54  53  231 60  54 | natridefiedance eadir  B  , 58  56  55  60  56      | ment, toting at r=1.25  mage.  Mean.  53.5  55.0  54.0  54.17                     | No.                 | t angles t. Obset Circle r  A  0 / 227 27 36  227 34 27  | B 28 38 27           | Magnet A. C.  Mean  27. 5  37. 0  32. 25  33. 5  27. 9  27. 5                 |
| West, East, Magnet, | Pue union E. W. E. W. E. W. E. W. Mean W. Mean   | No.   1   3   5     7   9                                       | Circle r  A  230 44  40  40  230 88  39     | B / 45 41 40 40 Comp  | mean.  Mean.  44. 5 40. 5 40. 0 41. 67  39. 0 39. 5                  | No. 2 4 8               | Circle re  A                             | B / 18 15 10 12 04  | gs.  Mean.  17. 0 15. 0  16. 00  09. 5 11. 0 03. 5 08. 0 | Weert. Bast. Magnet.                           | E. W.  | No.         | 1882. I net I.,, et Dist Circle r  A  | nstrnieficance eadir  B  , 58  56  55  60  56  Comp | ment, toting at tr=1.25  mgs.  Mean.  '53.5  55.0  54.0  54.17  27.0  55.0  59.50 | No.                 | t angles t. Obset Circle r  A  0 / 227 27 36  227 34 27  | eading B 28 38 27 28 | Mugnete, A. C.  Mean  , 27. 5 37. 0  32. 2t  33. 5  27. 6  29. 63             |
| West, East, Magnet, | Poo que W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. E. W. E. E. E. E. E. E. E. E. E. E. E. E. E.   | No. 1 3 5 1   | Circle r  A  230 44  40  40  230 88  89     | 2. Ir L <sub>i,i</sub> d istance adir B / 45 41 40 40 40 Comp | mean.  Mean.  44. 5 40. 5 40. 0 41. 67  39. 0 39. 5                  | No. 2 4 8               | Circle re  A                             | B   18   15   10   12   04   L  | gs.  Mean.  17. 0 15. 0 16. 00 09. 5 11. 0 03. 5 08. 0   | Weert. Bast. Magnet.                           | E. W.  | No.         | 1882. I net I.,, et Dist Circle r  A  | nstrnieficance eadir  B  , 58  56  55  60  56  Comp | ment, toting at tr=1.25  mgs.  Mean.  '53.5  55.0  54.0  54.17  27.0  55.0  59.50 | No.                 | t augles t. Obse t. Obse Circle r  A   | eading B 28 38 27 28 | Mugnet, A. C.  Mean  , 27, 5  37, 0  32, 22  33, 5  27, 9  29, \$3            |
| West, East, Magnet, | Pue union E. W. E. W. E. W. E. W. Mean W. Mean   | No.   1   3   5   1   1   1   1   1   1   1   1   1             | Circle r  A  230 44  40  40  230 88  89     | B / 45 41 40 40 40 67 . 25 5 46                               | mean.  Mean.  44. 5 40. 5 40. 0 41. 67  39. 0 39. 5                  | No. 2 4 8               | Circle re  A                             | B   18   15   10   12   04   I  | gs.  Mean.  17. 0 15. 0  16. 00  09. 5 11. 0 03. 5 08. 0 | Weert. Bast. Magnet.                           | E. W.  | No.         | 1882. I net L,, a Dist  Circle r  A  0 / 231 54 53 231 60 54                  | natri leffe ance eadir  B  58  56  56  56  Comp     | ment, toting at tr=1.25  mgs.  Mean.  '53.5  55.0  54.0  54.17  27.0  55.0  59.50 | No.                 | t augles t. Obse t. Obse Circle r  A   | eading B 28 38 27 28 | Magner, A. ( ) 10gs. Mea. ( ) 27. ( ) 37. ( ) 27. ( ) 27. ( ) 29. ( ) 4       |
| West. East. Magnet. | E. W. Mean W. E. W. Mean Mean Mean   | No.   1   3   5   1   7   9   1   1   1   1   1   1   1   1   1 | Circle r  A  0 / 230 44  40  40  230 88  89 | 2. In L <sub>ii</sub> , distant eadin B  45 41 40 40 40 40 23 | mean.  Mean.  44. 5 40. 5 40. 0 41. 67  39. 0 39. 5                  | No. 2 4 10              | Circle re  A  226 16  15  226 09  10  03 | B   18   15   10   12   04   15   15   15   15   16   17   18   18   18   18   18   18   18 | gs.  Mean.  17. 0 15. 0  16. 00  09. 5 11. 0 03. 5 08. 0 | Maggaer, Maggaer, Maggaer,                     | Maro<br>11. susperk.<br>G G G G G G G G G G G G G G G G G G G  | No.         | 1882. I I Inter L., Dist L., Dist Circle r A 231 54 53 231 60 54              | natricicide de de de de de de de de de de de de d   | ment, toting at tr=1.25  mgs.  Mean.  '53.5  55.0  54.0  54.17  27.0  55.0  59.50 | No.                 | L angles t. Obsect. Ob | eading B 28 38 27 28 | Magn<br>, A. (<br>pgs.<br>Mea<br>27.<br>32.<br>33.<br>27.<br>29. (<br>p. 698) |

| d.                   |                                  |
|----------------------|----------------------------------|
| net<br>to M          | om-<br>lag-<br>C.                |
| ngs                  |                                  |
| м                    | lean.                            |
|                      | ,                                |
| 1                    | 7. 5                             |
| 1                    | 20. 5                            |
| -                    | 84. 00                           |
| -                    | 35. 5                            |
| 1                    | 40. 5                            |
|                      | 59. 0                            |
| -                    | 45. 00                           |
| -                    |                                  |
|                      |                                  |
| Lo<br>9.<br>0.<br>8. | g'ms.<br>69897<br>29073<br>61038 |
| -                    | 60008                            |
| 0                    |                                  |
|                      |                                  |
| -                    |                                  |
| o M                  | meter<br>lagnet<br>A. C.         |
| er,                  | A. C.                            |
|                      |                                  |
| dio                  | ga.                              |
| В                    | Mean.                            |
| ,                    | ,                                |
| 28                   | 27. 5                            |
| 38                   | 87. 0                            |
|                      | 32, 25                           |
| 83                   | 83. 5                            |
| 27                   | 27. 0                            |
| 28                   | 27. 5                            |
|                      | 20.83                            |

|          | ı  |
|----------|----|
|          | L  |
|          | L  |
| Log'ms.  | 1  |
| 9. 69897 | 1  |
| 0.29073  | ı  |
| 8. 58590 | ١. |
|          | -1 |
| 8. 57560 | ١  |

| net.     | h end.                    |               | Circ       | le re                        | adir           | ıgs.                              |                  | Circ | clo r | eadi     | ngs.                                       | net.     | b end.                       |        | Circle             | readi            | ngs.                              |     | Circ | le re       | adir           | ge.   |
|----------|---------------------------|---------------|------------|------------------------------|----------------|-----------------------------------|------------------|------|-------|----------|--|----------|------------------------------|--------|--------------------|------------------|-----------------------------------|-----|------|-------------|----------------|---|
| Magnet.  | North                     | No.           | A          |                              | В              | Меан.                             | No.              | 1    | A.    | В        | Mean.                                      | Magnet.  | North                        | No.    | A                  | В                | Mean.                             | No. | A    |             | B              | Mean  |
| t. East. | E. W. E. W. E. Mean       | 1 3 5         |            | 46<br>41<br>40               | 44<br>43<br>40 | 45. 0<br>42. 0<br>40. 0<br>42. 33 | 2<br>4<br>6<br>8 | 227  | 12    | 08<br>12 | 08. 0<br>12. 0<br>10. 00<br>14. 0<br>08. 0 | t. East. | E. W. E. W. E. Mesu W. E. W. | 1 3 5  | 231 48<br>48<br>48 | 49               | 48. 0<br>49. 0<br>48. 0<br>48. 33 | 6 8 | 227  | 16 18 17 14 | 16<br>18<br>17 | 16. 0<br>18. 0<br>17. 0<br>17. 0                |
| West.    | W.<br>Mean                | Đ             |            | 45                           | 45             | 45. 0                             | 10               |      | 06    | 06       | 06. 0                                      | West.    | W.<br>Mean                   | 9      | 48                 | 3   48           | 48. 0                             | 10  |      | 24          | 24             | 24. 0   |
|          |                           |               |            | C                            | omp            | utation.                          |                  |      |       |          |  |          |                              |        |                    | Com              | putation                          |     |      |             |                |   |
| Magn     | set Ea<br>se: We<br>dean. | st, 2         | u=<br>u= : | 4 32,<br>35,<br>33,<br>2 16. | 17<br>75<br>88 |                                   | 0                |      | Sin   | ,        | 9. 69897<br>0. 29073<br>8. 59995           | Mag      | net We<br>Mean.              | est, 2 | u= 2               | 30. 17<br>30. 75 |                                   | ,   |      | Sin.        | .8             | og'ma.<br>9 6989<br>0, 2907;<br>8, 595 <b>f</b> |
| rime.    | of be<br>of end           | gipni<br>ling | 1          | 50<br>50                     |                | ľemp. —<br>ľemp. —                | 0.0              |      |       | H        | 8. 58965                                   | Tim      | e of be<br>e of en<br>Mean   | ginn   | ing 1h             | 54               | Temp. 4                           | -   |      |             | n<br>H         |   |

| iet.         | end.                 |               | Circle r                            | eadii           | ngs.           |                | Circio r                   | eadir          | ıgs.                                       | et.        | ı end.                 | ì      | Circle 1                         | eadir            | ıga.           |                     | Circl | е ге           | adin           | gs.                                   |
|--------------|----------------------|---------------|-------------------------------------|-----------------|----------------|----------------|----------------------------|----------------|--|------------|------------------------|--------|----------------------------------|------------------|----------------|---------------------|-------|----------------|----------------|---------------------------------------|
| Magnet.      | North                | No.           | A                                   | В               | Mean.          | No.            | A                          | В              | Меав.                                      | Magnet.    | North                  | No.    | A                                | В                | Mean.          | No.                 | A     |                | В              | Mean                                  |
| ئد           | E.                   | 1             | 280 26                              | 26              | 26. 0          | 2              | o /<br>226 36              | 36             | 36.0                                       | ند         | E.                     | 1      | ° '<br>231 55                    | 55               | 55. 0          | 2                   |       | 44             | 44             | 44. 0                                 |
| East.        | W.<br>E.             | 5             | 232 18<br>233 20                    | 20<br>22        | 19. 0<br>21. 0 | 4              | 229 00                     | 00             | 00.0                                       | East.      | W.<br>E.               | 3<br>5 | 53<br>58                         | 53<br>58         | 53. 0<br>58. 0 | 4                   |       | 45             | 45             | 45. 0                                 |
|              | Mea                  | n.            | 232                                 | 1               | 02. 00         |                | 227                        | ł              | 48.00                                      |            | Mea                    | n.     |                                  | 1                | 55. 33         | -1                  | ı     |                |                | 44 5                                  |
| West.        | W.<br>E.<br>W.<br>E. | 7 9           | 233 54<br>230 50                    | 54<br>50        | 54. 0<br>50. 0 | 8              | 230 25<br>229 05<br>226 06 | 25<br>05<br>06 | 25, 0<br>05, 0<br>06, 0                    | West.      | W.<br>E.<br>W.<br>E.   | 7      | 231 60<br>59                     | 60<br>59         | 60. 0<br>50. 0 | 8                   |       | 42<br>46<br>44 | 42<br>46<br>44 | 42. 0<br>46. 0<br>44. 0               |
|              | Mea                  | n             | 232                                 |                 | 22, 00         | 10             | 228                        | 00             | 32. 00                                     |            | Mea                    | n.     |                                  |                  | 59. 50         | -                   |       |                |                | 44.0                                  |
|              |                      |               |                                     | Com             | putation       | h.             |                            |                |  |            |                        |        |                                  | Com              | putation       | ı.                  |       |                |                |                                       |
| Mag          |                      | est, 2        | u = 4 1 $u = 3$ $u = 4$ 0 $u = 2$ 0 | 60, 00<br>2, 00 |                |                |                            | ra<br>ra       | og'ma.<br>9. 69897<br>0. 29073<br>8. 54642 |            | net E<br>net W<br>Mean | est, 2 |                                  | 15, 50<br>13, 16 |                |                     |       | Sin            | r3             | og'ms<br>9-6989<br>0, 2907<br>8, 5659 |
| Time<br>Time | e of be              | ginni<br>ling | ng 1 <sup>h</sup> 15                | m               |                | 21. 0<br>21. 0 |                            | H              | 8, 53612                                   | Tim<br>Tim | e of be                | ginni  | ng 1 <sup>b</sup> 2 <sup>c</sup> | 0m .             |                | 0<br>12. 0<br>18. 0 |       |                | n<br>H         | 8, 5556                               |
| 34           | lean                 |               | 1 32                                | . 51            | t=             | 21. 0          |                            |                |  |            | lean                   |        | 1 3                              | 2.5              | t= -           | 15. 0               |       |                |                |                                       |

Observations for determining the absolute magnetic horizontal intensity, &c.—Continued.

| ÷,                          | end.  |         | Circle i            | cadi                       | ngs.  |        | Circle i                           | endi                       | ngs.   | 1          | n end                              |       | Circle r             | eadi                         | ngs.  |                        | Circle r                           | eadi                       | ıgs.  |
|-----------------------------|---|---------|---------------------|----------------------------|---|--------|------------------------------------|----------------------------|--|------------|------------------------------------|-------|----------------------|------------------------------|---|------------------------|------------------------------------|----------------------------|---|
| Magnet.                     | North   | No.     | A                   | В                          | Mean.   | No.    | Aı                                 | В                          | Mean.  | Мада       | North                              | No.   | A                    | В                            | Meau.   | No.                    | Δ                                  | В                          | Mear  |
| West. East.                 | E. W. E. W. E. W. E. W. E. W. E. W. E. W. E. W. | 7       | 14<br>98<br>231 59  | 12<br>14<br>08<br>59<br>61 | 12. 0<br>14. 0<br>08. 0<br>11. 33<br>59. 0<br>61. 0 | 6 8 10 | 227 40<br>40<br>227 35<br>32<br>33 | 40<br>40<br>35<br>32<br>33 | 40. 0<br>40. 0<br>40. 00<br>35. 0<br>32. 0<br>33. 0    | West East. | E. W. E. W. E. W. E. W. E. W. Mean | 7 9   | 233 08               | 55<br>54<br>55<br>68<br>10   | 55. 0<br>54. 0<br>55. 0<br>54. 67<br>68. 0<br>10. 0 | 2<br>4<br>6<br>8<br>10 | 228 35<br>35<br>228 55<br>54<br>45 | 35<br>35<br>35<br>54<br>45 |   |
| Magn<br>M<br>Finne<br>Finne | iet We<br>Ieap.                                 | st, 2 i | u = 4 31.<br>u = 26 | 33<br>67<br>00<br>50       | emp. 21.  | 0 5    |                                    | . 10 ·                     | og'ms.<br>9. 69897<br>0. 29073<br>8. 59234<br>8. 58204 | Time       | ict We<br>Iean.                    | st, 2 | u == 4 19<br>u == 17 | . 67<br>. 67<br>. 67<br>. 33 | comp. 45  |                        | Sin                                | . "                        | og'ms<br>9, 6986<br>0, 2907<br>8, 5758<br>8, 5650 |

| ÷.          | ı end.        |                          | Circle r           | eadi                             | ngs.  |     | Circle 1                   | eadi          | nga.  | et.         | end.                                    |                         | Circle r                           | eadi                             | nga.  |                  | Circle                             | readi          | nga.  |
|-------------|---------------|--------------------------|--------------------|----------------------------------|---|-----|----------------------------|---------------|---|-------------|---|-------------------------|------------------------------------|----------------------------------|---|------------------|------------------------------------|----------------|---|
| Magnet.     | North         | No.                      | A                  | В                                | Mean.   | No. | A                          | В             | Mean.   | Magnet      | North                                   | No.                     | A                                  | В                                | Mean.   | No.              | A                                  | В              | Mean  |
| West. East. | E. W. E. Mes  | ; 7<br>; 9               |                    | 37<br>40<br>39<br>35             | 37. 0<br>40. 0<br>39. 0<br>38. 67<br>35. 0<br>33. 0 | 6 8 | 9 / 228 15 14 228 20 22 24 | 20            | 15. 0<br>14. 0<br>14. 50<br>20. 0<br>22. 0<br>24. 0 | West. East. | E. W. E. W. E. W. E. W. E. W. E. W. Mea | 7 9                     | 233 39<br>30<br>25<br>232 23<br>21 |                                  | 30. 0<br>30. 0<br>26. 0<br>28. 67<br>23. 0<br>21. 0 | 2<br>4<br>6<br>8 | 228 18<br>01<br>228 18<br>07<br>07 | 01<br>18<br>07 | 17. 0<br>01. 0<br>00. 00<br>14. 0<br>07. 0<br>07. 0 |
| Mag<br>Time | net W<br>Ican | est, 2<br>ginni:<br>ding | u = 4 2:<br>u = 1: | 1. 17<br>2. 00<br>4. 08<br>9. 04 | Temp. Temp.   | 47  |                            | I. u. u. m. H | .0g'ms.<br>9.69897<br>0.29073<br>8.57442<br>8.56412 | Time        | not W<br>Mean.                          | est, 2<br>ginni<br>ding | u = 41 $u = 1$                     | 9, 67<br>2, 67<br>6, 17<br>8, 08 | Temp.   | a<br>36. 0       |                                    | in. u          | og'ms.<br>9. 6989<br>0, 2907<br>8. 5711<br>8. 5608  |

eadings.

B Mean.

35 35,0 35 35,0 35,00

55 55.0 54 54.0 54 45.0 51.33

Loginis.

m 8, 56503 H 8, 56503

ment, theodoecting at right e r=1.25 feet.

e readings.

B Mean.

1 18 16 17.0
01 01 01.0

09.00 15 | 18 | 14.0 07 | 07 | 07.0

07 07 07.0 07 07 07.0 09.33

Log'ms, 9.60507 0.29073 Sin. u 8.57111

in 8, 56081

 ${\it Observations for \ determining \ the \ absolute \ magnetic \ horizontal \ intensity}-{\bf Continued.}$ 

| 30¢.        | North end.                          |             | Circle r | eadiı                      | nga.  |     | Circle r                          | eadii                      | ngs.  | et          | end.                              |             | Circle read                            | inga.                               |                  | Circle re                         | adir                       | ge.                                       |
|-------------|-------------------------------------|-------------|----------|----------------------------|---|-----|-----------------------------------|----------------------------|---|-------------|-----------------------------------|-------------|--|-------------------------------------|------------------|-----------------------------------|----------------------------|---|
| Magnet.     | Nort                                | No.         | A        | В                          | Mean.   | No. | A                                 | В                          | Mean.   | Magnet      | North                             | No.         | A I                                    | Mean.                               | No.              | A                                 | В                          | Mean                                      |
| West. East. | E. W. E. W. E. W. E. W. E. W. E. W. | 1 8 5 a 7 9 |          | 24<br>30<br>34<br>46<br>47 | 25. 0<br>30. 5<br>34. 5<br>30. 00<br>46. 0<br>48. 0 | 8   | 0 /<br>40 23<br>24<br>49 28<br>28 | 21<br>22<br>28<br>26<br>29 | 22. 0<br>23. 0<br>22. 50<br>27. 0<br>27. 0<br>30. 0 | West. East. | E. W. E. Mea                      | 1 3 5 n 7 9 | 53 48 44<br>45 45<br>41 86<br>53 37 33 | 44. 0<br>40. 0<br>43. 00<br>5 36. 0 | 2<br>4<br>6<br>8 | 9 /<br>49 30<br>28<br>49 23<br>20 | 23<br>26<br>21<br>18<br>11 | 29. 0<br>27. 0<br>28. 0<br>22. 0<br>19. 0 |
|             | Mean                                | 1           |          |                            | 47. 00  |     |                                   |                            | 28. 00  |             | Mea                               | n           |  | 36.00                               |                  |                                   | -                          | 17.                                       |
|             |                                     |             |          | Com                        | putation.   |     |                                   |                            |   |             |                                   |             | Con                                    | nputation                           | B.               |                                   |                            |   |
| Mag<br>Time | net Ea<br>net We<br>Mean            | est. 2      | u= 2 06  | . 00<br>. 25<br>. 62       | Temp. f   | 53  | Sin                               | 4                          | 9, 69807<br>0, 29073<br>8, 56013<br>8, 55583        | Mag         | net E<br>net W<br>Mean<br>e of be | est, 2      | $u = 2 \ 08.33$                        |                                     | o<br>50          | Sit                               | t,                         | 9 6989<br>9 6989<br>9 5711<br>8 5711      |

| let.               | a ond.                 | (   | Circle r                | eadi                | nga.                     |     | Circl | e rea | dings.                                  | et.               | r end.                           |      | C        | irele         | rendi                      | nga.                     |     | Circle             | readia         | ıgs.  |
|--------------------|------------------------|-----|-------------------------|---------------------|--------------------------|-----|-------|-------|---|-------------------|----------------------------------|------|----------|---------------|----------------------------|--------------------------|-----|--------------------|----------------|---|
| Magnet.            | North                  | No. | A                       | В                   | Mean.                    | No. | A     |       | B Mean                                  | Magnet            | North                            | No   |          | A             | В                          | Mean                     | No. | A                  | В              | Moni  |
| East.              | E.<br>W.<br>E.         | 3 5 | 54 00<br>53 55<br>54 00 | 53<br>00            | 00. 0<br>54. 0<br>00. 0  | 2   | 49    | 51    | 50. 0<br>57 58. 0                       | East.             | E.<br>W.<br>E.<br>W.             | 1 2  | 3 1      | 233 5<br>6    |                            | 54. 0<br>60. 0<br>64. 0  | 2   | 229 45<br>45       | 43<br>43       | 44. 0   |
| West.              | W. E. W. E. W. Mes     | 7   | 53<br>54 00<br>00       | 00                  | 58, 00<br>00, 0<br>00, 0 | 8   |       |       | 54. 0<br>48. 0<br>48. 49. 0<br>50 51. 0 | West.             | Me<br>W<br>E<br>W                |      | 7<br>9 : | 234 0<br>0    | 94 , 02<br>92 - 00         | 59. 33<br>03. 0<br>01. 0 | 8   | 229 46<br>39<br>43 | 44<br>37<br>41 | 44 (<br>45.0<br>38.4<br>42.0<br>41.0          |
|                    |                        |     |                         | Com                 | putation                 |     |       | -     |   |                   |                                  |      | -        | -             | Com                        | putation                 | ı   | -                  |                |   |
| Magn<br>M<br>Cince | iet W<br>Iean<br>of bi |     | ı= 11                   | . 33<br>66<br>1. 83 | Temp 6                   | )   |       | Sin.  | 9 5461                                  | Mag<br>Mag<br>Tim | met F<br>met W<br>Mean<br>e of b | est, | 2 u      | ran 2<br>g Ih | 20, 33<br>17, 93<br>08, 92 | Temp                     |     | Si                 | n. u           | Log'm<br>9 6986<br>0 2905<br>8,5736<br>8,5636 |

# Observations for determining the absolute magnetic horizontal intensity—Continued.

| 19                | end.                             |       | Circle r                           | eadi                         | ngs.  |                   | Circle r                               | eadi                             | ngs.  | et.         | p end                        |        | Circle r           | eadi                         | ngs.  |                        | Circle r                           | endi           | nga.   |
|-------------------|----------------------------------|-------|------------------------------------|------------------------------|---|-------------------|--|----------------------------------|---|-------------|------------------------------|--------|--------------------|------------------------------|---|------------------------|------------------------------------|----------------|--|
| Magnet.           | North                            | No.   | A                                  | В                            | Mean.   | No.               | A                                      | В                                | Mean.   | Magnet.     | North                        | No.    | A                  | В                            | Mean.   | No.                    | A                                  | В              | Mean   |
| West. East.       | E. W. E. Mean W. E. W. Mean Mean | 7 0   | 233 40<br>46<br>52<br>233 51<br>51 | 38<br>44<br>50<br>49         | 39. 0<br>45. 0<br>51. 0<br>45. 00<br>50. 0<br>50. 0 | 2<br>4<br>8<br>10 | 229 31<br>31<br>229 31<br>229 31<br>39 | 29<br>29<br>29<br>20<br>37<br>39 | 30. 0<br>30. 0<br>30. 0<br>30. 0<br>38. 0<br>40. 0      | West. East. | E. W. E. W. E. W. E. W. Mean | 7 0    | 234 10<br>08       | 00<br>01<br>00<br>08<br>06   | 01. 0<br>02. 0<br>01. 0<br>01. 33<br>09. 0<br>07. 0 | 2<br>4<br>6<br>8<br>10 | 229 49<br>53<br>229 51<br>52<br>52 | 49<br>50<br>50 | 50. 0<br>50. 0<br>51. 0<br>51. 0<br>50. 6          |
| Magr<br>A<br>Time | et Easet Welvan                  | et, 2 | $u = 4 \ 15$ $u = 14$ $u = 2 \ 07$ | . 00<br>. 00<br>. 50<br>. 25 | Temp. Temp.   | o<br>58<br>58     | Sin                                    | t u                              | log'ms.<br>9, 69897<br>0, 29073<br>8, 56828<br>8, 55798 | Time        | iet Wo<br>Iean               | est, 2 | u = 4 11<br>u = 17 | . 33<br>. 33<br>. 33<br>. 17 | Temp.   | 62                     | 8                                  | in. 16         | Log'ms<br>9, 6980<br>0, 2907<br>8, 5680<br>8, 5577 |

| ů,                   | end                        |             | Circle r            | eadi                         | ngs.                    |               | Circle r            | eadi           | ngs.   | et           | end                  |             | Circle r       | eadi                                      | ıgs.                     |                  | Circle r                   | eadi           | ngs.  |
|----------------------|----------------------------|-------------|---------------------|------------------------------|-------------------------|---------------|---------------------|----------------|--|--------------|----------------------|-------------|----------------|---|--------------------------|------------------|----------------------------|----------------|---|
| Magnet.              | North                      | No.         | A                   | В                            | Mean.                   | No.           | A                   | В              | Mean.  | Magnet.      | North                | No.         | A              | В   | Mean.                    | No.              | А                          | В              | Mean  |
| East.                | E.<br>W.<br>E.<br>W.<br>E. | 1<br>3<br>5 | 855 30<br>30<br>30  | 28<br>28<br>28               | 29. 0<br>29. 0<br>29. 0 | 2             | o /<br>351 26<br>23 | 24<br>21       | 25, 0<br>22, 0   | East.        | E.<br>W.<br>E.<br>W. | 1<br>8<br>5 | 03<br>03<br>02 | 02<br>01<br>00                            | 03. 0<br>02. 0<br>01. 0  | 2                | o /<br>350 52<br>50        | 60<br>48       | 51. 0<br>49. 0  |
| West.                | W.<br>E.<br>W.<br>E.<br>W. | 7<br>9      | 355 36<br>38        | 34<br>36                     | 35. 0<br>37. 0          | 6<br>8<br>10  | 351 31<br>30<br>32  | 29<br>28<br>30 | 23. 50<br>30. 0<br>29. 0<br>31. 0                      | West.        | W. E. W. E. W.       |             | *355 32<br>28  | 30<br>26                                  | 02. 00<br>31. 0<br>27. 0 | 6<br>8<br>10     | 350 03<br>350 05<br>349 58 | 01<br>03<br>56 | 50, 0<br>02, 0<br>04, 0<br>57, 0                        |
|                      | Mean                       | 'n '        |                     |                              | 36. 00                  |               |                     |                | 30. 00   |              | Mean                 | 3           | 54             |   | 29, 00                   |                  | 350                        |                | 01. 0   |
| Magr<br>Time<br>Time | iet We<br>Mean             | st, 2       | u = 4 05<br>u == 00 | . 50<br>. 00<br>. 75<br>. 88 | Гетр. 4                 | o<br>13<br>13 | Sin                 | 73             | og'ms.<br>9. 69897<br>0. 29073<br>8. 55311<br>8. 54281 | Magi<br>Time | net We<br>Ican       | st, 2       | u=2 10         | 2. 60<br>3. 60<br>3. 60<br>3. 60<br>3. 60 | Temp.                    | 39<br>39<br>39.0 | Sin                        | 73<br>. 11     | og'ms.<br>9. 6989<br>0. 2907:<br>8. 5775<br><br>8. 5672 |

### Observations for determining the absolute magnetic horizontal intensity-Continued.

| ter               | No. 1<br>No. 1<br>S., st           | ust j<br>il. h<br>ispen | 19, 1882.<br>dagnet l<br>ded. L                  | Ina<br>L,, d<br>ista       | trument<br>effecting<br>aco r=1.                    | , the<br>at :<br>25 fe | odelite<br>right su<br>st. Obs                      | magi<br>gles i<br>erve | netome-<br>to Mag-<br>r, A. C.                         | ode<br>ris        | lite r                              | nagne<br>glea | tometer                          | r No<br>net          | S., stinbe  | lagne             | t L., d                         | effec                | nt, the-<br>ling at<br>r=1.25                          |
|-------------------|------------------------------------|-------------------------|--|----------------------------|---|------------------------|---|------------------------|--|-------------------|-------------------------------------|---------------|----------------------------------|----------------------|---|-------------------|---------------------------------|----------------------|--|
| et.               | end                                |                         | Circle r   | eadi                       | ngs.  |                        | Circle r  | eadi                   | ngs.   | #                 | end                                 |               | Circle r                         | eadi                 | ngs.  |                   | Circle r                        | eadir                | gs.  |
| Magnet.           | North                              | No.                     | A  | В                          | Mean.   | No.                    | A   | В                      | Mean.  | Magnet.           | North                               | No.           | A                                | В                    | Mean.   | No.               | A                               | В                    | Mean.  |
| West. East.       | E. W. E. W. E. W. E. W. E. W. Mean | 7 9                     | 355 16<br>17<br>14<br>355 16<br>13               | 14<br>15<br>12<br>14<br>11 | 15. 0<br>16. 0<br>13. 0<br>14. 67<br>15. 0<br>12. 0 | 2<br>4<br>6<br>8<br>10 | 351 08<br>05<br>351 02<br>35 04<br>350 57<br>351 00 | 00<br>02<br>55         | 07. 0<br>04. 0<br>05. 50<br>01. 0<br>03. 0<br>56. 0    | West. East.       | E. W. E. W. E. W. E. W. E. W. E. W. | 7 9           | 75 22<br>20<br>20<br>20<br>75 10 | 20<br>18<br>18<br>18 | 19. 0<br>19. 0<br>19. 0<br>19. 67<br>09. 0<br>14. 0 | 2<br>4<br>8<br>10 | 71 14<br>08<br>71 0<br>02<br>03 | 00<br>00<br>00<br>01 | 13. 0<br>07. 0<br>10. 00<br>00. 0<br>01. 0<br>02. 0    |
|                   |                                    |                         |  | C                          | omputat   | ion.                   |   |                        |  |                   |                                     |               |                                  | Com                  | putation  |                   |                                 |                      |  |
| Magi<br>M<br>Time | ean.                               | est, 2                  | u = 4 06 $u = 4 13$ $4 11$ $u = 2 05$ $a = 1 55$ | . 50<br>. 34<br>. 67       |   | 0<br>40<br>40          | Sin   |                        | og'ms.<br>9, 69897<br>0, 29073<br>8, 56285<br>8, 55255 | Maga<br>M<br>Time | of beg                              | est, 2 :      | 10<br>s= 2 05<br>og 4h 20s       | . 50<br>. 08<br>. 04 |   | o<br>40<br>40     | Sir                             | į,                   | og'ms.<br>9. 69897<br>0. 29073<br>8. 56068<br>8. 55088 |
|                   | ean.                               | Research                | 1 35   |                            | temp.<br>t=   | -                      |   |                        |  |                   | ean.                                | ing           | 4 50                             | -                    |   | 40 0              |                                 |                      |  |

| let.         | b end.                                    |                | Circle r  | eadi                       | ngs.                                |                        | Circle r                                  | eadi                       | ngs.   | net.         | h end.                        |                                  | Circle re  | adiı                             | ngs.                              |                  | Circle              | readi                                | ngs.   |
|--------------|---|----------------|---|----------------------------|-------------------------------------|------------------------|---|----------------------------|--|--------------|-------------------------------|----------------------------------|--|----------------------------------|-----------------------------------|------------------|---------------------|--------------------------------------|--|
| Magnet.      | North                                     | No.            | Λ   | В                          | Mean.                               | No.                    | A   | В                          | Mean.  | Magnet.      | North                         | No.                              | A  | В                                | Mean.                             | No.              | A                   | В                                    | Mean   |
| West. East.  | E. W. E. W. E. W. E. W. E. W. E. W. E. W. | 7 9            | 175 20<br>18<br>08<br>175<br>174 55<br>57               | 22<br>20<br>10<br>57<br>59 | 21<br>19<br>09<br>16.33<br>56<br>58 | 2<br>4<br>6<br>8<br>10 | 171 08<br>67<br>171<br>170 42<br>40<br>39 | 08<br>09<br>44<br>42<br>41 | 07<br>08<br>07.5<br>43<br>41<br>40                               | West. East.  | E. W. E. W. E. W. E. W. E. W. | 1<br>3<br>5                      | 75 33<br>31<br>32<br>75<br>75 36<br>85                         | 31<br>29<br>30<br>31<br>34<br>33 | 32<br>30<br>31<br>31<br>35<br>34  | 2<br>4<br>6<br>8 | 71 11 71 71 11 12 2 | 3   13<br>3   11<br>9   17<br>0   17 | 14<br>12<br>13<br>18<br>18<br>18               |
| Magi<br>Pime | ict We<br>Mean                            | st, 2<br>et, 2 | 174  u = 4 08. u = 4 15. 4 12. u = 2 06. ng 3h 35u 4 05 | 83<br>67<br>25<br>125      |                                     | o<br>2. 5<br>1. 5      | Sin                                       | 16<br>16                   | 41, 33<br>og'ms,<br>9, 69897<br>0, 29073<br>8, 56442<br>8, 55412 | Time<br>Time | net We<br>Mean                | set, 2 :<br>set, 2 :<br>trinning | 75  u=4 18.0  u=4 16.0  4 17.0  u=2 08.0  ng 3h 10m 4 00  3 35 | 0<br>17<br>08<br>54              | 34. 5  putation  cemp. 4  cemp. 4 | 4 4              | S                   | I<br>rs<br>in. u<br>m<br>H           | 0g'ms<br>9, 698<br>0, 200'<br>8, 572<br>8, 562 |

П. Ех. 44——77

ga. Mean.

48. 0 52. 0 50. 00 50. 0

51. 0 51. 0 50. 67

Log ms. 9, 60897 0, 29073 8, 56800 8, 55770

gnetomes to Magerver, A.

dings.

50, 00 50, 00 1 02, 0 3 04, 0

66 57.0

9. 69897 0. 29073 u 8. 57757 n 8. 56727

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# Observations for determining the absolute magnetic horizontal intensity—Continued.

| ų.   | t di  |  | Circle  | rendi                                    | ngs.  | -  | Circle                                       | readi                              | nge.  |                               | epd   | f  | Circle r  | endi   | nga.   |                                       | Circ                 | to re                 | eadir          | nga.   |
|--|---|--|---|--|---|--|--|------------------------------------|---|-------------------------------|---|--|---|--|--|---------------------------------------|----------------------|-----------------------|----------------|--|
| Magnet.  | North   | No   | A   | В  | Mean.   | No.  | A  | В                                  | Mean.   | Magnet                        | North   | No.  | ٨   | В  | Mean.  | No.                                   | 1                    | A                     | В              | Mea  |
| East.  | E.<br>W.<br>E.<br>W.  | 1<br>3<br>5                                  | 75 33<br>34   | 32                                       | 31<br>33<br>34  | 3  | 0 /<br>71 09<br>11                           | 97<br>09                           | 08  | East.                         | E.<br>W.<br>E.<br>W.                              | 1<br>3<br>5  | 75 21<br>29<br>26   | 99<br>24<br>28                                       | 98<br>23<br>27   | 9                                     | 71                   | 02                    | 04<br>08       | 93<br>97   |
| West.  | W. E. W. E. W. Mea  | 7  | 75<br>75 33<br>32<br>75   | 31                                       | 32. 67<br>32<br>31<br>31. 5   | 6 8 10   | 71<br>71 16<br>15<br>14                      | 14                                 | 16<br>14<br>13  | West                          | W. E. W. Mean                                     | 9  | 75 20 22 75   | 92   | 24<br>21<br>25   | 6<br>8<br>10                          | 71 71 71             | 06<br>00<br>01        | 08<br>02<br>03 | 03<br>07<br>01<br>02<br>03.  |
| Maga<br>M<br>Cince   | act Wo  | est, 2<br>ginni                              | n = 4 23.<br>n = 4 17.<br>4 20.<br>n = 2 10.<br>ng 3h 200   | .5<br>58<br>29<br>• Te                   | աթ. 1   | o<br>0. <b>o</b>   | Sii  | 1. 16                              | 9. 69897<br>9. 29973<br>8. 57853<br>8. 56823  | Magr                          | ot Wo<br>Ican<br>of be                            | sat, 2   | u= 4 10<br>u= 4 18.<br>4 18.<br>4 18.<br>u= 2 09.<br>ing 4h 00°   | . 84<br>. 42<br>n   1                                | emp.   | H                                     |                      |                       | 4              | Log'm<br>9, 698<br>0, 290<br>8, 575<br>8, 565  |
| Magn<br>Mi<br>Cime<br>Cime<br>A.   | of beg<br>of end<br>M. me   | est, 2<br>ginni<br>ling<br>ean               | $u = 4  17.$ $4  20.$ $u = 2  10.$ $0  g  3^{h}  20^{t}$ $4  05$ $3  42.$   | 5 58 29 n Te                             | mp. 1:  | 0. 0   | Sit  | n<br>1. 16<br>10<br>10<br>11<br>11 | 9. 69897<br>9. 29973<br>8. 57853<br>8. 56823  | Time Time A                   | of be of en. M. me                                | ginni<br>ding<br>ean<br>inber<br>nagno                   | u== 4 18.<br>u== 2 09.<br>0 /   | 84<br>42<br>1 1<br>1 1<br>1 No<br>S <sub>//</sub> 81 | temp. 1  | 8.5<br>tim                            | e. Î<br>t L<br>Dista | natr                  | m<br>H         | 9, 698<br>0, 200<br>8, 575<br>8, 565   |
| Magna Millia | of begof end M. mo Nove of the angle; log-  | est, 2<br>ginni<br>ling<br>ean               | $u = 4  17.$ $4  20.$ $u = 2  10.$ $0  g  3^{h}  20^{t}$ $4  05$ $3  42.$   | 5 58 29 Te                               | t=10  | 0. 0<br>1. 0<br>0. 5<br>time<br>Magnended<br>C. Da       | Sit  | n. 16 m H                          | 9. 69897<br>9. 29973<br>8. 57853<br>8. 56823<br>8. 56823<br>ent, the-<br>ting at<br>r=1.25  | Time Time A  Date ode rigitog | of be of en. M. me                                | ginni<br>ding<br>ean<br>mber<br>nagno<br>les to<br>19691 | 4 18.<br>4 18.<br>4 2 09.<br>ing 4 00.<br>4 55.<br>4 27.<br>2 30, 1882<br>etometer.<br>Magnet           | S, Ri  | temp. 1<br>lemp. 1<br>temp. 1<br>temp. 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. | 8.5<br>tim                            | Justa                | natr                  | m<br>H         | 9. 698<br>0. 200<br>8. 575<br>8. 565<br>nt, the<br>ing s<br>25 feet                    |
| Magna Ming Magna Ming Ming Ming Ming Ming Ming Ming Ming   | of beg<br>of enc<br>M. mo<br>Nove<br>lite r<br>ht and   | est, 2<br>ginni<br>ling<br>ean               | #=4 17.<br>4 20.<br>#=2 10.<br>ng 3h 20f<br>4 05<br>3 42.<br>14, 188<br>etomete<br>to Mag.  | 5 58 29 Te                               | t=10  | 0. 6<br>1. 0<br>0. 5<br>1 time<br>Magn                   | e. Instead L., d. Dist.                      | n. 16 m H                          | 9. 69897<br>9. 29973<br>8. 57853<br>8. 56823<br>8. 56823<br>ent, the-<br>ting at<br>r=1.25  | Time Time A                   | of be of en. M. no. Nove dite not ang.            | ginni<br>ding<br>ean<br>mber<br>nagno<br>les to<br>19691 | u=4 18,<br>4 18,<br>u=2 09,<br>ing 4h 00<br>4 55<br>4 27,<br>2 30, 1882<br>etometer<br>Mngnot<br>Observ | S, Ri  | temp. 1<br>lemp. 1<br>temp. 1<br>temp. 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temperate 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. 1<br>temp. | 8.5<br>tim                            | Justa                | natr<br>de<br>ncer    | m<br>H         | 9, 698<br>0, 290<br>8, 575<br>8, 565<br>mt, the<br>ing s<br>25 feet                    |
| Magn M Cime Cime A. Cado cighteet  | of begof end M. mo Nove of the angle; log-  | not, 2 ginni ling can mber uagn gles . r = 0 | ### 17. ### 20. #### 20. #### 20. ##### 20. #### 20. ### 20. ### 20. ### 20. ### 20. #### 20. ### 20. ### 20. | 5 58 29 Te Te Te Si Observesdir          | t=10  t=10  t=10  ottinger , 11.  j., susperver, A.                 | 0. 6<br>1. 0<br>0. 5<br>1 time<br>Magn                   | e. Insteet L., d. Dist.                      | rume<br>effector                   | 9. 69897<br>9. 29973<br>8. 57853<br>8. 56823<br>ent, the-<br>ting at<br>r==1.25   | Time Time A  Date ode rigitog | of be of en. M. me                                | ginni ding ean mber nagn ies to 9691                     | u= 4 18. 4 18. u= 2 09. ing 44 00. 4 55 4 27. 20, 1882 ctometer Magnot Observ                           | B4 42 1 1 1 1 1 S/R RI FOR A                         | tenp. it   | 8.5<br>tim<br>agne<br>l. I            | Circ                 | nstr<br>, de<br>nce r | m<br>H         | 9, 668<br>0, 200<br>8, 575<br>8, 565<br>8, 565<br>8, 565<br>Meail<br>9ga.              |
| Time A. Dute, a doing feet   | of begon to M. mo of can M. mo | mber<br>mber<br>mber<br>mber<br>yes<br>r = 0 | ### 177 ### 12 ### 175 ### 16 ### 175 ### 16 ### 175 ### 16 ### 175 ##########  | 5 58 58 58 58 58 58 58 58 58 58 58 58 58 | mp. 1:  t=10  t=10  ttinger . 11. ] ., susperver, A.  Mean.  11  16 | 0. 0<br>1. 0<br>0. 5<br>1 time<br>Magn<br>anded<br>C. Da | e. Instead to District.  Circle t  A  170 57 | rumeestee saco                     | 9. 698073<br>8. 57853<br>8. 56823<br>8. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823<br>9. 56823 | Time A  Date odd rigit log    | et Welcan  of be of en  M. mo  Nove lite n  r=0.0 | ginniding ean imbermings to 9691                         | u= 4 18.  | . G No S,, and B 25 27                               | temp. 1 temp.  | s s s s s s s s s s s s s s s s s s s | Circ                 | os os os              | m H unne eadin | 9, 698<br>0, 290<br>8, 575<br>8, 565<br>8, 565<br>8, 565<br>8, 565<br>8, 565<br>8, 565 |

4 38

05

#### Observations for determining the absolute magnetic horizontal intensity—Continued.

| 841               | u.00691                                | Mag                              | met S, s<br>server,   | diam'r.                          | Brigal. I   | ot L. | , dellecti<br>neer=1.5                    | ng a                       | st; log r   | BBI         | to 100001                     | Mage           | erver, A                                  | 10000                            | ngen tin<br>Magn<br>ded. Di<br>Dark.                | in tuan                | 00 F= | 1.35           | feet           | ; log. r  |
|-------------------|--|----------------------------------|---|----------------------------------|---|-------|---|----------------------------|---|-------------|-------------------------------|----------------|---|----------------------------------|---|------------------------|-------|----------------|----------------|---|
| ų                 | 1 8                                    | 1                                | Circle :  | readi                            | nga.  |       | Circle r                                  | eadit                      | nga.  | 4           | -                             |                | Circle r                                  | vadiı                            | iga.  |                        | Circ  | le re          | adix           | щa.   |
| Magnet            | Narrh                                  | No.                              | Α   | В                                | Mean.   | No.   | A   | В                          | Mean.   | Magnet.     | North                         | No.            | A   | В                                | Mean.   | No.                    | A     |                | В              | Moan.   |
| West. East.       | W. E. W. E. W. E. W. E. W. E. W. E. W. | 9                                | 175<br>175<br>175 30<br>81                                  | 29<br>32<br>30<br>32<br>32<br>83 | 28. 0<br>31. 0<br>29. 0<br>29. 33<br>31. 0<br>32. 0 |       | 171 13<br>10<br>171<br>171 05<br>06<br>07 | 15<br>12<br>07<br>08<br>09 | 14. 0<br>11. 0<br>12. 50<br>06. 0<br>07. 0<br>08. 0               | West. East. | E. W. E. W. E. W. E. W. E. W. | 7 9            | 175 25<br>26<br>28<br>175<br>175 22<br>24 | 37<br>28<br>30<br>30<br>24<br>28 | 96. 0<br>97. 0<br>29. 0<br>27. 33<br>23. 0<br>25. 0 | 2<br>4<br>6<br>8<br>10 | 171   | 57<br>85<br>54 | 59<br>57<br>56 | 05. 0<br>07. 0<br>06. 0<br>58. 0<br>56. 0<br>55. 0  |
| Mai<br>Tin<br>Tin | inet Wi                                | st, 2<br>est, 2<br>ginni<br>ding | 175  w=4 10.  u=4 24.  4 20.  u=2 10.  ag 35 30  4 00  3 45 | 83<br>50<br>665<br>332<br>m T    | 31.5  putation  cemp1:  t=-1:                       | 333   | Sin.                                      | <b>.</b>                   | 07. 0<br>Log'ins.<br>9. 69897<br>9. 29673<br>8. 57867<br>8. 50837 | Time Time   | net We<br>dean                | at, 2<br>at, 2 | u = 3 1:<br>ing 3h 5<br>4 1               | 1. 33<br>7. 67<br>4. 50<br>2. 25 | Temp  | 9<br>-11. 5            |       | Sir            | 4              | 56, 33<br>org'ms.<br>9 69897<br>0 29678<br>8, 58501 |

\* (179 56.33)? So used in computation.

| i.        | end                         |        | Circle r   | eadir                   | aga.                    |              | Circle | e readii    | ige.                             | 坡      | end.                       |             | Circle r            | eadir                   | nga.                     |              | Circle re                 | sactic       | ıga.   |
|-----------|-----------------------------|--------|--|-------------------------|-------------------------|--------------|--------|-------------|----------------------------------|--------|----------------------------|-------------|---------------------|-------------------------|--------------------------|--------------|---------------------------|--------------|--|
| Magnet.   | North                       | No.    | Α.   | В.                      | Mean.                   | No.          | Δ.     | В.          | Mean.                            | Magnet | North                      | No.         | Α.                  | В.                      | Mean.                    | No.          | Α.                        | В.           | Mean   |
| East.     | В.<br>W.<br>E.<br>W.        | 3 5    | 0 /<br>175 28<br>22<br>24                                | 25<br>24<br>26          | 24. 0<br>28. 0<br>25. 0 | 2            | 171 (  | 02 03 01 02 | 02. 5<br>01. 5                   | East.  | E.<br>W.<br>E.<br>W.       | 1<br>3<br>5 | 33<br>31<br>33      | 35<br>38<br>35          | 34. 0<br>32. 0<br>34. 0  | 2            | 0 /<br>171 01<br>02       | 03<br>04     | 02. 0<br>03. 0                                 |
| West.     | Mea<br>W.<br>E.<br>W.<br>E. | 7 9    | 175<br>175 31<br>27                                      | 33                      | 24. 0<br>32. 0<br>28. 0 | 6<br>8<br>10 | 170    |             | 02. 0<br>01. 5<br>55. 0<br>54. 0 | West.  | W.<br>E.<br>W.<br>E.<br>W. | 7 9         | 175<br>175 28<br>24 | 28<br>26                | 33. 38<br>27. 0<br>25. 0 | 6<br>8<br>10 | 171<br>170 58<br>56<br>54 | 58           | 59. (<br>57. (<br>55. (                        |
|           | Mea                         | D.     | 175  | Com                     | 30.0                    |              | 170    | -           | 56. 88                           |        | Mean                       | n.          | 175                 | Com                     | 26. 0                    |              | 170                       |              | 57.0   |
| dagi<br>M | net W<br>Ica <b>n</b>       | est, 2 | $u = 4 \ 2$ $u = 4 \ 3$ $4 \ 2$ $u = 2 \ 1$ $u = 6 \ 55$ | 3. 17<br>7. 58<br>3. 79 |                         | -30<br>-30   | 8      | Sin. u  H   | 9. 69897<br>0. 29073<br>8. 59004 | Mag    | net We<br>Mean             | eat, 2      | n= 2 1<br>ing 4 0   | 9. 00<br>9. 92<br>4. 96 | Temp.<br>Temp.           | -30<br>-30   |                           | L<br>u  u  H | 9, 698<br>9, 698<br>9, 290<br>8, 593<br>8, 583 |

# Observations for determining the absolute magnetic horizontal intensity-Continued.

| 810    | e magi                         | netoi<br>Mag | market M.                                       | o. 14<br>mpen        | tingen t<br>. Magn<br>ided. Di<br>. Dark. | et L.        | allerfferer!              | 1 24 (64.)     | AL PIEDE   | li*    | e mag                      | hise   | neter No  | o. H<br>Babet  | ded. Di                  | wt L         | Instrum<br>,, defice<br>pe P== 1.5 | ittige t       | A tight  |
|--------|--------------------------------|--------------|---|----------------------|---|--------------|---------------------------|----------------|--|--------|----------------------------|--------|---|----------------|--------------------------|--------------|------------------------------------|----------------|--|
| et.    | ě                              |              | Circle  | rendi                | ngs.                                      |              | Circle i                  | radi           | nga.   | 4      | 1                          |        | Circle r  | eadi           | ngs.                     |              | Circler                            | radi           | agn.   |
| Magnet | North                          | No.          | A   | В                    | Mean.                                     | No.          | A                         | В              | Mean.  | Magnet | Narth                      | No.    | A   | В              | Mean.                    | No.          | A                                  | ы              | Mean.  |
| East.  | E.<br>V.<br>R.<br>V.           | 1 3 5        | 0 /<br>175 21<br>20<br>20                       | 23<br>22<br>22       | 22. 0<br>21. 0<br>21. 0                   | 2            | 0 /<br>170 50<br>57       | 59<br>58       | 58, 5<br>57, 5                                       | East.  | E.<br>W.<br>B.<br>W.<br>E. | 3 5    | 174 26<br>30                                    | 28<br>32<br>32 | 27. 0<br>31. 0<br>31. 0  | 9            | 0 /<br>170 02<br>06                | 04             | 0%, <b>0</b><br>07, 0                                |
| West.  | W. E. W. E. W.                 | 7 9          | 175<br>175 17<br>19                             | 19 21                | 21, 33<br>18, 0<br>20, 0                  | 6<br>8<br>10 | 170<br>171 05<br>04<br>05 | 07<br>06<br>07 | 58<br>06, 0<br>05, 0<br>06, 0                        | West.  | W. R. W. E. W.             | 7 9    | 174<br>174 30<br>33                             | 32             | 29. 67<br>31. 0<br>34. 0 | 6<br>8<br>10 | 170<br>170 13<br>11<br>10          | 15<br>13<br>12 | 05, 0<br>14, 0<br>12, 0<br>11, 0                     |
| Magt   | Mean<br>net Englet Wes<br>Ican | if, 2 :      | 175<br>u = 4 23<br>u = 4 13<br>4 18<br>u = 2 09 | . 33<br>. 33<br>. 33 | 19, 0 outation.                           |              | 171                       |                | 95, 67<br>og'ms,<br>9, 69807<br>0, 29073<br>8, 57475 | Maga   |                            | int, 2 | 174<br>u = 4 24<br>u = 4 20<br>4 22<br>u = 2 11 | . 67<br>), 17  | B2.50                    |              | Su                                 | . u            | 12. 33<br>0g'mn,<br>9. 60897<br>0. 23073<br>8. 58159 |
| ime    | of begi<br>of endi<br>M. mea   | ing          | g 4h 00*<br>4 40<br>4 20                        | T                    | emp8<br>emp8<br>t==-8                     |              |                           | й              | 8. 50445   | Time   | of be;<br>of en<br>M. m    | ding   | 4 30<br>4 15                                    | 3              | t=-1                     | 3            |                                    | 'n             | 8, 57129   |

| et.                       | epd                        |                           | Circle r            | eadii                 | nga.                    |              | Circle r                         | omii           | uge.   | et.                | p es q   |                         | Circle r                              | eadii          | age.                    |        | Circle re           | adi            | нди.  |
|---------------------------|----------------------------|---------------------------|---------------------|-----------------------|-------------------------|--------------|----------------------------------|----------------|--|--------------------|--|-------------------------|---------------------------------------|----------------|-------------------------|--------|---------------------|----------------|---|
| Magnet.                   | North                      | No.                       | A                   | В                     | Mean.                   | No.          | A                                | В              | Mesu.  | Magnet.            | North  | No.                     | A                                     | В              | Mean.                   | No.    | A                   | В              | Moa   |
| East.                     | E.<br>W.<br>E.<br>W.<br>E. | 3 5                       | 171 11<br>08<br>05  | 13<br>10<br>07        | 12. 0<br>09. 0<br>06. 0 | 2            | 0 /<br>166 41<br>37              | 43<br>39       | 42. u<br>38. o   | East.              | E.<br>W.<br>E.<br>W.   | 1<br>3<br>5             | 0 /<br>346 84<br>40<br>81             | 36<br>42<br>33 | 35. 0<br>41. 0<br>32. 0 | 2      | 0 /<br>350 52<br>42 | 7<br>54<br>44  | 53.<br>43.                                    |
| West.                     | W. E. W. E. W. Mean        | 7<br>9                    | 171 05<br>06<br>171 | 07<br>08              | 09. 0<br>06. 0<br>07. 0 | 6<br>8<br>10 | 166<br>166 40<br>40<br>40<br>166 | 42<br>42<br>42 | 40. 0<br>41. 0<br>41. 0<br>41. 0                       | West.              | W. E. W. E. W. Mean  | 7                       | 346 25<br>25<br>346                   | 27<br>27       | 26, 0<br>26, 0<br>26, 0 | 6 8 10 | 350 39 39 39 41 350 | 41<br>41<br>45 | 40. 40. 41. 41.                               |
| dagi<br>A<br>Cime<br>Cime | net Entiret Welleau of beg | est,2 i<br>sinnic<br>ling | 0 /                 | 5<br>25<br>625<br>• T | outation.  emp3.  emp3. | 0 0          | Sin                              | . 14           | og'ms,<br>9, 69897<br>0, 29073<br>8, 58950<br>8, 57920 | By c<br>No<br>Time | net Eas<br>net We<br>fean<br>hron,<br>. 188:<br>of beg<br>of end | st,2 t<br>Rond<br>innir | = 4 12<br>= 4 15.<br>4 13.<br>= 2 06. | 5<br>75<br>875 | emp. 28                 |        |                     | 3              | og'ms<br>9, 698<br>0, 290<br>8, 567<br>8, 556 |

lings.

07.0

12. 33 Log'ms. 9. 60897

8, 57129

nt, theodoig at right feet; log. r

adings.

B Mean.

0 / 54 : 53.0 44 43.0

, 48, 0 41 40, 0 41 40, 0

41.5

Log'ms. 9, 69897 0, 29073

n 8, 55670

Observations for determining the absolute magnetic horizontal intensity—Continued.

| Me           | , April<br>tomote<br>ignet<br>server | E No        | issa, G<br>5. 13.<br>aspende<br>2. Dark.     | Mage          | gen time<br>iet L.,<br>Distance | defic               | eting at<br>1.25 feet  | t, theoderight<br>right<br>, log. r | nlite mag-<br>augles to<br>= 0.00691 | ma     | gnetou                                | Mai    | No. 11       | I THE REAL           | en time.<br>dagnet<br>perded.<br>A. C. Da | L      | deliectin           | 46 34          | right                          |
|--------------|--------------------------------------|-------------|--|---------------|---------------------------------|---------------------|------------------------|-------------------------------------|--------------------------------------|--------|---------------------------------------|--------|--------------|----------------------|---|--------|---------------------|----------------|--------------------------------|
| **           | cod                                  |             | Circle                                       | readi         | nga.                            |                     | Circl                  | e readin                            | gs.                                  | t      | 1                                     |        | Circle r     | eadi                 | ngs.                                      |        | Circle r            | eadi           | iga.                           |
| Mappet       | North                                | No.         | A  | В.            | Mean.                           | No.                 | A                      | В                                   | Mean.                                | Magnet | North                                 | No.    | A            | В                    | Mean.                                     | No.    | A                   | В              | Mean                           |
| Part         | W.<br>W.<br>W.                       | 1<br>8<br>5 | 00 /<br>171 01<br>00<br>00                   | 00<br>01      | 00. 5<br>02. 0                  | 9 4                 | 0 /<br>166 57<br>58    | 9 /<br>55<br>56                     | o ,<br>56. 0<br>57. 0                | Part   | E.<br>W.<br>E.<br>W.                  | 1 3 5  | 170 39<br>30 | 40<br>40             | 39. 5<br>39. 5<br>40. 5                   | 9      | 9 /<br>166 83<br>31 | 88             | 32. 6<br>31. 8                 |
|              | Mear                                 | -           | 171  | 01            | 01.5                            |                     | 166                    |                                     | 56.5                                 |        | Mon                                   |        | 170          | **                   | 89. 83                                    |        | 166                 |                | 32. 0                          |
| West         | W.<br>R.<br>W.<br>F.                 | 7           | 171 08<br>10                                 | 10<br>12      | 09. 0<br>11. 0                  | 6<br>8<br>10        | 166 58<br>59<br>167 00 | 56<br>57<br>166 58                  | 57. 0<br>58. 0<br>166 59. 0          | West   | W.<br>E.<br>W.                        | 7      | 170 41<br>40 | 43<br>42             | 42. 0<br>41. 0                            | 8 10   | 160 31<br>32<br>32  | 33 83          | 31. 5<br>32. 5<br>32. 5        |
|              | Mean                                 |             | 171  |               | 10. 0                           |                     | 160                    |                                     | 58.0                                 |        | Men                                   | n<br>n | 170          | 4                    | 41. 5                                     |        | 166                 |                | 92. 1                          |
| Magi         | net Ea                               | st, 2       | u= 4 0                                       | 5. 0          | omputat                         | ion.                |                        | .                                   | Log'ms.<br>9. 69897                  | Mag    | net Ea                                | at, 2  | u = 4 07     | 7. 83                | putation                                  |        |                     |                | Log'me<br>9. 6989              |
| Thro<br>Cime | lean<br>n. Hone                      | l No        | u = 4 1<br>4 0<br>u = 2 0<br>188,<br>lng 4 3 | 6. 5<br>1. 25 |                                 | o<br>25. 0<br>28. 0 |                        | Sin. u                              |                                      | Chro   | net Weden<br>n. Bon<br>of be<br>of en | d No   |              | 1. 58<br>1. 29<br>0m |   | e<br>6 | Sir                 | э. и<br>т<br>И | 0, 2907;<br>8, 5580<br>8, 5477 |
| A            | . M. m                               | ean         | 4 4  | 0             | t= 1                            | 24. 0               |                        |                                     |                                      | 1      | . M. n                                | ean    | 4 3          | 5                    | there is                                  | 86     |                     |                |                                |

| 19     | h end.                  |     | Circle r                             | eadi           | ngs.                    |         | Circle 1            | eadi     | ngs.                                       | net.   | h end.                   | -           | Circle r                              | eadir          | igs.                    |         | Circle re           | adiı     | ıga.                                 |
|--------|-------------------------|-----|--------------------------------------|----------------|-------------------------|---------|---------------------|----------|--|--------|--------------------------|-------------|---------------------------------------|----------------|-------------------------|---------|---------------------|----------|--------------------------------------|
| Magnet | North                   | No. | A                                    | В              | Mean.                   | No.     | Δ                   | В        | Mean.                                      | Magnet | North                    | No.         | A                                     | В              | Mean.                   | No.     | A                   | В        | Mean                                 |
| East.  | E.<br>W.<br>E.<br>W.    | 3 5 | 170 33<br>32<br>32                   | 35<br>34<br>34 | 34. 0<br>88. 0<br>33. 0 | 2 4     | 0 ,<br>166 26<br>25 | 24<br>23 | 25. 0<br>24. 0                             | East.  | E.<br>W.<br>E.<br>W.     | 1<br>3<br>5 | 170 39<br>43<br>45                    | 37<br>41<br>43 | 38, 0<br>42, 0<br>44, 0 | 2       | 0 /<br>166 32<br>40 | 30<br>38 | 31. (                                |
|        | Mean<br>W.              | 1   | 170                                  | 1              | 83. 38                  | 6       | 166<br>166 30       | 28       | 24. 50<br>29. 0                            |        | Mea:                     |             | 170                                   | 1              | 41. 33                  | 6       | 166 00              | 1 39     | 85,                                  |
| West.  | W.<br>E.<br>W.          | 9   | 170 39                               | 37             | 38. 0<br>39. 0          | 8<br>10 | 29<br>30            | 27<br>28 | 28. 0<br>29. 0                             | West.  | W.<br>E.<br>W.           | 9           | 170 51                                | 49             | 50. 0<br>50. 0          | 8<br>10 | 48<br>41            | 41<br>30 | 42.<br>40.                           |
|        | Mea                     | n.  | 170                                  | 1              | 38. 5                   |         | 166                 | .        | 28. 67                                     |        | Mea                      | n           | 170                                   | -              | 50. 0                   |         | 166                 | t        | 40.                                  |
|        |                         |     |                                      | Com            | putation                |         |                     |          |  |        |                          |             |                                       | Com            | putation                |         |                     |          |                                      |
| lagi   | net Es<br>net W<br>dean |     | u = 4 08 $u = 06$ $u = 06$ $u = 2 0$ | 0. 83<br>9. 33 |                         |         | Sir                 | A.       | og'ms.<br>9. 69897<br>0. 29073<br>8. 55938 | Mag    | net Ea<br>net We<br>Mean | ent, 2      | u= 4 06<br>u= 4 00<br>4 07<br>u= 2 03 | . 88           |                         |         | Sin.                | Å.       | 0g'ras<br>9, 698<br>0, 290<br>8, 556 |

# Observations for determining the absolute magnetic horizontal intensity—Continued.

| et:                           | Circlen  | milme.                                     |                        | Circle r                                  | eadii                      | nge.   | iet.                 | h end.                                   | ļ<br>                           | Circle r                                  | eadi                             | nga.  |                  | Circle re                                 | nadi                 | ıga.   |
|-------------------------------|--|--|------------------------|---|----------------------------|--|----------------------|--|---------------------------------|---|----------------------------------|---|------------------|---|----------------------|--|
| Magnet.                       | No. A  | B Mean.                                    | No.                    | Λ   | В                          | Mean.  | Magnet               | North                                    | No.                             | A   | В                                | Mean.   | No.              | A   | В                    | Mcan   |
| West. East.                   | E.   1   170   50   W.   2   3   40   W.   5   45   Wm   170   W.   E.   7   170   49   W.   E.   9   50   W.     170    | 47 48.0<br>43 44.0<br>47 48.0              | 2<br>4<br>6<br>8<br>10 | 0 /<br>166 45<br>45<br>166 45<br>43<br>45 | 43<br>43<br>43<br>41<br>43 | 44. 0<br>44. 0<br>44. 0<br>41. 0<br>42. 0<br>43. 33    | West. East.          | E. W. E. W. E. W. E. W. E. W. E. W. Mean | 7 9                             | 170 08<br>05<br>06<br>170<br>170 12<br>12 | 08<br>07<br>08                   | 07. 0<br>06. 0<br>07. 0<br>06. 67<br>13. 0<br>13. 0 | 2<br>4<br>6<br>8 | 166 12<br>10<br>166<br>166 08<br>08<br>09 | 14<br>12<br>10<br>10 | 13. 0<br>11. 0<br>12. 0<br>09. 0<br>09. 0<br>10. 0 |
| Magi<br>Chror<br>Time<br>Time | net East, 2 # 4 55 and twest, 2 # 4 65 Mean # 1 91 and twest, 2 # 4 65 and twest and t | 17<br>. 08<br>. 04<br>Temp. 42<br>Tomp. 45 | 2.0                    | Sin                                       | 1. 26                      | og¹ms.<br>9, 69897<br>0, 29073<br>8, 75014<br>8, 53984 | Chro<br>Time<br>Time | iet We<br>Mean<br>n. Bon                 | at, 2<br>d No<br>ginni<br>ling, | ng, 3h 05                                 | 1. 67<br>3. 67<br>9. 17<br>9. 58 | remp. Cremp. £                                      | 3. 0<br>J. 0     | Sin                                       | 17 T                 | og'ms<br>9, 6989<br>0, 2967<br>8, 5413<br>8, 5310  |

| E.   3   30   32   31,0   4   23   25   24,0  | В Ме   |
|---|--|
| E   |  |
| W. 7 108 57 79 58.0 G 121 17 49 18 0 W. 7 170 30 32 31.0 6 166 23 W. 7 170 30 32 31.0 6 166 23  | 27 26 24   |
| ₩ 10 5 50 58 0 ₩ W.   10 26   | 26 25  |
| My m   169   62 5   161   54 67   Mean   170   31 5   166   | 28   27  |
| Computation. Computation.   |  |
| Magnet East, $2n - 4.07.17$ 4.00 ms       Magnet West, $2n - 4.07.17$ 4.06 files       Mount West, $2n - 4.07.17$ 4.06 files       Mean $4.08.00$ 8m $n - 8.570.0$ Mean $4.08.00$ 8m $n - 8.570.0$ Magnet West, $2n - 4.06.17$ 4.06.17       Magnet West, $2n - 4.07.33$ 5.00.75       Sin. $4.08.00$ 8m $n - 8.570.0$ Magnet West, $2n - 4.06.17$ 8m. $4.06.17$ Mean $4.08.00$ 8m. $4.08.00$ Magnet West, $2n - 4.06.17$ 8m. $4.06.17$ Mean $4.08.00$ 1.00 ms       Magnet West, $2n - 4.06.17$ 8m. $4.06.17$ Mean $4.08.00$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms       Magnet West, $2n - 4.06.17$ 1.00 ms | Log'<br>9, 69<br>9, 69<br>0, 29<br>1, 11 - 8, 55 |

# ${\it Observations for determining the absolute magnetic horizontal intensity} - {\it Continued}.$

| net.    | North end.               |        | Circle 1                              | eadir | aga.     |     | Circle r | eadi: | nga.                                      |
|---------|--------------------------|--------|---------------------------------------|-------|----------|-----|----------|-------|---|
| Magnet. | Nort                     | No.    | A                                     | В     | Mean.    | No. | Λ        | В     | Mean                                      |
|         | E.                       | 1      | 0 /                                   | ,     | ,        |     | 0 1      | ,     | ,   |
|         | W.                       | 1.     | 170 57                                | 59    | 01       | 2   | 166 55   | 57    | 56  |
| East.   | W.                       | 5      | 56                                    | 58    | 58       | 4   | 56       | 58    | 57  |
| 144     | . Alea                   |        | 170                                   | 98 /  | 57       |     |          |       |   |
|         | II.                      |        |                                       |       | 58. 67   |     | 166      |       | 56. 5                                     |
|         | E.                       | 7      | 170 50                                | 52    | 51       | 6   | 166 54   | 56    | 55  |
| West.   | E.                       | 9      | 49                                    | 51    | 50       | 8   | 50       | 52    | 51  |
|         |                          |        |                                       |       |          | 10  | 47       | 49    | 48  |
| _       | Mean                     | 1      | 170                                   |       | 50, 5    |     | 166      |       | 51. 3                                     |
|         |                          |        |                                       | Comp  | utation. |     | -        |       |   |
| Maga    | iot Ea<br>ict We<br>Mean | est, 2 | u = 4 02 $u = 3 59$ $4 00$ $u = 2 00$ | 67    |          |     | Sin.     | . 6   | og'ma<br>9. 69897<br>9. 29071<br>9. 54408 |

ument, the-leflecting st r=1.25 feet,

nued.

eadings. B Mean.

14 18. 0 12 11.0 12.00

00.0 10 10 09.0 10. 0

09. 33

m 8. 53100

ment, theodo-eting at right r=1.25 feet,

readings.

B Mean 25 27 26.0 23 | 25 | 24.0

24 | 26 | 25.0 26 | 28 | 27.0

25, 33

Log'ms, 9, 69897 0, 29073 Sin. n 8, 55488

m 8,54458

#### Magnetic observations at Uglaamie, Alaska.

[Date, December 17, 1881. Göttingen time. Instrument, theodolite magnetometer No.11. Magnet L<sub>ii</sub>. Chronometer, Bond No.188; daily rate, 1-5, gaining on mean time. Observer, M. Smith.]

| No. of clation     | oscil-<br>ns.                                    |         | nometer<br>iine.                       | Temp.             |                 | ne scale<br>lings. | Time o                           | of oscil-<br>ons.          | Computation.   |
|--------------------|--|---------|--|-------------------|-----------------|--------------------|----------------------------------|----------------------------|--|
| 0<br>8<br>16<br>24 |  | 2       | m. s.<br>19 06.0<br>20 09.0<br>21 12.0 | -8.0              | 10.5            | 40. 9              | m.                               | ø.                         | $T^2 = T'^2 \left(1 + \frac{h}{f}\right) (1 - (t' - t) q)$ Observed time of 80 oscillations, |
| 24<br>32<br>40     |  |         | 22 14.9<br>23 18.0<br>24 21.0          | -8.0              | 12.2            | 38. 4              |                                  |                            | Time of one oscillation  |
| 80<br>88<br>96     | 8 30 36.8<br>6 31 40.0<br>4 32 43.0<br>2 33 46.0 |         | -8. 0                                  | 14. 5             | 32. 2           | 10                 | 27. 6<br>27. 8<br>28. 0<br>28. 1 | Log'ms<br><b>T</b> 0.89481 |  |
| 104<br>112<br>120  |  |         |  | 8.0               | 17. 2           | 30. 1              |                                  | 28. 1<br>28. 0<br>28. 0    | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |
|                    |  | М       | eans                                   | -8.0              |                 |                    | 10                               | 27.92                      | 1-(t'-t) q 9. 90911  |
| (                  | Coeffic  | ient of | torsion.                               |                   | Value of        | one scale          |                                  |                            | (ar. co.) T <sup>2</sup> 8. 2081<br>2081<br>2081   |
| Tors.<br>circle.   | Ser  | ıle.    | Mean.                                  | Differ-<br>ences. | divisio         | n == 3'.69         | Loga                             | rithms.                    | $q = 0.0000^{-1}$ $t' - t = +2.3$ $mH = \frac{\pi^2 M}{T^2}$ $mH = 9.14401$ $mH = 8.8597$    |
| 15                 | 17. 2  | 30, 1   | 23. 65                                 | 10. 95            |                 |                    |                                  |                            | m = 0.0724 $H = 1.929$ $H = 0.2852$ Observations of deflections: Date, December 17;          |
| 105                | 29. 2  | 40.0    | 34. 60                                 | 20. 15            |                 |                    |                                  |                            | hour, 1641m. Temp. t =-10°.3   |
| 285                | 11.0   | 17. 9   | 14. 45                                 | 10.55             | v = 3 $5400'$   | + v'               |                                  | 0 70547                    | m 8. 5745;<br>H  |
| 15                 | 9. 5   | 40. 5   | 25, 00                                 |                   |                 | (ar. co.)          |                                  | 8. 73547<br>6. 26761       | mH 9.1449  |
|                    | Mea  | n v =   | 10. 41                                 |                   | $1+\frac{h}{f}$ |                    |                                  | 0. 00308                   | m <sup>2</sup> 7,71951<br>m 8,85974  |

\*This value deduced from observations of oscillations at widely different temperatures was adopted as producing the best agreement in the value of m when reduced to a standard temperature.

[Date, December 18, 1881. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>II</sub>. Chronometer, Bond No. 188; daily rate 1\*5, gaining on mean time. Ober ver, M. Smith.]

| No. of c                            |  |                | nometer<br>ime.                        | Temp.             |                          | ne scale<br>lings.     | Time of  |   | Computation.  |    |
|-------------------------------------|--|----------------|--|-------------------|--------------------------|------------------------|--|---|---|----|
| 0<br>8<br>16<br>24                  |  | 2              | m. s.<br>07 05.0<br>08 08.0<br>09 11.1 | 19. 7             | 2. 2                     | 36. 0                  | m.   | 8.  | 8. Observed time of 80 oscillations   |    |
| 24<br>32<br>40                      |  |                | 10 14.0<br>11 17.0<br>12 20.0          | 19. 2             | 2.0                      | 34. 2                  |  |   | <b>T</b> = 7.874  |    |
| 80<br>88<br>96<br>104<br>112<br>120 | 80 17 34.9<br>88 18 38.0<br>96 19 41.0<br>104 20 44.1<br>112 21 47.1<br>120 22 50.0 —10.<br>Means —19. |                | 19. 0                                  |                   |                          |                        | 29. 9<br>30. 0<br>29. 9<br>30. 1<br>30. 1<br>30. 0 | $\begin{array}{c} \textbf{Log m} \\ \textbf{T} & \textbf{0}, 856 \\ \textbf{T}^2 & \textbf{1}, 7924 \\ \textbf{1} + \overset{\textbf{h}}{\rightarrow} & \textbf{0}, 693 \\ \textbf{1} + (t'-t)q & \textbf{0}, 9906 \end{array}$ | 24<br>19<br>07  |    |
|                                     | 1  | M              | eans                                   | -19.3             |                          |                        | 10   | 30. 00  | Ta 1.7951   | 15 |
| (                                   | Coeffic  | ient o         | f torsion                              | .                 | ** 1                     |                        |  |   | $\begin{array}{cccc} \textbf{(ar. 00.)} & \textbf{\textit{T}}^2 & 8.2048 \\ \textbf{\textit{\pi}}^2 & 0.9945 \\ \textbf{\textit{t'}} - \textbf{\textit{t}} = + 1.1 \\ & \textbf{\textit{H}} & 9.9424 \end{array}$ | 30 |
| Tors.<br>circle.                    | Se   | ale.           | Mean.                                  | Differ-<br>ences. |                          | fonescale<br>n = 3'.69 | Logar  | ithms.  | $mH = \frac{\pi^2 M}{T^2}$ $m = 0.0717$ $mH = 0.0717$ $mH = 0.0717$   | 0  |
| 15<br>105                           | 19. 2<br>34. 2   | 28. 1<br>35. 0 | 23. 65<br>34. 60                       | 10, 95            |                          |                        |  |   | $H=1.932$ $H=0.2860$ Observations of deflections: Date, December hour, 1 <sup>b</sup> 27 <sup>m</sup> .5 Temp. $t=-20^{\circ}.4$  |    |
| 285<br>15                           | 12. 1<br>11. 2   | 16. 8          | 14. 45<br>24. 75                       | 20. 15<br>10. 30  | v == 3<br>5400′<br>5400′ |                        | 3  | . 73546   | **************************************  |    |
|                                     |  | an v =         |  |                   |                          | $+\frac{h}{f}$         | 6  | . 26761   | 995 <sup>2</sup> 7. 7111<br>998 8. 8550   |    |

[Date, December 19, 1881. Göttingen time. Instrument, theodolite magnetometer No.11. Magnet L<sub>iv</sub>. Chronometer, Bond No. 188; daily rate, 14.5, gaining on mean time. Observer, M. Smith.]

| No. of<br>latio                | oscil-<br>ns.   |                                  | nometer<br>ime.   | Temp.                      |                           | ne scale<br>lings.      |  | of oscil-                        | Computation  |  |                                       |
|--------------------------------|---|----------------------------------|---|----------------------------|---------------------------|-------------------------|--|----------------------------------|--|--|---------------------------------------|
| 0<br>8<br>16<br>24<br>32<br>40 |   | 1                                | m. g.<br>88 03.0<br>39 05.9<br>40 08.9<br>41 11.9<br>42 14.9<br>43 17.8 | -27. 5                     | 11.5                      | 28. 8                   | m.   | 8.                               | Observed time of 80 oscillations Time of one oscillation. Correction for rate.           |  | -0.000                                |
| . 88<br>96                     | 80 48 32.4 -2<br>88 40 35.5<br>96 50 38.5<br>104 51 41.5<br>112 52 44.6<br>120 53 47.4 -2 |                                  | -27. 6<br>-27. 6<br>-27. 6  | 15. ?                      | 26. 9<br>27. 0            | 10                      | 29. 4<br>29. 6<br>29. 6<br>29. 6<br>29. 7<br>20. 6 |                                  | T°   | 1. 7910<br>0. 0033<br>0. 0000<br>1. 795:       |                                       |
|                                | Coeffic   | ient of                          | torsion   |                            |                           |                         |  |                                  |  | (ar. co.) T <sup>2</sup> <sup>3</sup> M        | 8, 2047<br>0, 9043<br>9, 9424         |
| Tors.<br>circle.               | Sei   | ıle.                             | Mean.   | Differ-<br>ences.          | Value of<br>division      | one scale<br>n == 3'.69 | Loga   | rithms.                          |  | mH $m$   | 9. 141-<br>8. 854                     |
| 15<br>105<br>285<br>15         | 16. 0<br>22. 9<br>1. 5<br>5. 1  | 26. 0<br>41. 9<br>17. 5<br>36. 0 | 21. 00<br>32. 40<br>9. 50<br>20. 55                                     | 11. 40<br>22. 90<br>11. 05 | v == 1<br>5400'<br>5400 ( |                         |  | 3. 7357 <sub>4</sub><br>6. 26761 | H=1.934  Observations of deflections: D hour, 1 <sup>b</sup> 23 <sup>m</sup> .5; Temp. 6 | $H$ eate, Decem $= -27^{\circ}.6$ $m$ $H$ $mH$ | 0, 286<br>ber 19<br>8, 568<br>9, 1414 |
|                                | Mean v = 11.34  |                                  |   |                            | 1-4                       | <u>h</u>                |  | 0.00335                          |  | $\frac{gn^2}{m}$                               | 7, 7(.9<br>8, 854                     |

[Date, January 18, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L., Chronometer, Bond No. 188; daily rate, 1º.625, gaining on mean time. Observer, A. C. Dark.]

| No. of c                 |                             |                | nometer<br>ime,                                   | Temp.          | Extrem              | ne scale :<br>lings.    | Time of oscil-<br>lations. | Compu   | tation.                                 |                         |
|--------------------------|-----------------------------|----------------|---|----------------|---------------------|-------------------------|----------------------------|---|---|-------------------------|
| 0<br>8<br>16<br>24<br>32 |                             | 6 4            | n. s.<br>18 10.5<br>19 13.5<br>50 16.5<br>51 10.5 | -6.0           | 33. 1               | 63. 5                   | m. a.                      | Observed time of 80 oscill<br>Time of one oscillation<br>Correction for rate                            | *************************************** | 7. 86:                  |
| 40                       |                             |                | 52 22.0<br>53 25.0                                | 6. 0           | 36. 5               | 61. 0                   |                            |   |   | 7. 84                   |
| 80<br>88<br>96<br>104    |                             | 7 6            | 58 39, 0<br>59 42, 0<br>00 45, 5                  | -6.0           | 39. 0               | 57. 2                   | 10 28.5<br>28.5<br>29.0    |   | T' 0.  T' 1.                            | g'ms.<br>89556<br>79111 |
| 112<br>120               |                             | i              | 01 48.5<br>02 51.5<br>03 54.5                     | -6. 0          | 39, 8               | 50. 2                   | 29. 0<br>29. 5<br>29. 5    |   | - 1 f                                   | 00088<br>99926          |
|                          | ,                           | Me             | ans   | -6.0           | ļ                   |                         | 10 29.00                   |   | 7'2 1.                                  | 79125                   |
| (                        | Coeffic                     | ient of        | torsion   |                |                     |                         |                            |   | $\pi^2 = 0$ .                           | 20875<br>99430<br>94255 |
| Tors.<br>circle.         |                             |                |   |                | Value of<br>divisio | one scale<br>n == 3'.69 | Logarithms.                | $\begin{array}{c} t'-t = +2^{\circ} \\ mH = \frac{\pi^2 M}{T^2} \\ m = 0.0751 \\ H = 1.863 \end{array}$ | mH 9.<br>m 8.                           | 14500<br>87544<br>27016 |
| 15<br>105                | 44. 2<br>35. 0              | 53. 0<br>69. 2 | 48. 60<br>52. 10                                  | 3. 50          |                     |                         |                            | Observations of deflection hour, 3615m.   | ons: Date. Janua                        |                         |
| 285                      | 30. 2                       | 64. 5          | 47. 35  | 4. 75<br>3. 55 | v :== 1<br>5400'    | + v'                    | 8, 73327                   | *9. 14560<br>8. 86114   | H                                       | 60529                   |
| 15                       | 15   42. 0   59. 8   50. 90 |                |   |                | (ar. co.)           | 0. 00(88 (1)            | 0. 28446 1. 925            | $m^2 = 7$ .   | 75089<br>87544                          |                         |

H. Ex. 44---78

ometer, Bond

nometor, Bond

[Date, January 19, 1862. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>pp.</sub> Chronometer, Bond No. 188; daily rate, 14.625, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.           | Chronometer time.  | Temp.                    | Extreme scale<br>readings.                 | Time of oscil-<br>lations.                      | Computation.  |
|-------------------------------------|--|--------------------------|--|---|---|
| 0<br>8<br>16<br>24<br>32<br>40      | h. m. s.<br>6 25 42.5<br>26 45.0<br>27 47.0<br>28 49.5<br>29 51.5<br>30 53.5 | -7. 0<br>-7. 0           | 48. 1 62. 3                                | т. в.   | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| 80<br>88<br>96<br>104<br>112<br>120 | 36 04.5<br>37 06.5<br>38 00.0<br>39 12.0<br>40 14.5<br>41 17.0               | -6. 0<br>-6. 0           | 49. <b>8</b> 59. <b>8</b> 53. 1 58. 9      | 10 22.0<br>21.5<br>22.0<br>22.5<br>23.0<br>23.5 | $ \begin{array}{c} \text{Log ns.} \\ \mathcal{I}^{n} & 0.89645 \\ \mathcal{I}^{n} & \overline{1.79290} \\ \mathbf{1+f} & 0.00232 \\ \mathbf{1-(t-t)} & 0.00232 \\ \mathbf{1-7} & \overline{1.79540} \end{array} $ |
| Coeffic<br>Tors. Sca                | ient of torsion.   |                          | Valuo of one scal<br>division = 3',69      | 6- Logarithms.                                  | $v-t=-0.5$ (ar. 00.) $T^2$ 8. 29460<br>$mH=\frac{\pi^2M}{T^2}$ $M$ 9. 94250<br>m=0.0753 $mH$ 0. 94250<br>H=1.840 $H$ 0. 29425   |
| 105 · 51, 2<br>285 42, 2            | 58. 9 56. 00<br>77. 4 64. 30<br>52. 2 47. 20<br>78. 5 53. 15                 | 8. 30<br>17. 10<br>5. 95 | v = 28'.9<br>5400' + v'<br>5400  (ar. co.) | 3. 73471<br>6. 26761                            | Observations of deflections: Date, January 19; hour, 3 <sup>h</sup> 32 <sup>m</sup> .5. Temp. t=-6°.0  **n 8.61178 **n H 3.14146  **n H 3.14146   |
| Мея                                 | B v == 7. 84 !   |                          | 1+ h                                       | 0. 00232 !                                      | 8.86040<br>0.28106 1.910 m <sup>2</sup> 7.75324<br>m 8.87662  |

<sup>\*</sup> Apparently 79 instead of 80 oscillations have been counted.

[Date, January 20, 1882.] Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet Lip. Chronometer, Bond No. 188; daily rate, 19.625, gaining on mean time. Observer, A. C. Dark.]

| Computation.  | Time of oscil-<br>lations.                            | Extreme scale readings.                 | Temp.                      | Chronometer<br>time.  | No. of oscil-<br>lations.                        |
|---|---|---|----------------------------|---|--|
| erved time of 80 oscillations   | m. e.   | 44.3 49.5                               | -2,0                       | h. m. s.<br>6 14 11.5<br>15 14.0<br>16 17.0<br>17 19.5<br>18 22.5             | 8<br>16<br>24<br>32                              |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  | 10 26. 0<br>26. 5<br>26. 5<br>26. 5<br>26. 5<br>27. 0 | 40.1 60.3                               | -1. 0                      | 24 37. 5<br>25 40. 5<br>26 43. 5<br>27 46. 0<br>28 49. 0<br>29 52. 0<br>Means | 80<br>88<br>96<br>104<br>112<br>120              |
| $=+0.5$ (ar. co.) $T^2$ 8.2 $T^2$ 0.1 $T^2$ 8.2 $T^2$ 0.1 $T^2$ 4.2 $T^2$ 0.1 $T^2$ 4.3 $T^2$ 6.4 $T^2$ 6.4 $T^2$ 6.4 $T^2$ 6.5 $T^2$ 6.7 $T^2$ 6.8 $T^2$ 6.8 $T^2$ 6.9 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.1 $T^2$ 6.2 $T^2$ 6.2 $T^2$ 6.3 $T^2$ 7.3 $T^2$ 6.3 $T^2$ 6.3 $T^2$ 7 | Logarithms.   | Value of one scale<br>division == 3'.69 | Differ-<br>ences.          | ent of torsion.   | Tone   |
| ervations of deflections: Date, January ur, 3° 35°. Temp. $t=-2^{\circ},0$ $\frac{m}{H}=8.5$ $mH=9.1$   | 3, 73582<br>6, 26761                                  | n:=42'.8<br>5400'+v'<br>5400 (at. co.)  | 16. 60<br>13. 00<br>16. 75 | 77. 2 51. 00  | 15 42.0<br>105?] 115 62.0<br>285 24.8<br>15 57.3 |
| m <sup>2</sup> 7.7:<br>m 8.86   | 0.00343?  | $1+\frac{h}{f}$                         |                            | n v == 11.59 f  | Меаг   |

Magnetic observations at Uglaamic, Alaska-Continued.

{Date, February 16, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L.,. Chronemeter, Bond No. 188; daily rate, 1-5. gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations. | Chro    | nometer<br>ime.                                       | Temp.             | Extren   | ne scale<br>ings. | Time of oscillations.   |                                    | Computation.                       |                                   |
|---------------------------|---------|---|-------------------|----------|-------------------|-------------------------|------------------------------------|------------------------------------|-----------------------------------|
| 0<br>8<br>16<br>24        | 2 4     | n. g.<br>12 35, 5<br>13 38, 0<br>14 40, 5<br>15 43, 0 | -1.2              | 6. 2     | 16. 2             | *n. #.                  | Time of one oscilla                | tion                               | 8.<br>627, 50<br>7, 843<br>9, 006 |
| 24<br>32<br>40            | 4       | 16 45.5<br>17 48.0                                    | -1.2              | 7.8      | 15. 2             |                         |                                    | <i>T</i> ∴                         | 7. 843                            |
| 80<br>88<br>96            |         | 53 02.0<br>54 05.0<br>55 08.0                         | -1.2              | 7. 9     | 18.0              | 10 26.5<br>27.0<br>27.5 |                                    | T'<br>Tr2                          | Log'm:<br>0, 8945                 |
| 104<br>112<br>120         |         | 66 11.0<br>67 18.5<br>68 16.0                         | -1.2              | 7.5      | 14.8              | 28. 0<br>28. 0<br>28. 0 | t'-t = -0.1                        | $1 + \frac{h}{f}$ $1 - (v - t) q$  | 0. 0010                           |
|                           | Ме      | ans   | -1.2              |          | •••••             | 10 27.50                |                                    | T <sup>2</sup>                     | 1. 790                            |
| Coeffic                   | ient of | torsion.  |                   | Value of | one scale         |                         | $mH = \frac{\pi^2 M}{T^2}$         | (ar. co.) $\frac{T^2}{\pi^2}$<br>M | 8, 2099<br>0, 9942<br>9, 9424     |
| Fors. Scarcle. Sca        | ale.    | Mean.   | Differ-<br>ences. | divisio  | n=8'."            | Logarithms.             | m == 0.0708                        | $_{mH}^{H}$                        | 9. 146<br>8. 8497                 |
|                           | 12. ?   | 11. 10  | 11. 20            |          |                   |                         | $H=1.979$ Observations of $\alpha$ | Hiefiections: Date, Febru          | 0. 2966<br>tary 16                |
| 105 19. 2<br>285 3. 5     | 25. 4   | 22. 30  | 10.40             | v === 20 | ν 9               |                         | hour, 1h 45m. T                    | •                                  | -                                 |
|                           | 20. 0   | 11. 60  | 0. 30             | 5400'-   |                   | 3, 73402<br>6, 26761    |                                    | m<br>∄<br>mH                       | 9, 1461                           |
| Mr                        |         | 5.471   |                   | 1        | $+\frac{h}{f}$    | 0. 00163 ?              |                                    | m²<br>m                            | 7. 6995                           |

[Date, February 17, 1882. Göttingen mean time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>10</sub>. Chronometer, Bond No. 188; daily rate, 1<sup>o</sup>.5, gaining on mean time. Observer, A. C. Dark.]

| No. of c                 |                                    |                | nometer<br>ime.                              | Temp.             |                | ings.      | Time o                   |                             | Comp   | outation.                        |                              |
|--------------------------|------------------------------------|----------------|--|-------------------|----------------|------------|--------------------------|-----------------------------|--|----------------------------------|------------------------------|
| 0<br>8<br>16<br>24<br>32 |                                    |                | 15 30, 5<br>16 33, 5<br>17 35, 5<br>18 38, 5 | -3.8              | 14. 5          | d8. 4      | m.                       | <b>a.</b>                   | Observed time of 80 osoi<br>Time of one oscillation<br>Correction for rate     |                                  | 7. 818<br>-0. 000            |
| 40                       | Ť                                  |                | 19 41. 0<br>20 43. 0                         | -3.8              | 16. 2          | 35. 0      |                          |                             |  | T'=                              | 7. 818                       |
| 80<br>88<br>96           |                                    |                | 25 55.5<br>26 58.5<br>28 01.5                | -3.8              | 18.2           | 32.0       | 10                       | 25. 0<br>25. 0<br>26. 0     |  | T'<br>T'2                        | Log'm:<br>0, 8931<br>1, 786; |
| 104<br>112<br>120        |                                    |                | 29 04. 5<br>30 06. 5<br>31 08. 5             | -3.8              | 19.0           | 31.5       |                          | 26. 0<br>25. 5<br>25. 5     | t'-t == -0. 5  | $1 + \frac{h}{f}$ $1 - (t'-t) q$ |                              |
|                          |                                    | Me             | ans  | -3.8              |                |            | 10                       | 25. 50                      |  | $T^2$                            | 1. 7874                      |
| (                        | Means3. 8  Coefficient of torsion. |                | Value of one scale                           |                   |                |            | $mH = \frac{\pi^2 M}{m}$ | (ar. co.) $T^2$ $\pi^2$ $M$ | 8, 212<br>0, 991<br>9, 9425  |                                  |                              |
| Tors.<br>circle.         | Sea                                | ale.           | Mean.  | Differ-<br>ences. | divisio        | n=3'.69    | Loga                     | rithma.                     | m = 0.0749   | mH $m$                           | 9, 1494<br>8, 8747           |
| 15<br>105                | 19.0                               | 31. 5<br>41. 2 |  | 7. 60             |                |            |                          |                             | H=1.882  Observations of deflect hour, 2 <sup>h</sup> 12 <sup>m</sup> .5. Temp | iona: Date Febr                  | 0. 2746<br>tary 17           |
| 285                      | 12. 5                              | 42. 3          | 27. 40                                       | 5. 45<br>0. 20    | v=19<br>5400′- | + 101      |                          | 1. 73337                    |  | m<br>H                           | 8. G000                      |
| 15                       | 15 22.2 33.0 27.60                 |                |  |                   | ar. co.)       | -          | . 26761                  |                             | m H  | 9. 1494                          |                              |
|                          | Me                                 | an v =         | 3.31 9                                       |                   | 1.             | + <u>*</u> | 1 0                      | . 000981                    |  | m²                               | 7. 7495<br>8. 8747           |

onometer, Bond

T = 7.8786

 $\begin{array}{ccc} T^{*2} & \overline{1.79290} \\ 1 + \frac{h}{f} & 0.00232 \\ t - t) q & 0.00018 \end{array}$ 

 $T^{g} = 1.79540$ 

00.) T<sup>2</sup> 8. 20460 π<sup>2</sup> 0. 99430 **M** 9. 94256

mH \*9.14146 m 8.87662

H 0. 26484

January 19;

m B. 61178 mH 3. 14146

m\* 7,75324 m 8,87662

hronometer. Bond

8. 626, 50 7, 8313 -0, 0001

T = 7.8312

Log'nis. T 0, 89383 T'2 1.78766

T2 1.79091

r. co.)  $T^3 = 8.20909$  $\pi^2 = 0.99430$ M = 0.94259

mH 9, 14598 m 8, 86428

H 0.28170

te, January 20;

 $egin{array}{ccc} m & 8,58258 \\ H & 9,14598 \\ \end{array}$ 

m<sup>2</sup> 7, 72856 m 8, 86428

[Date, February 18, 1882. Göttingen mean time. Instrument, theodolite magnetometer No. 11. Magnet  $\lambda_m$ . Chronometer, Bond No. 188; daily rate. 1.5°, gaining on mean time. Observer, A. C. Dark.]

| No. of c                            |  |         | onom <b>et</b> e<br>time. | Tem;             |                      | ings.                   | Time o   |                                 | Com   | putation.                            |  |
|-------------------------------------|--|---------|---------------------------|------------------|----------------------|-------------------------|--|---------------------------------|---|--------------------------------------|--|
| 0<br>8<br>16<br>24<br>32<br>40      |  | h.<br>2 |                           |                  | 32. 2 ·              | 63                      | m.   | 8.                              | Observed time of 80 osc<br>Time of one oscillation<br>Correction for rate |                                      | 7. 79  |
| 80<br>88<br>96<br>104<br>112<br>120 | 80 3 05 03<br>88 06 05.5<br>96 07 07.5<br>104 08 10.0<br>112 09 12.5<br>120 10 15.0<br>Means |         | 9. 5                      | 42.5 62          |                      |                         | 23. 5<br>24. 0<br>24. 0<br>23. 5<br>23. 5<br>23. 5<br>23. 67 | $t'-t = +0^{\circ}.5$ 1- $(t'-$ |   | 1. 783<br>0. 601<br>9. 999<br>1. 784 |  |
| Tors.                               |  | cient e | Mean.                     | Differences.     | Value of<br>division | one scale<br>1 == 3'.69 | Logar  | ithms.                          | $mH = rac{\pi^2 M}{T^2}$ $m = 0.0736$ $H = 1.930$                        | (ar. co.) $T^2$ $\pi^2$ $M$ $mH$ $m$ | 8, 215<br>0, 994<br>9, 942<br>9, 152<br>8, 866<br>0, 285 |
| 15<br>105<br>285<br>15              | 105  |         |                           | + v'<br>ir. co.) |                      | 3354<br>6761            | Observations of deflect<br>hour, 1h 36m.5. Temp              | ions: Date, Febru               |   |                                      |  |
|                                     | Mean v = 3.87 t  |         |                           | 1+               | h                    | 0.0                     | 01157  |                                 | ms a  | 7, 733<br>8, 866                     |  |

\* No doubt - 100 0

[Date, March 17, 1882. Göttingen mean time. Instrument, theodolite magnetometer No. 11. Magnet L., Chronometer, Bond No. 188; daily rate, 30.0, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.              |                            | nometer<br>ime.   | Temp.                   | Extrem read  | ings.                   | Time o<br>latie |  | Comp   | utation.                                      |  |
|--|----------------------------|---|-------------------------|--------------|-------------------------|-----------------|--|--|---|--|
| 0<br>8<br>16<br>24<br>32<br>40         | 2                          | m. a.<br>17 22.5<br>18 25.5<br>19 28.5<br>20 31.5<br>21 34.0<br>22 37.0 | 2.0                     | 19           | 80<br>74. 3             | m.              | 4.   | Observed time of 80 osci<br>Time of one oscillation .<br>Correction for rate | ****************                              | #,<br>627, 83<br>7, 8476<br>—0 0003<br>- 7, 8476               |
| 80<br>88<br>96<br>104<br>112<br>120    |                            | 27 50. 5<br>28 53. 5<br>29 56. 5<br>30 59. 0<br>32 01. 5<br>33 05       | 3.0                     | 36. <b>2</b> | 69. 2<br>66             |                 | 28. 0<br>28. 0<br>28. 0<br>27. 5<br>27. 5<br>28. 0<br>27. 83 | t'-t=+2°.8   | $T'$ $T'^{2}$ $1 + h$ $1 - (t' - t)q$ $T^{2}$ | Log'ms<br>0, 8947<br>1, 7894<br>0, 0013<br>9, 9989<br>1, 7897  |
|  | rient o                    | f torsion.<br>Mean.   | Differ-<br>ences.       |              | one scale<br>n := 3'.69 | Loga            | rithms.  | $mH = \frac{\pi^2 M}{f^2}$ , $m = 0.0727$ , $H = 1.931$                      | (ar. co.) $T^2$ $\frac{\pi^2}{M}$ $mH$ $m$    | 8, 2102<br>0, 9943<br>9, 9426<br>9, 1471<br>8, 8618<br>0, 2857 |
| 15 39<br>105 51. 5<br>285 57.<br>15 38 | 66<br>• 72<br>  59<br>  68 | 52, 50<br>61, 75<br>55, 00<br>53, 00                                    | 9. 25<br>6. 75<br>2. co |              |                         |                 | 73373<br>26761   | Observations of deflection $1^{\rm h}$ $36^{\rm m}.5$ . Temp. $t=0^{\circ}$  | na: Date. March 1                             |  |

[Date, March 18, 1882. Göttingen mean time. Instrutient, theodolite magnetometer No. 11. Magnet L<sub>II</sub>. Chronometer, Bond No. 188; daily rate, 3-0, gaining on mean time. Observer, A. C. Dark.]

| No. of o                            |   |        | nometer<br>ime.   | Temp.             |       | ne scale<br>lings.         | Time of        | f oscil-  | Compu  | tation.  |   |
|-------------------------------------|---|--------|---|-------------------|-------|----------------------------|----------------|---|--|--|---|
| 0<br>8<br>16<br>24<br>32<br>40      |   | 2      | 9. 8.<br>18 14. 9<br>10 16. 5<br>10 10. 5<br>11 22. 5<br>12 25. 0<br>13 28. 0 | 1.0               | 34. 5 | 63                         | m.             | 8.  | Observed time of 80 oscill.<br>Time of one oscillation | <i>T'</i> =  |   |
| 80<br>88<br>96<br>104<br>112<br>120 |   |        | 28 41. 5<br>29 44. 5<br>30 47. 0<br>31 49. 5<br>32 52. 5<br>33 55. 5          | 1.0<br>2.0        | 40    | 57                         | 10             | 27. 5<br>28. 0<br>27. 5<br>27. 0<br>27. 5<br>27. 5<br>27. 5             | o<br>f'-f=+2   | $T = \frac{T'^{2}}{1 + \frac{h}{f}}$ $1 - (t' - ')q$ $T^{3}$ | Log'ms<br>0. 8045<br>1, 7890<br>0, 0024<br>9, 9992<br>1, 7907 |
| C                                   | oeffic  | ient o | torsion.  |                   |       |                            |                |   | -9   | (ar. co.) $T^2$ $M$  | 8, 2092<br>0, 9943<br>9, 9425                                 |
| Tors.<br>circle.                    | Sei   | ale.   | Mean.   | Differ-<br>ences. |       | f one scale<br>on == 3'.69 | Loga           | rithme.   | $mH = \frac{\pi^2 m}{T^2}$ $m = 0.0738$ $H = 1.898$    | $mH \atop m$   | 9. 1461<br>8. 8678<br>0. 2782                                 |
| 15<br>105<br>285<br>15              | 105 52 67 59.50 16.30<br>285 37.2 49.2 43.20 6.80 |        | 10. 50<br>16. 30<br>6. 80   | v=3 5400 5400     |       |                            | 73488<br>26761 | Observations of deflection 1 <sup>k</sup> 38 <sup>m</sup> . Temp. t=-1° | ns: Date, March 1<br>0<br>m<br>H<br>mH                 | 8; hour<br>8, 5806<br>9, 1461                                |   |
|                                     | Mean v = 8.40?                                    |        |   | $1+\frac{h}{f}$   |       | 0.                         | 002491         |   | $m^2$ $m$  | 7. 735<br>8. 867   |   |

[Date, March 19, 1882. Göttingen mean time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>II</sub>. Chronometer, Bond No. 188; 'ally rate, 3°0, gaining on mean time. Observer, A. C. Dark.]

| No. of o                            |  |              | nomete<br>ime.  | Temp.                       |                      | ne scale<br>ings.           | Time of<br>lation  |              | Comput  | ation.  |  |
|-------------------------------------|--|--------------|---|-----------------------------|----------------------|-----------------------------|--|--------------|---|---|--|
| 0<br>8<br>16<br>24<br>32<br>40      |  | 2            | m. s.<br>21 12.6<br>22 15.4<br>23 17.1<br>24 20.1<br>25 23.1<br>26 26.2 |                             | 26                   | 77                          | n.   | •            | Observed time of 80 osci. Tume of one oscillation   |   | #,<br>628, 67<br>7 8584<br>—0, 0003<br>7, 8581 |
| 80<br>88<br>96<br>104<br>112<br>120 | 80 31 40.5<br>88 32 43.5<br>96 33 46.5<br>104 34 49.5<br>112 35 52.0 |              | 10  | 32 70<br>35.4 68.2<br>41 65 |                      |                             | 28, 5<br>28, 5<br>29, 0<br>29, 0<br>28, 5<br>28, 5<br>28, 67 | t'−t=+5.5    | $1'$ $1 + h$ $1 - (t'-t)q$ $T^{2}$  | Log'ms<br>0, 89532<br>1, 79064<br>0, 00241<br>9, 9987<br>1, 79170 |  |
| (                                   | Zoeffi   | –<br>cient o | f torsio  | n.                          |                      |                             |  |              |   | (ar. co.) $T^2$ $\pi^2$ $M$                                       | 8, 2082<br>0, 9943<br>9, 9426                  |
| Tors.<br>circle.                    | 8  | cale.        | Mean  | Differences.                | Value of<br>division | f one scale<br>on -== 3'.69 | Logari   | ithma.       | $mH = \frac{\pi^2 M}{T^2}$ $m = 0.0733$   | mH $m$  | 9, 1451<br>8, 8650                             |
| 15<br>100                           | 41<br>59   | 65<br>63     | 53  | 8                           |                      |                             |  |              | $H=1,906$ Observations of deflection 1 <sup>h</sup> 40 <sup>m</sup> , Temp. $t : 5^{\circ}.0$ |   | 0. 2801<br>9; hour                             |
| 285<br>15                           | 39<br>50   | 51<br>57     | 45<br>53, 5   | 8, 5                        |                      | 30'.0<br>: v'<br>(ar. co.)  |  | 3480<br>6761 |   | m $m$ $m$ $m$   | 8, 5848<br>9, 1451                             |
| - 10                                |  | tean r       | 8.12  |                             |                      | + h                         |  | 0241         |   | $m^2$   | 7, 7308<br>8, 8650                             |

# ${\it Magnetic observations \ at \ Uglaumie, \ Alaska}\hbox{--} {\it Continued}.$

[Date, April 17, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet, L.,. Chronometer, Bond No. 188; daily rate. 3: 2, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations. |                                | ometer<br>ne.                | Temp.             | Extrem<br>readi                  | e scale :<br>ngs. | Time o | of ometh-                        | Cor  | nputation.   |                                     |
|---------------------------|--------------------------------|------------------------------|-------------------|----------------------------------|-------------------|--------|----------------------------------|--|--|-------------------------------------|
| 0<br>8<br>16<br>24<br>32  | h. m<br>3 30<br>31<br>32<br>33 | 18.5<br>21.5<br>24.5<br>27.5 | 25. 0             | 32. 0                            | 65. 2             | 913.   | e. !                             | Observed time of 80 or<br>Time of one oscillation<br>Correction for rate | 1  | 8.<br>620, 08<br>7, 8266<br>0, 0005 |
| 40                        | 3.7                            |                              | 25. 0             | 55. <del>0</del>                 | 85. 0             |        |                                  |  | 1  | 7, 825                              |
| 80<br>86<br>96<br>104     | 40<br>41<br>42<br>43           | 47. 5<br>50, 5               | 25. 0             | 52. 0                            | 83. 0             | 10     | 26. 5<br>26. 0<br>26. 0<br>26. 0 |  | T' T'2   | Log'me<br>0, 8935<br>1, 7870        |
| 112<br>120                | 44                             | 56.5                         | 25, 0             | 57. o                            | 110. 0            |        | 26. 0<br>26. 0                   | •  | 1+2  | 0.0021                              |
|                           | Mes                            | 1119                         | 25, 0             |                                  |                   | 10     | 26. 08                           |  | 1-(t'-t)q  | 9, 9985                             |
| Couffic                   | ~<br>ient of                   | torsion.                     |                   | Value of                         | one scale         | Loga   | rithms.                          | $t'-t = +4$ $mH = \frac{\pi^2 M}{\pi^2}$                                 | $\begin{array}{c} (\text{ar. eo.})  T^2 \\ \pi^2 \\ M \end{array}$ | 8. 2123<br>0. 9943<br>9. 9427       |
| Fors. Se:<br>ircle.       | tle.                           | Mean.                        | Differ-<br>ences. | division                         | 23,00             |        |                                  | m = 0. 0606<br>H = 2. 026  | m <b>H</b><br>m<br><b>H</b>  | *9, 1497<br>8, 8427<br>0, 3066      |
| 15 27.0                   | 59. 0                          | 43. 0                        | 7. 5              |                                  |                   |        |                                  | Observations of defler   | ctions: Date. April 1  | 7; hou                              |
| 105 - 32, 0               | 39. 0                          | 35, 5                        | 9.5.              |                                  |                   |        |                                  | 1 .02 .0, LUMPI -  |  |                                     |
| 285 - 20, 0               | 32. 0                          | 26, 0                        | 11.5              | $v = 26'$ . 5400' $\div$ 5400 (a | $P^{I}$           |        | 3. 73450<br>3. 26761             | *9. 14935<br>8. 85660  | #<br>#<br>##   | 9, 5361<br>9, 1493                  |
| 15 22.0                   | 53. 0<br>10. =7.               | 37. 5                        |                   | 1+                               |                   |        | 0.00211 1                        | 0. 29275 1. 962  | $m^3$ $m$  | 7. 685-<br>8. 8421                  |

[Date, April 18, 1882. Göttingen time, Instrument, theodolite magnetometer No. 11. Magnet L<sub>th</sub>, Chronometer, Bond No. 188; daily rats, 3-2, gaining on mean time. Observer, A. C. Dark.]

| No. of o<br>lation |          |       | nometer<br>inc.                                   | Temp.   | Extreme<br>readin      |                                      | Time o<br>lati |                         | Computation.  |                               |
|--------------------|----------|-------|---|---------|------------------------|--------------------------------------|----------------|-------------------------|---|-------------------------------|
| 0<br>8<br>16<br>24 |          | 2     | n. 8.<br>27 19.0<br>28 22.0<br>29 25.0<br>30 28.0 | 17. 0   | 4.5                    | 69. 2                                | 176.           | *.                      | Time of one oscillation   | 630, 42<br>7, 886<br>-, 000   |
| 32<br>40           | :        |       | 31 31.0<br>32 34.5                                | 17. 0   | 23. 5                  | 67. 5                                |                |                         | T'=   | 7. 879<br>Log'mi<br>0. 8965   |
| 80<br>88<br>96     |          | - 1   | 37 49. 5<br>38 52. 7<br>39 55. 5                  | 17, 0   | 29. 0                  | 63. 8                                | 10             | 30. 5<br>30. 5<br>30. 5 | Tes.  | 1, 7930                       |
| 104<br>112<br>120  | 1        |       | 58.5<br>42 01.5<br>43 04.5                        | 18.0    | 38. 5                  | 60. 0                                |                | 30. 5<br>30. 5<br>30. 0 | $1 + \frac{h}{f}$ $1 - (t' - \ell)\eta$                               | 0. 0024<br>9. 9991            |
|                    |          | M     | ea <b>ns</b>                                      | 17. 2   |                        |                                      | 10             | 30. 42                  | $t'-t \sim 2.2$ (or co.) $T^2$  | 1. 7047                       |
| C                  | oefficie | nt o  | torsic  |         |                        |                                      | ı              |                         | $mH_{m}^{-\tau^{2}M}$ $M$   | 8, 205;<br>0, 994;<br>9, 9426 |
| Tors.              | Scal     | θ.    | Meau.   | Differ- | Value of a<br>division | ш≘ ас <b>але</b><br>-:= 3, <b>69</b> | Loga           | rithms.                 | $T^2$ $mH$ $m=0.0706$ $mH$ $H=1.965$                                  | 9, 1425<br>8, 8485            |
|                    |          |       |   |         |                        |                                      | _              |                         | H=1.900   | 0. 2933                       |
| - 1                |          | 36. 0 | 49.75   | 3. 25   |                        |                                      |                |                         | Observations of dedections: Date. April 1-<br>18 32m.5. Temp. t=150.0 | 8; hou                        |
| 105                | 45.0     | 31. 0 | 53, 00  | 19.00   |                        |                                      |                |                         | H   | 8. 555                        |
|                    | 22.0 ;   |       | 34. 00  | 11.00   | v = 30, $5400'$ -,     | 11                                   |                | . 73486                 | mH  | 9. 142                        |
|                    | 40.5     | 19. 5 | 45, 00  |         | 5400 (a                | 1. co.)                              | . 6            | . 26761                 | m²  | 7, 697                        |
| 15                 |          |       |   |         | $1+\frac{h}{a}$        |                                      |                |                         |   | 8, 848                        |

No. 188 :

Vo. 188;

[Date, April 10, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L.,.. Chronometer. Bond No. 188; daily rate, 3v.2. gaining on mean time. Observer, A. C. Dark.

| No. of oscil<br>lations.            |                            | ometer<br>me.                                  | Temp                    | readings.                                  | Time of oscillations.                        | Con   | putation.  |   |
|-------------------------------------|----------------------------|--|-------------------------|--|--|---|--|---|
| 0<br>8<br>16<br>24<br>32<br>40      | h. n<br>2 2<br>2 2<br>3 3  | 7 46.5<br>8 49.5<br>0 52.0<br>0 54.5           | 23. 0                   | 12.0 78.0                                  | m. s.  | Observed time of 80 ose<br>Time of one oscillation<br>Correction for rate |  | 628, 33<br>7, 8541<br>—0, 0003<br>7, 8538                                 |
| 80<br>88<br>96<br>104<br>112<br>120 | 33<br>33<br>44<br>44<br>42 | 7 11.5<br>8 14.5<br>9 17.5<br>9 20.5<br>1 28.5 | 24. 0<br>25. 0<br>25. 0 | 22. 0 76. 2<br>27. 5 70. 2<br>28. 0 60. 0  | 10 27. 5<br>28. 0<br>28. 0<br>28. 5<br>29. 0 |   | 27° 1+ h 1-(t'-t) q                              | Log'ms<br>0. 89508<br>1. 70016<br>0. 00237<br>0. 00037                    |
| Torr                                | dicient of Scale.          | tersion.                                       | Differences.            | Value of one scale<br>division = 3′,69     | 10 28.38 Logarithms.                         | $t'-t = -1.0$ $mH = \frac{\pi^2 M}{T^2}$ $H = 1.910$                      | $T^3$ (ar. co.) $T^2$ $\frac{\pi^2}{M}$ $MH$ $m$ | 1. 7929<br>8. 2071<br>0. 9943<br>9. 9127<br>9. 1441<br>8. 8631<br>0. 2810 |
| 15 28<br>105 41<br>285 29<br>15 39  | 65                         | 53<br>37<br>44                                 | 9<br>16<br>7            | v = 29'.5<br>5400' + v'<br>5400  (ar. co.) | 3. 7347 <b>6</b><br>6. 26761                 | Observations of deflect 1b 32 a. 5. Temp. $\ell = 3$                      | tions: Date, April 1                             |   |
|                                     | tean r==                   |  |                         | $1+\frac{h}{\ell}$                         | 0. 00237                                     |   | 9n <sup>-2</sup>                                 | 7. 7261<br>8. 8631  |

[Date, May 17, 1882. Göttengen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>111</sub>. Chronometer, Bond No. 188; daily rate, 34.5, gaining on mean time. Observer, A. C. Dark.]

| No. of e              |         |         | tim                  | meter                            | Temp.             |          | ne scale<br>ings.      | Time o |                                  | Comput  | ation.                                     |                               |
|-----------------------|---------|---------|----------------------|----------------------------------|-------------------|----------|------------------------|--------|----------------------------------|---|--|-------------------------------|
| 0<br>8<br>16<br>24    |         | h.<br>2 | m.<br>19<br>20<br>21 | 8.<br>07. 0<br>10. 5<br>1. 5     | 46. 5             | 18. 0    | 62.0                   | m.     | e.                               | Observed time of 80 oscilla<br>Time of one oscillation<br>Correction for rate |  | 8.<br>640. 17<br>8. 002       |
| 32<br>40              |         |         |                      | 22.5                             | 47. 0             | 20. 0    | 55. 0                  |        |                                  |   | <b>T</b> ':                                | 8, 001                        |
| 80<br>88<br>96<br>104 |         | 2       | 29<br>30<br>31<br>32 | 47. 5<br>51. 0<br>54. 5<br>58. 5 | 47. 0             | 22. 0    | 51. 0                  | 10     | 40. 5<br>40. 5<br>40. 0<br>40. 0 |   | $T^{\circ}$ $T^{\circ 2}$ $h$              | Log'm<br>0. 9031<br>1. 8063   |
| 112<br>120            |         |         | 34<br>35             | 02.5                             | 47. 5             | 15. 0    | 49. 9                  |        | 40. 0<br>40. 0                   |   | $1 + \frac{1+\frac{\alpha}{f}}{1-t(t-t)q}$ | 0.0017<br>9.9996              |
|                       | ,       | 31      | eau                  | 8                                | 47. 0             |          |                        | 10     | 40.17                            |   | $T^{\gamma}$                               | 1. 8077                       |
|                       | Coeffic | ient «  | of to                | rsion.                           |                   | W-1      |                        |        |                                  | t'-t=+1.0   | (ar. co.) $T^2 \over \pi^2 M$              | 8, 1922<br>0, 9943<br>9, 9428 |
| Tors.                 | Sci     | sie.    | Λ                    | đean.                            | Differ-<br>ences. | division | one scale<br>a = 34.69 | Loga   | rithms.                          | $mH = \frac{\pi^2 M}{T^2}$ $m = 0.0703$                                       | mH $m$                                     | 9. 1294<br>8. 847             |
| 15                    | 14      | 49      |                      | D2 5                             |                   |          |                        | i      |                                  | H = 1.915   | Н  | 0. 2822                       |
| 105                   | 24      | 41      |                      | 31.5                             | 1. 00             |          |                        |        |                                  | Observations of defications<br>1h 32m.5. Temp. t = 46°.                       | s: Date May 1'                             | 7. how                        |
| 285                   | 18. 5   | 24. 5   |                      | 19. 0                            | 13. 50            | v == 21  |                        |        |                                  |   | 911  | 8, 5650                       |
| 15                    | 11      | 45      |                      | 28. 0                            | 9.00              | 5400 (   | + v'<br>ar. co.)       |        | . 73414<br>. 26761               |   | mH   | 9 1294                        |
|                       | Me      | an e-   | - 5.1                | 679                              |                   | 1 -      | + h                    | 0      | : 00175?                         |   | 911 <sup>2</sup>                           | 5. 6944<br>8. 8472            |

[Date, May 18, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L.,. Chronometer, Bond No. 188; daily rate, 3°.5, gaining on mean time. Observer, A. C. Dark.]

|                                     | -              |   |                       |                                       |  |  |  | -   |
|-------------------------------------|----------------|---|-----------------------|---------------------------------------|--|--|--|---|
| No. of oscil-<br>lations.           |                | nometer<br>time.  | Temp                  | Extreme scale<br>readings.            | Time of oscil-<br>lations.                                     | Сотр   | utation.                                   |   |
| 9<br>8<br>16<br>24<br>32<br>40      |                | m. s.<br>18 12.5<br>19 10.5<br>20 20.5<br>24 24.5<br>22 28.0<br>23 32.0 | 43.0                  | 14. 0 78. 0                           | 775. #.  | Observed time of 80 oaci<br>Time of one oaciliation .<br>Correction for rate | *************                              | 638. 33<br>7. 9°<br>-0. 00                |
| 80<br>88<br>96<br>104<br>112<br>120 |                | 22 51.5<br>29 55.0<br>30 59.0<br>32 02.5<br>33 06.0<br>34 09.5          | 43.0                  | 70. 0 43. 0                           | 10 39. 0<br>38. 5<br>38. 5<br>38. 5<br>38. 5<br>38. 5<br>37. 5 | t' - t = 3°, 0   | $1 + \frac{h}{f}$ $1 - (t' - t) q$ $T^{2}$ | 1. 89<br>0. 00<br>0. 00<br>0. 00<br>1. 80 |
| Cons                                | cient o        | f torwion.  Mean.   | Differ-               | Value of one scal<br>division = 3'.69 | C. Logarithms.   | $mH = \frac{\pi^2 M}{2^{n}}$ $m = 0.0703$                                    | (ar. co.) $T^{q}$ $mH$ $m$                 | 9, 14<br>9, 94<br>9, 13<br>8, 84          |
|                                     |                |   |                       |                                       | -  | H = 1.919  | H  | 0, 28                                     |
| 15 36<br>105 53<br>285 37           | 63<br>58<br>49 | 49. 5<br>55. 0<br>73. 0   | 5. 5<br>12. 0<br>7. 5 | v = 2'.31 $5400' + v'$                | 3. 73425<br>6. 26761   | Observations of deflection 1h 32m.5. Temp. &= 46                             | ons: Date, May 1                           | 8; ho<br>8, 56<br>9, 13                   |
| 15 37                               | 64<br>an v     | 50. 5   |                       | 5400 (år. co.) $1 + \frac{h}{f}$      | 0. 00186   |  | 911.2<br>116                               | 7. 69<br>8. 84                            |

[Date, May 19, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L.,. Chronometer, Bond No. 188; daily rate, 3º.6, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>latio) 3.                 | Chronometer<br>time.  | Temp.                   | Extreme scale<br>readings.              | Time of oscil-<br>lations.                            | Computation.  |
|--|---|-------------------------|---|---|---|
| 0<br>8<br>16<br>24<br>32<br>40             | h, m, s,<br>2 33 05.0<br>34 08.5<br>35 12.0<br>36 16.0<br>37 20.0<br>38 24.0  | 36, 5<br>36, 5          | 2.0 76.0                                | 778. 8.   | Observed time of 80 oscillations  |
| 80<br>88<br>96<br>104<br>112<br>120        | 43 41. 5<br>44 45. 0<br>45 48. 0<br>46 51. 5<br>47 55. 5<br>48 59. 0<br>Means | 36. 0<br>36. 0<br>36. 2 | 27. 0 56. 0                             | 10 36. 5<br>36. 5<br>36. 5<br>36. 5<br>35. 5<br>35. 6 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
| Coeffic<br>Tors. Sea                       | ient of torsion.  | Differ ences.           | Value of one scale-<br>division = 3'.69 | Logarithms.   | $mH = rac{\pi^2 M}{T^2}$ $mH = 0.0704$ $m = 0.0704$ |
| 15 25.0<br>105 31.0<br>285 27.5<br>15 40.0 | 59. 0 45. 0<br>47. 5 37. 5  | 6. 1<br>7. 5            | n 23'.2<br>5400 + v'<br>5400 (ar. co.)  | 3, 73426<br>6, 26761                                  | Observations of deflections: Date, May 19; h 12 40°. Temp. $t=30^{\circ}.2$ $\begin{array}{c} m & 8.5 \\ H & 9.1 \\ mH & 9.1 \end{array}$   |
| Mer  | an v == 6. 28 î   |                         | $1 + {h \choose f}$                     | 0.001877  | m 8.8   |

[Date, June 17, 1882, Göttingen time. Instrument, theodelite magnetometer No. 11. Magnet L.,. Chronometer, Rond No. 1884; daily rate, 4-5, gaining on mean time. Observer, A. C. Dark.]

| No. of o                            | moil-                   |                         | nometer<br>ime.   | Temp.                 |                             | iv scale<br>ings.        |                    | of oscil-  | Com  | putation.                             |  |
|-------------------------------------|-------------------------|-------------------------|---|-----------------------|-----------------------------|--------------------------|--------------------|--|--|---------------------------------------|--|
| 0<br>8<br>16<br>24<br>32<br>40      |                         | 3                       | n. s.<br>21 07<br>23 10.5<br>23 14.5<br>24 18.0<br>25 22.0<br>20 20.0 | 53, 0<br>53, 0        | 35. 0<br>37. 0              | 80. 0<br>78. 0           | <i>m</i> .         | #,   | Observed time of 80 osc<br>Time of one oscillation.<br>Correction for rate |                                       | я,<br>638, 00<br>7, 950<br>, 000<br>7, 949         |
| 80<br>88<br>96<br>104<br>112<br>120 |                         | 0 0 0                   | 31 43, 5<br>32 48, 5<br>33 50, 0<br>44 54<br>15 58<br>37 02           | 58. 0                 | 40. 0                       | 70<br>67. 2              | 10                 | 36. 5<br>36. 0<br>36. 5<br>36. 0<br>36. 0<br>36. 0 | t'-t=0   | $T^{2}$ $1+h$ $f$ $1-(t'-t)q$ $T^{3}$ | Log'ms<br>0. 9003<br>1. 8006<br>0. 0019<br>0. 0000 |
|                                     |                         |                         | f toraion   |                       |                             |                          | ,                  | 30.00  |  | (ar. co.) T <sub>e</sub>              | 8. 1973<br>0. 9943                                 |
| Tors.<br>circle.                    |                         | ale.                    | Mean.   | Differ-<br>ences.     | Value of<br>division        | one scale<br>on =: 3'.69 | Loga               | rithms.  | $mH = \frac{\pi^0 M}{T^0}$ $m = 0,0700$ $H = 1,947$                        | M<br>mH<br>m                          | 9, 1345<br>8, 8451                                 |
| 15<br>105<br>285<br>15              | 45. 2<br>57<br>47<br>53 | 67. 2<br>72<br>56<br>61 | 56, 2<br>64, 5<br>51, 5<br>57, 6                                      | 8. 3<br>13. 0<br>5. 5 | 9 = 24<br>5400' -<br>5400 ( |                          | manuferman = 1 apr | 8, 73438<br>6, 26761                               | Observations of deflect 25 36%. Temp. t = 5                                | 3.0<br>##<br>## ##                    | 8, 5558<br>9, 1346                                 |
|                                     |                         | san v=                  |   |                       | 1-                          | + 1/                     |                    | 0. 00190   |  | 201.2                                 | 7, 6903<br>8, 846                                  |

[Date, June 18, 1882. Göttingen time. Instrument, theodoitte magnetometer No. 11. Magnet L<sub>o</sub>. Chronometer, Eard No. 188; daily rate, 4.5, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.                    | Chronometer<br>time.   | Temp.                 |                              | ings.                    | Time o<br>latic | f oscil-                                  | Comp   | outstion.  |                              |
|--|--|-----------------------|------------------------------|--------------------------|-----------------|---|--|--|------------------------------|
| 0<br>8<br>16<br>24<br>32<br>40               | h. m. s.<br>2 23 10.5<br>24 15.0<br>25 19.0<br>26 23.5<br>27 27.5<br>28 31.5 | 49. 5                 | 26. 5<br>40. 5               | 80. <b>0</b>             | 116.            | ø.  | Observed time of 80 oscillation<br>Correction for rate                     |  | #.<br>641 60<br>8.020<br>000 |
| 80<br>88<br>96<br>104<br>112<br>120          | 34 57. 5<br>36 01. 0<br>37 05. 0<br>38 08. 5<br>39 12. 5<br>Means            | 50. 0                 | 46.0                         | 71. 0<br>67. 0           |                 | 42. 5<br>42. 0<br>41. 5<br>41. 0<br>41. 0 | t'−t0  | $1 - \frac{T^{2}}{t}$ $1 + \frac{f}{f}$ $1 - (t' - t) q$ $T^{2}$ (ar. co.) $T_{2}^{2}$ | 1, 810°<br>8, 1890           |
|  | cient of torsion.  | Differ-<br>ences.     |                              | one scale<br>n = . 3',69 | Logar           | rithms.                                   | $mH = \frac{\pi^2 M}{T^2}$<br>m = 0.0698<br>H = 1.916                      | m II<br>mb   | 9, 942<br>9, 126<br>8, 844   |
| 15   46<br>105   63<br>285   30<br>15   56.5 | 67   56, 5   67   65, 0   59   49, 9   59, 5   58, 0                         | 8, 5<br>16, 0<br>9, 0 | v == 30<br>5400′ -<br>5400 ( |                          |                 | 3. 73487<br>6. 26761                      | Observations of deflecti<br>1 <sup>h</sup> 38 <sup>m</sup> .5. Temp. t = 5 |  | 8, 561                       |
|  | ean v - 8.37   |                       | 1                            | h                        |                 | 0 00218                                   |  | $m^2$  | 7. 680s<br>F 2111            |

H. Ex. 44——79

155:

[Date, June 19, 1882. Instrument, theodolite magnetometer No. 11. Magnet, L<sub>D</sub>. Chronometer, Bond No. 188; daily rate, 4.5 gaining on mean time. Observer, A. C. Dark.]

| Description   Confidence   Co   |                           | -       |  |        | a Workshipean      |                              |   |
|--|---------------------------|---------|--|--------|--------------------|------------------------------|---|
| 0  | No. of oscil-<br>lations. | . Ch    |  | Temp.  |                    | Time of ossile .<br>lations. | Computation.  |
| \$\begin{array}{c c c c c c c c c c c c c c c c c c c  | 9<br>16<br>24<br>32       | , A.    | 22 00. 5<br>23 05. 0<br>24 09. 5<br>26 16. 0 | 1      |                    | 106. #-                      | Observed time of 80 oscillations  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | 88<br>98                  | 1 2     | 33 47<br>34 51.5                             | 89     | 44.8 : 78.2        | 42.0                         | T' 0.0050<br>T'2 1.8100   |
| Coefficient of torsion.  Coefficient of torsion.  Value of one scale division = 3°.69 Logarithms.  Value of one scale division = 3°.69 Logarithms.  Note: $\frac{m}{T^2}$ and $$ | 112                       |         | 37 00.5                                      |        | 47.0 72.0          | 44. 0                        | 1 = (t' - t)'q = 0.0003   |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   |                           | ficient | of torsion.                                  | Differ | Value of one scale | Logarithms.                  | $P - t = -1.6$ $\frac{\pi}{37}$ 0.0943<br>$mH = \frac{\pi^2 M}{77}$ $mH = 0.1244$<br>m = 0.0084 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$   |                           |         |  |        |                    |                              | Observations of deflections: Date, June 19: hour 18 38m. Temp. t = 60°.0                        |
| 1 h 9, 00241 m 8, 8352   | 1                         |         |  |        | 5 100' + v'        |                              | B 8, 54010  |
|  | M                         | lean r  | = 8.19                                       |        | 1+ h               | 0. 00241                     |   |

(Date, July 18, 1882. Gättingen time. Instrument, theodolite magnetometer No. 11. Magnet L., Chronometer, Bond No. 188; daily rate, 3\*.5, gaining on mean time. Observer, A. C. Dark.)

| No. of oscil-<br>lations. |          | ime            | eter                    | Temp.             | Extreme                        |         | Time o<br>latic |                              | Comp  | putation.                          |                                      |
|---------------------------|----------|----------------|-------------------------|-------------------|--------------------------------|---------|-----------------|------------------------------|---|------------------------------------|--------------------------------------|
| 0<br>8<br>16<br>24        | 2        | 20<br>21<br>22 | #.<br>06<br>10<br>13. 5 | 48                | 18. 0                          | 75      | 976.            | #.                           | Observed time of 80 osc<br>Time of one oscillation<br>Correction for rate |                                    | #,<br>635, 33<br>: 7, 94<br>: — , 00 |
| 32<br>40                  |          | 24             | 17. 5<br>21. 0<br>24. 5 | 48                | 21. 0                          | 66      |                 |                              |   | T' -                               | 7. 94                                |
| 80<br>88<br>96            |          | 31<br>32       | 42. 0<br>45. 5<br>49. 0 | 48                | 24. 5                          | 61      | 10              | 36. 0<br>35. 5<br>35. 5      |   | T' T' 1                            | Log'm<br>0. 899<br>1. 799            |
| 104<br>112<br>120         |          | 34             | 52, 5<br>56, 0<br>59, 5 | 48                | 30. 0                          | 58      |                 | 35, 0<br>35, 0<br>35, 0      |   | $1 + \frac{h}{f}$ $1 - (t' - t) q$ | 0, 002<br>0, 000                     |
|                           | Me       | an×            |                         | 48                |                                |         | 10              | 35. <b>38</b>                |   | $T^{\gamma}$                       | 1, 801                               |
| Coeffic                   | ient o   | f to           | rsion.                  |                   | Walne - 6                      |         |                 |                              | t't==0  | (ar. co.) $\frac{T^4}{\pi^2}$ $M$  | 8, 198<br>0, 944<br>9, 942           |
| Tors. Sc                  | ale.     | м              | ean.                    | Differ-<br>ences. | Value of o                     | = 3'.69 | Loga            | rithms.                      | $mH = \frac{m \cdot m}{T^2}$ $m = 0.0707$                                 | mH                                 | 9, 135<br>8, 849                     |
|                           | 1        | -              |                         |                   |                                |         |                 | -                            | H = 1.931   | Н                                  | 0. 287                               |
| 15 30<br>105 37           | 58<br>65 | 1              | 4. 0<br>1. 0            | 7. 00             |                                |         | i               |                              | Observations of deflecti<br>1h 35m. Temp. t = 483                         | ons: Date, July 18                 | i; hoi                               |
| 285 27.5                  | 50       | 3              | 8. 75<br>6. 75          | 12. 25<br>8. 00   | v == 25/<br>5400' +<br>5400 (a | - 10"   |                 | 3. 73 <b>441</b><br>6. 26761 |   | m<br>H<br>m H                      | 8, 563<br>9, 135                     |
|                           | ean v    | 1              |                         |                   | 1+                             |         |                 | 0. 00202                     |   | m²<br>m                            | 7, 69 <sup>6</sup><br>8, 819         |

[Date, July 10, 1882. Göttlingen time. Instrument, theodolite magnetometer No. 11. Magnet L.,.. Chronometer, Bond No. 1881, daily rate, 35.5, gaining on mean time. Observer, A. C. Dark.]

ally rate, 44.5

# 642 90 # 6092 2 0004 # 6358 \* Log'ins. # 0.90504 # 0.00241 # 0.0037 1.81284 \* 0.90430 9 0.90430 9 0.90430 9 0.90430

0, 28913 19: hour, 8, 54616 9, 12442

d No. 188;

8, 635, 33 7, 9416 7, 9413 7, 9413 7, 9413 1, 9413 1, 96989 1, 79978 0, 00202 0, 00000 1, 80180 8, 19820 0, 94289 9, 14289 9, 14289 9, 14289 1, 16539 1, 66903

|                                     |  |                              | -  |  |  |                       |
|-------------------------------------|--|------------------------------|--|--|--|-----------------------|
| No. of oscil-<br>lations.           | Chronometer time.  | Temp.                        | Extreme scale   'readings.                 | Time of oscil-   | Computation.   |                       |
| 0<br>8<br>16<br>24<br>32<br>40      | A. m. e.<br>2 28 20.0<br>24 24.0<br>25 28.5<br>26 32.5<br>27 17.0<br>28 41.5 | Вн. <b>9</b><br>Бн. <b>0</b> | 7. 0 78. 0<br>33. 2 76. 0                  | 996. @.  |  | 0437<br>0000          |
| 80<br>88<br>96<br>104<br>112<br>120 | 2 34 03, 5<br>35 07, 5<br>36 12, 0<br>37 16, 0<br>38 20, 5<br>89 25, 0       | 58. 0<br>58. 0               | 38. 2 74. 0<br>42. 0 68. 0                 | 10 43, 5<br>43, 5<br>43, 5<br>43, 5<br>43, 5<br>43, 5  | V-t=0 1.8<br>1.+ Å 0.00  | 0544                  |
|                                     | Mesns  | 58. 0                        | 1  | 10 43 50   | Ta 1.8   | 1274                  |
| Coeffi                              | rient of tormion.  |                              | **   | and the second s | ** 0.9<br>************************************                       | 18726<br>MA30<br>H205 |
| Tors. Sc                            | sale. Mean   | Differ-                      | Value of one scale<br>division = :3', 69   | Logarithms.  | mH = 9.1   | 2451<br>4124          |
|                                     |  | -                            | A =  |  | H = 1.920 $H = 0.2$  | 3832                  |
| 15 56. 5<br>105 56. 0               |  | 0. 5                         |  |  | Observations of deflections: Date, July 19; h 1* 37*5. Temp. t=58°.0 | our                   |
| 285 59.0<br>15 47.5                 | 80.0 60.5<br>60.5 54.0   | 9 0<br>15. 5                 | e - 23′, 1<br>5400′ + v′<br>5400 (a), co.) | 3. 78425<br>6. 26761   | H  | 55700<br>1245         |
|                                     | lean v=6.25†   | 10 -                         | 1+h  | 0. 00186   |  | 24<br>3412            |

[Date, July 20, 1882. Göttingen time. Instrument, the dolte magnetometer No. 11. Magnet L.". Chronometer, Bond No. 188; daily rate, 3.5. gaining on mean time. Observer, A. C. Dark ]

| No. of oscil-<br>lations.           |                  | nome <b>ter</b><br>time.   | Temp.         | Extreme scale<br>readings.             | Time of oscil-<br>lations.                            | Сотри  | tation.  | * * **  |
|-------------------------------------|------------------|--|---------------|--|---|--|--|---|
| 0<br>8<br>16<br>24                  | 2                | m. e.<br>22 10.5<br>23 15.9<br>24 19.5<br>25 28.5                    | 61.0          | 22.5 68 0                              | <b>m</b> . 6:   |  |  | #.<br>643. 00<br>8. 0373<br>—. 0003                 |
| 32<br>40                            |                  | 26 28.0<br>27 32.0   | 61. 0         | 23. 0 61. 3                            |   |  |  | 8, 037  |
| 80<br>88<br>96<br>104<br>112<br>120 |                  | 32 53, 5<br>33 58, 0<br>35 02, 5<br>36 06, 5<br>37 11, 0<br>38 15, 0 | 61. 0         | 32. 0 57. 2<br>35. 0 55. 2             | 10 43. 0<br>43. 0<br>43. 0<br>43. 0<br>43. 0<br>43. 0 | •<br>• -t=-1.0                                   | $\begin{matrix} T' \\ T''^3 \\ 1 + \frac{h}{f} \\ 1 - (t' - t) \end{matrix} q$ | Log'me<br>0. 9051<br>1. \$102<br>0. 0025            |
|                                     | 1 M              | leaus  | 61.0          |  | 10 43.00  |  | $T^{\eta}$   | 1. 8131   |
| man.                                | flicient (       | of toraioa<br>Mean.  | Differ-       | Value of one sca<br>division == 3'. 69 | le Logarithms.  | $mH = \frac{\pi^2 M}{T^2}$<br>m = 0.0693         | (ar. co.) $T^3$ $M$ $mH$ $m$   | 8, 1869<br>0, 9943<br>9, 9429<br>9, 1241<br>8, 8409 |
|                                     |                  |  |               | -                                      |   | H:=1. 920  | Н  | 0. 2832   |
| 15 35.<br>105 47.                   | 2 54.8<br>5 59.5 |  | 8. 5          |  |   | Observations of deflection 1h 40m. Temp. t 62°.0 | ns: Date, July 20  | ); hou  |
| 285 22.                             |                  |  | 16. 0<br>9. 5 | v = 31′. 4<br>5400′ ± v′               | 3. 73491  | •  | $\frac{m}{H}$  | 8, 5571   |
| 15 38.                              | 0 56.0           | 47. 0  | 01-           | 5400 (ar. co.)                         | G. 26761  |  | mH   | 9. 1241   |
|                                     | Mean v           | =8.50  |               | 1+ <b>h</b>                            | 0. 00252  |  | 975. <sup>2</sup><br>971.  | 7. 6818<br>8. 8400                                  |

[Date, August 17, 1882. Instrument, theodolite magnetometer No. 11. Magnet L<sub>ij</sub>. Chronometer, Bond No. 188; daily rate, 3°.5, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations. | Chronometer<br>time.                                   | Temp              | . Extren                  | ne scale<br>lings. | Time o |                                  | Co   | mputation.                                |                                  |
|---------------------------|--|-------------------|---------------------------|--------------------|--------|----------------------------------|--|---|----------------------------------|
| 0<br>8<br>16<br>24<br>32  | h. m. s.<br>2 32 01.5<br>33 05.0<br>34 09.0<br>35 12.5 | 41.0              | 7. 0                      | 67. 0              | m.     | 8.                               | Observed time of 80 o<br>Time of one oscillatio<br>Correction for rate | n   | 8.<br>635. 33<br>7. 9416<br>0003 |
| 40                        | 36 15.5<br>37 19.0                                     | 41.0              | 56. 0                     | 3.0                |        |                                  |  | •   |                                  |
| 80<br>88<br>96<br>104     | 88 43 40.5<br>96 44 44.0<br>04 45 47.5<br>12 46 51.0   |                   | 22. 0                     | 49. 0              | 10     | 35, 5<br>35, 5<br>35, 0<br>35, 0 |  | T' 1 + h                                  | 1. 79970<br>0. 00220             |
| 112<br>120                | 46 51.0  | 41.0              | 22. 0                     | 46.0               |        | 35. 5<br>35. 5                   |  | 1-(t'-t)q                                 | 0. 0007                          |
|                           | Means  | 41.0              | -                         |                    | 10     | 35. 33                           | n  | T'2                                       | 1. 80278                         |
| Coeffic                   | cient of torsion                                       |                   | Value of                  | one scale          |        |                                  | $t'-t=-2$ $mH=\frac{\pi^2m}{T^2}$                                      | (ar. co.) T <sup>2</sup> # <sup>2</sup> M | 8, 1972;<br>0, 9943;<br>9, 9428  |
| Tors. Se                  | ale. Mean.   | Differ-<br>ences. | division                  | a =3'. 69          | Loga   | rithms.                          | m = 0.0690   | m H<br>m                                  | 9. 1343<br>8. 8386               |
| 15 22. 0<br>105 33. 0     | 46. 0 34. 0<br>50. 0 41. 5                             | 7. 5              |                           |                    |        |                                  | H=1.976  Observations of deflet 1b 37m.5. Temp. t=0                    | H ctions: Date, August 1 30 0             | 0. 2957<br>17; hon               |
| 285 15.0<br>15 21.0       | 40.0 27.5<br>52.0 36.5                                 | 14. 0<br>9. 0     | v=:28<br>5400′-<br>5400 ( |                    |        | 3. 73465<br>6. 26761             |  | m<br>H<br>mH                              | 8, 5428<br>9, 1343               |
|                           | ean v=7.62   |                   | 1+                        | + h,               |        | 0. 00226                         |  | $m^2$ $m$                                 | 7. 6771<br>8. 8386               |

[Date, August 18, 1882. Instrument, theodolite magnetometer No. 11. Magnet L<sub>ii</sub>. Chronometer, Bond No. 188; daily rate, 3.5, gaining on mean time. Observer, A. C. Dark.]

| No. c^oscil-<br>lations.            |                                 | ometer<br>no.                                       | Temp.             | Extrem                  | e scale<br>ings.            | Time of osc<br>lations.                      | 1- Co   | mputation.                   |  |
|-------------------------------------|---------------------------------|---|-------------------|-------------------------|-----------------------------|--|---|------------------------------|--|
| 0<br>8<br>16<br>24<br>32<br>40      | h. n<br>2 2<br>2<br>3<br>3<br>3 | 8 22. 0<br>9 25. 5<br>0 28. 5<br>1 32. 0<br>2 36. 0 | 41. 0             | 14. 0<br>25. 0          | 53. 0<br>5 <sub>n</sub> . 0 | m. s.  | Observed time of 80 of<br>Time of one oscillatio<br>Correction for rate | D                            | 636, 50<br>7, 956,<br>, 000<br>7, 955              |
| 80<br>88<br>96<br>104<br>112<br>120 | 3<br>4<br>4<br>4<br>4           | 0 02. 0<br>1 05. 0<br>2 08. 5                       | 42. 3             | 2. 0                    | 42. 0<br>45. 0              | 10 36. 5<br>36. 5<br>36. 5<br>36. 5<br>36. 5 |   | T' $1+h$ $1-(t'-t)q$         | Log'ms<br>0. 0906<br>1. 8013<br>0. 0025<br>9. 0988 |
|                                     | Means 42.0                      |   | . 42.0            |                         |                             | 10 36.5                                      | 0   | J. 5                         | 1. 8028  |
| Coeffi                              | cient of                        | torsion   |                   | Value of one scale      |                             |  | $t'-t=+3.0$ $mH=\frac{\pi^{3}M}{r^{2}}$                                 | (ar. co.) T * #2 M           | 8, 1971<br>0, 9943<br>9, 9428                      |
| Tors. Service. Se                   | cale.                           | Mean.   | Differ-<br>onces. | divisio                 | n =3'. 69                   | e- Logarithn                                 | m==0.0709<br>H==1.921   | mH $m$                       | 9 1343<br>8, 8508                                  |
| 15 30. 0<br>105 38. 0               | 45. 0<br>51. 0                  | 37. 5<br>44. 5                                      | 7. 0              |                         |                             |  |   | H rtions: Date, August 1 0.0 | 0. 2835<br>18: hou                                 |
| 285 18. 2<br>15 18. 0               | 32. 0                           | 25. 1<br>33. <b>0</b>                               | 19. 4<br>7. 9     | #= 31<br>5400′<br>5400′ |                             | 3. 734<br>6. 267                             |   | $_{mH}^{m}$                  | 8, 5672<br>9, 1343                                 |
|                                     | Ican r -                        | 0.87  |                   | 1-                      | + <u>h</u>                  | 0, 002                                       | 54  | m m                          | 7. 7018<br>8, 8508                                 |

[Date, August 19, 1882. Instrument, theodolite magnetemeter No. 11. Magnet L<sub>U</sub>. Chronometer, Bond No. 188; daily rate, 3°.5, gaining on mean time. Observer, A. C. Dark.]

rate.

y rate,

| No. of or<br>lation                 |                | Chron   | iometer<br>nie.                      | Temp.           | Extren         |                          | Time o<br>lati |   | Cor   | mputation.   |  |
|-------------------------------------|----------------|---------|--------------------------------------|-----------------|----------------|--------------------------|----------------|---|---|--|--|
| 0<br>8<br>16<br>24<br>32            |                | 2 2     | 5 14.0<br>6 18.5<br>7 23.0           | 43. 0           | 6.0            | 63. 8                    | 111.           | 8.  | Observed the of 80 os<br>Time of one oscillation<br>Correction for rate | 1  | 339, 17<br>7, 9896<br>0, 0003            |
| 40                                  |                | 2       |                                      | 43. 0           | 16. 0          | 55. 5                    |                |   | •   |  | Log'ms                                   |
| 80<br>88<br>96<br>104<br>112<br>120 |                | 3 3     | 5 54.0<br>6 57.5<br>8 01.5<br>9 05.5 | 43. 0           | 26. 0          | 55.0                     | 10             | 40. 5<br>40. 0<br>39. 0<br>38. 5<br>38. 5 | t'−t=+3°. 0   | $ \begin{array}{c} T' \\ T'' \\ 1+h \\ 1-(t'-t)q \end{array} $ | 0. 9025<br>1. 8050<br>0. 0023<br>9. 9968 |
| 120                                 |                |         | 0 09.0<br>nns                        | 43. 0           | 25. 0          | 49.5                     | 10             | 38. 5<br>39. 17                           | € — € \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \                                 |  | 1, 8062                                  |
| c                                   | oeffic         | ient of | tor-ion.                             |                 |                |                          |                |   | $mH = \frac{\pi^2 M}{r_3}$  | (ar. co.) $T^3$<br>$\pi^3$<br>M                                | 8, 1927<br>0, 9943<br>9, 9428            |
| Tors.                               | Sei            | ale.    | Mean.                                | Differ-         |                | `one acale<br>n == 3′.69 | Logs           | rithms.                                   | m=0.0695  | $mII \\ m$   | 9, 1208<br>8, 8417                       |
|                                     |                |         |                                      |                 |                |                          | -              |   | H=1.946   | H  | 0. 2891                                  |
| - 1                                 | 25. 0<br>19. 0 | 49. 5   | 37. 25<br>47. 50                     | 10. 25          |                |                          |                |   | Observations of deflect 15 35. Temp. t—40                               | tions: Date, August 1<br> °.0                                  | 9; hou                                   |
| 285                                 | 13. 0          | 53. 0   | 33. 00                               | 14. 50<br>7. 25 | v == 2<br>5400 | +111                     |                | 3. 73476                                  |   | m<br>H<br>mH   | 8. 5528<br>9. 1308                       |
| 15                                  | 39. 0          | 41.5    | 40. 25                               |                 |                | (ar. co.)<br>  h<br>  f  |                | 0. 26761<br>0. 002371                     |   | m <sup>3</sup>   | 7. 683-<br>8. 841                        |

[Date, August 31, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>n</sub>. Chronometer, \*Bond No. 188; daily rate, 5\*.0, gaining on mean time. Observer, A. C. Dark.]

| No. of o<br>lation       |                |                | im                               | meter<br>e.                                     | Temp.   | Extrem |                         | Time o |                                  | Co   | mputation.                   |      |                              |
|--------------------------|----------------|----------------|----------------------------------|---|---------|--------|-------------------------|--------|----------------------------------|--|------------------------------|------|------------------------------|
| 0<br>8<br>16<br>24<br>32 |                | 6              | m.<br>31<br>32<br>33<br>34<br>35 | 8.<br>24. 2<br>27. 9<br>31. 5<br>35. 3<br>38. 8 | 36. 0   | 11.5   | 61. 0                   | 171.   | *.                               | Observed time of 80 or<br>Time of one oscillation<br>Correction for rate | n=                           | -0.  | 9506<br>9005                 |
| 40                       |                |                | 36                               | 42. 4   | 36, 0   | 10. 0  | 55. 0                   |        |                                  |  |                              |      |                              |
| 89<br>88<br>96<br>104    |                |                | 42<br>43<br>44<br>45             | 00. 5<br>04. 0<br>07. 5<br>11. 1                | 37. 0   | 22. 0  | 53. 0                   | 10     | 36, 3<br>36, 1<br>36, 0<br>35, 8 |  | T' T'2                       | 1. 8 | ms.<br>00027<br>30078        |
| 112<br>120               |                |                | 46<br>47                         | 14. 8<br>18. 5                                  | 39. 0   | 27. 5  | 47. 5                   |        | 36. 0<br>36. 1                   | t'-t=-3°.0   | 1+h f $1-(t'-t)q$            |      | 2011                         |
|                          | -              | M              | ean                              | 8   | 37 0    |        |                         | 10     | 36. 05                           |  | $T^{\eta}$                   | 1.8  | F0371                        |
|                          | Coeffic        | ient o         | ıf t                             | orsion,   | 1       | V-1    |                         |        |                                  | $mH = \frac{\pi^2 M}{T^2}$   | (ar. co.) $T^2$ $m^2$ $M$    | 0. 9 | 19 <b>62</b><br>9943<br>9428 |
| Tors.                    | Se             | ale.           | 1                                | Mean.   | Differ- |        | one scale<br>n == 3'.60 | Loga   | rithms.                          | m=0.0695   | $_{m}_{m}$                   |      | 1333<br>8418                 |
|                          |                |                | Ļ                                |   |         |        | ARIAN TATALAN           |        |                                  | H=1.057  | H                            | 0. 2 | 2914                         |
| 15<br>105                | 27. 5<br>30. 0 | 47. 5<br>57. 0 |                                  | 37. 5<br>43. 5                                  | 6. 00   |        |                         |        |                                  | Observations of deflect 4h 35m. Temp. t=46                               | tions: Date, August 3<br>№ 0 | 1; 1 | iour                         |
| 285                      | 22. 0          | 39. 0          |                                  | 30. 5   | 13. 00  | v 2    | P. 0                    |        |                                  |  | m<br>H                       | 8. ! | 5503                         |
| 15                       | 27. 0          | 48. 0          | 1                                | 37. 5   | 7. 00   | 5100   |                         |        | 3 73432<br>6 26761               |  | m H                          | 9.   | 1333                         |
|                          | M              | ean v          | 0                                | . 50  |         | 1-     | h<br>J                  |        | 0. 00193                         |  | 31F <sub>3</sub>             |      | 6837<br>8418                 |

[Date, September 14, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L. Mass ring not used. Chronometer, Bond No. 188, fast 18= 33\*; daily rate, 3\*; losing on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations. |        | pnometer<br>time.                                 | Temp.             | Extre            | ne sc <b>ale</b><br>lings. |      | of oscil-<br>ions.      | Com   | outation.                                 |                                  |
|---------------------------|--------|---|-------------------|------------------|----------------------------|------|-------------------------|---|---|----------------------------------|
| 0<br>8<br>16              | 4      | m. s.<br>28 40.9<br>29 44.5<br>30 47.9<br>31 51.0 | 12.0              | 7. 0             | 65.0                       | m.   | ø.                      | Observed time of 80 osci<br>Time of one oscillation.<br>Correction for rate |   |                                  |
| 24<br>32<br>40            |        | 32 54.5<br>33 57.5                                | 40. 5             | 15. 0            | 57. 0                      |      |                         |   | <b>T</b> =                                | 7. 9607                          |
| 80<br>88<br>96            |        | 39 17.3<br>40 21.0<br>41 24.5                     | 40. 0             | 64. 0            | 12. 0                      | 10   | 36. 4<br>36. 5<br>36. 6 |   | T'  | Log'ms.<br>0. 90095<br>1. 80190  |
| 104<br>112<br>120         |        | 42 28.0<br>43 31.5<br>44 35.0                     | 40. 5             | 16.0             | 57. 0                      |      | 37. 0<br>37. 0<br>37. 5 | t'-t=-10.25   | $1 + \frac{h}{f}$ $1 - (t' - t) q$        | 0. 00186<br>0. 00046             |
| 1                         | Me     | ans   | 40.75             |                  |                            | 10   | 36. 88                  |   | $T^2$                                     | 1. 80422                         |
| Coeffici                  | ent of | torsion.  |                   | Value of         | one scale                  | 1    |                         | $mH=rac{\pi^2M}{T^2}$  | (ar. co.) $T^2$ $\pi^2$ $M$               | 8, 19578<br>0, 99436<br>9, 94285 |
| Tors. Sca                 | le.    | Mean.   | Differ-<br>ences. | division         | n = 3′.69                  | Loga | rithms.                 | m==0.0 <b>697</b>   | $mH \atop m$                              | 9. 18293<br>8. 84352             |
|                           |        |   |                   |                  |                            | -    |                         | H=1.947   | H   | 0. 28041                         |
| 15 16.0                   |        | 36. 5<br>29. 5                                    | 7. 0              |                  |                            |      |                         | Observations of deflect<br>hour, 3.35-4.05 a. m.                            | ions: Date, Septer Temp. $t=42^{\circ}.0$ | nber 14                          |
| 285 23.0<br>105 18.0      |        | 40.5  | 11.0              | v=2              |                            |      |                         |   | m<br>H                                    | 8. 55412                         |
| 15 24.0                   | 43.0   | 33. 5   | 7.0               | 5400′-<br>5400 ( | ar. co.)                   |      | 8. 73425<br>6. 26761    |   | mH  | 9. 13293                         |
| Med                       | an v=  | 6. 25   |                   | 1-               | h /                        |      | 0.00186                 |   | $m^2$                                     | 7. 68708<br>8. 84358             |

[Date, September 30, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L. Mass ring not used. Chronometer. Bond No. 188; fast 18-56; daily rate, 2, gaining on mean time. Observer, A. C. Dark.]

| putation.   | Comp  | e of oscil-   |      | treme scale ;<br>readings.            | np. Ext  | neter Temp.  | Chronor                                     | No. of oscil-<br>lations.           |
|---|---|---|------|---------------------------------------|----------|--|---|-------------------------------------|
| 8. 020  | Observed time of 80 osoil<br>Time of one oscillation<br>Correction for rate | 76. 8.  |      | 7.0 64.0                              |          | 8.<br>23. 0 43. 0<br>26. 8<br>31. 0<br>35. 2<br>39. 4<br>43. 2 43. 0 | h. m.<br>4 24<br>25<br>26<br>27<br>28<br>29 | 0<br>8<br>16<br>24<br>32<br>40      |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                  | f'-6=-10 3  | 10 42. 2<br>42. 7<br>42. 5<br>42. 3<br>42. 2<br>42. 3 |      | 2.0 74.0                              | .0 2     | 05.2 43.0<br>09.5<br>13.5 17.5 22.6<br>25.5 43.0                     | 40  | 80<br>88<br>96<br>104<br>112<br>120 |
| (ar. co.) T <sup>2</sup> 8. 1884<br>M 9. 125<br>m H 9. 125<br>n 8. 844<br>H 0. 2817     | $mH = \frac{\pi^{4}M}{T^{2}}$<br>mH = 0.0696<br>H = 1.013                   | garithms.   | B. L | ge of one scale<br>vision = 3',69     | or. divi | Iean. Differences.   | ient of to                                  | TP                                  |
| tions: Date, September 30<br>Temp. $t = 449.0$<br>$\frac{m}{H} = 8.5023$<br>mH = 9.1258 | Observations of deflects<br>hour, 3.10-4.00 a. m. 3                         | 3. 73399<br>6. 267 <b>61</b>                          |      | = 19'. 9<br>400'+ v'<br>400 (ar. co.) | 5 te=    | 38. 0<br>42. 0<br>31. 5<br>38. 5                                     | 67. 0<br>62. 0<br>51. 0<br>57. 0            | 105 22.0                            |
| m <sup>2</sup> 7, 6881<br>m 8, 8440   |   | 0. 00160  |      | $1+\frac{h}{f}$                       | ,        |  | :<br>อลม <i>v == 5</i> .                    | -                                   |

[Date, October 14, 1882]. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>II</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 19= 10 daily rate, 1-75, gaining on mean time. Observer, A. C. Dark.

| No. of oscil-<br>lations. | Chro           | nometer<br>ime.  | Temp.             | Extres<br>read          | me scale<br>lings.       | Time o |  | Com   | putation.                                  |                                  |
|---------------------------|----------------|--|-------------------|-------------------------|--------------------------|--------|--|---|--|----------------------------------|
| 0<br>8<br>16<br>24<br>32  | 4              | m. s.<br>33 14.0<br>34 17.2<br>35 20.2<br>36 23.3<br>37 27.0 | 10.0              | 28                      | 46                       | 116.   | 4.   | Observed time of 80 uss<br>Time of one oscillation<br>Correction for rate |  | 7. 8809<br>-0. 0002              |
| 40                        |                | 38 30.0  | 11.0              | 27                      | 41                       |        |  |   | -  |                                  |
| 80<br>88<br>96            | 4              | 43 45.0<br>44 48.0<br>45 50.7                                | 11.5              | 22                      | 43                       | 10     | 31. 0<br>30. 8<br>30. 5                        |   | Tr.  | Log'ma.<br>0, 89656<br>1, 79313  |
| 104<br>112<br>120         | 4              | \$6 53.8<br>\$7 56.9<br>\$9 00.1                             | 11. 5             | 26                      | 45                       |        | 30. 5<br>29. 9<br>30. 1                        | <i>t'-t=</i> +0°. 5   | $1 + \frac{h}{f}$ $1 - tt' - t) q$         | 9, 99982                         |
|                           | Mea            | ms   | 11.0              |                         |                          | 10     | 30. 47   |   | Tv2  | 1. 79519                         |
| Coeffic                   | ient of        | torsion.   |                   |                         |                          |        |  | $mH = \frac{\pi^2 M}{T^2}$  | (ar. co.) T <sup>rg</sup> # <sup>2</sup> M | 8. 20481<br>0. 99430<br>9. 94266 |
| Tors. Sc                  | ale.           | Mean.  | Differ-<br>ences. | Value of<br>division    | f one scale<br>on=3'. 69 | - Loga | rithms.  | $m = \frac{1}{T^3}$ $m = 0.0716$  | mH m                                       | 9. 14177<br>8. 85500             |
| 15 - 26, 0                | 45, 0          | 35, 5  |                   |                         |                          | -      |  | H=1.935   | H  | 0. 28677                         |
| 105 45.7                  | 39. 3          | 42. 5  | 7. 00<br>15. 5    |                         |                          |        |  | Observations of deflec-<br>hour, 3h 42m, 5 a. n                           | tions: Date, Octob<br>n. Temp. $t=10.5$    | er 14 ;                          |
| 285 20, 5<br>15 32, 5     | 33, 5<br>37, 0 | 27. 0<br>34. 8   | 7. 76             | v==27<br>5400′<br>5400′ |                          |        | 3. 734 <b>6</b> 3<br><b>6</b> . 26 <b>7</b> 61 |   | . <u>m</u><br>H<br>mH                      | 8, 56823<br>9, 14177             |
| М                         | ean v          | -7, 56   |                   | 1-                      | + h                      |        | 0.00224  |   | $m^2$ $m$                                  | 7. 71000<br>8. 85500             |

[Date. October 31, 1882. Göttingen time. Instrument. theodolite magnetometer. Magnet L<sub>H</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 19m0lt; daily rate, 11.75, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.           |                                 | nometer<br>me.                       | Temp.             |                         | ings.       |      | of oscil-<br>ons.                         | Computation  | 1.                          |  |
|-------------------------------------|---------------------------------|--------------------------------------|-------------------|-------------------------|-------------|------|---|--|-----------------------------|--|
| 0<br>8<br>16<br>24<br>32<br>40      | h. n<br>6 3<br>3<br>3<br>3<br>3 | 5 02.5<br>6 05.8<br>7 09.4<br>8 12.5 | 19.5              | 10                      | 62<br>55, 5 | m.   | 8.  | Observed time of 80 oscillation<br>Time of one oscillation                     |                             | 7. 902<br>-0. 000                          |
| 80<br>88<br>96<br>104<br>112<br>120 | 6 4<br>4<br>4<br>4              | 5 34.7<br>6 38.0<br>7 41.4           | 20. 5             | 21                      | 53          | 10   | 32. 0<br>32. 2<br>32. 2<br>32. 0<br>82. 2 | t'-t=+13.5   | T' 1+h                      | Log'ms<br>0, 89777<br>1, 79540<br>0, 00213 |
| 120                                 |                                 | ns                                   | 21.0              | 25                      | 49          | 10   | 32. 4                                     |  | $1-(t'-t)'q$ $T^2$          | 9, 9994<br>1, 7970                         |
| Coeffic                             | cient of                        | torsion                              |                   | Value of                | one scale   | Loga | rithma.                                   | $mH = \frac{\pi^2 M}{\dot{n}^2}$   | (ar. co.) $T^2$ $\pi^2$ $M$ |  |
| Tors. Sc                            | ale.                            | Mean.                                | Differ-<br>ences. | divisio                 | B := 3'.09  |      |   | m = 0.0712   | mII<br>m                    | 9, 1399<br>8, 8526                         |
| 15 25<br>105 44.4                   | 49<br>45. 2                     | 37. 0<br>44. 8                       | 7. 80             |                         |             |      |   | $H=1.938$ Observations of deflections: Da $4^h$ 27°a.5. Temp. $t=18^{\circ}.5$ |                             | 0, 2873<br>31 : bour                       |
| 285 15, 0<br>15 19, 0               |                                 | 31. 0<br>38. 0                       | 13. 80<br>7. 00   | r == 2<br>5400′<br>5400 |             |      | 3. 73451<br>6. 26761                      |  | m<br>H<br>m H               | 8, 5653<br>9, 1399                         |
|                                     | ean e                           | 7, 15                                |                   | 1                       | + 1         | -    | 0.00212                                   |  | 111 <sup>2</sup>            | 7, 7053<br>8, 8526                         |

636. 83 - 7. 9604 -+0. 0003 P 7. 9607

Log'ms.

T' 0.90095

T'3 1.80190

h 0.90186

f 0.90046

T'2 1.80422

T<sup>1</sup> 8. 19578 π<sup>2</sup> 0. 99436 M 9. 94285 mH 9. 13293 m 8. 84352

H 0.28941
ptember 14;

 $egin{array}{ll} m & 8,55412 \\ \hline H & 9,13293 \\ \hline m^2 & 7,68705 \\ m & 8,84352 \\ \hline \end{array}$ 

ring not used.

8. 0296 ...=0, 0002 T= 8. 0294

 $T' = \begin{bmatrix} \text{Log'ms.} \\ T' & 0.00468 \end{bmatrix}$   $T^2 = \begin{bmatrix} 1.80937 \\ + \frac{h}{f} & 00160 \\ -t) & q = 0.9037 \end{bmatrix}$ 

T<sup>2</sup> 1, 81184 ο.) T<sup>2</sup> 8, 18866 π<sup>2</sup> 0, 99430 M 9 94286

M 9 94286 mH 9, 12582 m 8, 84409

H 0.28173 September 30;

m = 8.56236 mH = 9.12582  $m^2 = 7.68818$  m = 8.84409

[Date, November 14, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet, L.,. Mass ring not used, Chronometer, Bond 188; 18= 28\* fast; daily rate, 1\*.75, losing on mean time. Observer, A. C. Dark.]

| No. of o                     |          |                | onomete<br>time.                                    | Temp.           |                            | ne scale-<br>lings.    |      | of oscil-<br>ions.               | Co   | omputation.           |   |
|------------------------------|----------|----------------|---|-----------------|----------------------------|------------------------|------|----------------------------------|--|-----------------------|---|
| 0<br>8<br>16<br>24<br>32     |          | 6              | m. e.<br>30 15.5<br>31 17.0<br>32 19.0<br>33 20.8   |                 | 21                         | 42                     | m.   | 6.                               | Time of one oscillation  | oscillations          | 7. 7350<br>+0. 0003                                 |
| 40                           |          |                | 34 22.5<br>35 24.4                                  | -20.5           | 21                         | 38                     |      |                                  |  |                       | 7. 735  |
| 80<br>88<br>96<br>104<br>112 |          |                | 40 34.5<br>41 36.1<br>42 37.8<br>43 39.5<br>44 41.2 | -20.5           | 26                         | 39                     | 10   | 19. 1<br>18. 8<br>18. 7<br>18. 7 |  | T'                    | Log'ma<br>0. 8884<br>1. 7769<br>0. 0029             |
| 120                          |          |                | 45 42.9   | -20.0           | 25                         | 36                     | 10   | 18. 5                            |  | 1-(t'-t)q             | 0.0000  |
| Tors.                        |          |                | f torsion   |                 | Value of<br>division       | one scale<br>1 = 3'.69 | Loga | rithms.                          | $t'-t = 0$ $mH = \frac{\pi^2 M}{T^2}$ $m = 0.0724$ $H = 1.982$ | M<br>mU<br>m          | 8, 2201<br>0, 9043<br>9, 9424<br>9, 1568<br>8, 8597 |
| 15<br>105                    | 25<br>36 | 36<br>42. 5    | 30. 5<br>39. 25                                     | 8, 75           |                            |                        |      |                                  | Observations of defi<br>hour, 15 38m. Tem                      | lections: Date, Noven | 0. 2971<br>aber 14                                  |
| 285<br>15                    | 05<br>28 | 34. 0<br>34. 0 | 19. 5<br>31. 0                                      | 19. 75<br>11. 5 | v == 30<br>5400′<br>5400 ( |                        |      | 3. 73536<br>6. 26761             |  | m<br>H<br>mH          | 8, 5626<br>9, 1568                                  |
|                              | Mo       | an v ==        | 10.0  |                 | 1-                         | h                      |      | 0. 00296                         |  | $m^q$                 | 7. 7105   |

[Date, November 30, 1882. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>iji</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 18<sup>m</sup> 15<sup>n</sup>; daily rate, 3<sup>n</sup>.5, losing on mean time. Observer, A. C. Dark ]

| No. of oscil-<br>lations.                     | Chronometer<br>time.   | Temp.                     | Extreme sca<br>readings.                       | le- Time of oscil-<br>lations.                                 | Computation.  |
|---|--|---------------------------|--|--|---|
| 0<br>8<br>16<br>24<br>32<br>40                | h. w. s.<br>6 27 33<br>28 35.5<br>29 37.5<br>30 39.5<br>31 42.0<br>32 44.0 | 0. 0                      | 13 46  | 776. 8.  | State   |
| 80<br>88<br>96<br>104<br>112<br>120           | 6 37 54 5<br>38 57<br>39 59<br>41 01<br>42 03.5<br>43 05.5                 | 0. 0                      | 21 42  | 10 21. 5<br>21. 5<br>21. 5<br>21. 5<br>21. 5<br>21. 5<br>21. 5 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |
|   | Means 0.0  Coefficient of torsion.   |                           | Value of one s<br>division == 3'               | ale Logarithms.  | $T^2$ 1.7821<br>$t^2-t=+4^\circ$ (ar. co.) $T^2$ 8. 2178<br>$t^2$ 0. 6441<br>$t^2$ 1. $t^2$ 1 |
| 15   28<br>105   40<br>285   03<br>15   14, 2 | 40 31.5<br>43 41.5<br>42.5 22.75<br>52.8 33.5<br>an v = 9.88               | 10. 0<br>18. 75<br>10. 75 | r = 36'.5 $5400' + v'$ $5400  (ar. co$ $1 + h$ | 3. 73532<br>6. 26761<br>0. 00293                               | $H=1$ 941 $H=0.2023$ Observations of deflections: Date, November 30 hour, 4 <sup>h</sup> 37.8.5. Temp. $t=-4.0$ $\frac{m}{H}$ 8. 5699 $\frac{m}{H}$ 9. 1547 $\frac{m}{1}$ 7. 7. 445   |

[Date, December 14, 1882. Göttingen time. Instrument, theodollte magnetometer No. 11. Magnet L<sub>ij</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 18<sup>th</sup> 16\*; daily rate, 1\*,75, gaming on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.                      | Chronometer<br>time.   | Temp.                      | Extrem<br>readi               |                | Time of 80 os-<br>cillations.                                  | Con  | putation.  |  |
|--|--|----------------------------|-------------------------------|----------------|--|--|--|--|
| 0<br>8<br>16<br>24<br>32<br>40                 | h. m. s.<br>4 46 34.5<br>47 36.5<br>48 30.0<br>49 41.0<br>50 43.5<br>51 46.0 | -13. 0<br>-13. 0           | 40. 0                         | 60. 0<br>57. 0 | т. г.  | Observed time of 80 os<br>Time of one oscillation<br>Correction for rate | *****************                                | #.<br>623, 25<br>7, 790<br>-0, 600<br>7, 790                   |
| 80<br>88<br>96<br>104<br>112<br>129            | 4 56 57.5<br>58 60<br>59 02.5<br>5 00 04.5<br>01 06.5<br>02 09.0<br>Means    | -13. 0<br>-13. 0<br>-13. 0 | 43. 0                         | 55. 0          | 10 23. 0<br>23. 5<br>23. 5<br>23. 5<br>23. 0<br>23. 0<br>23. 0 | t'-t=0   | $T'$ $1 + h$ $1 - (v - t)q$ $T^2$                | Log'ms<br>0, 8915<br>1, 7831<br>0, 0029<br>0, 0000<br>1, 7860  |
| Para I   | eient of torsion.  | Differ ences.              | Value of division             | one scale      | Logarithms.  | $mH = \frac{\pi^3 M}{T^2}$<br>m = 0.0724<br>H = 1.955                    | (ar. co.) $\frac{T^2}{\pi^2}$ $\frac{1}{M}$ $mH$ | 8, 2130<br>0, 9942<br>9, 9427<br>9, 1507<br>8, 8597<br>0, 2911 |
| 15 43. 7<br>105 44. 5<br>285 34. 0<br>15 43. 0 |  | 10<br>20<br>10             | v == 30<br>5400′ -<br>5400′ ( |                | 3, 78505<br>6, 26761   | Observations of defle<br>hour, 3.45 a.m. Ter                             | etions: Date, Decemp. $t=-13^{\circ}.0$          | nber 14<br>8, 5683<br>9, 1507                                  |
|  | ean v == 10, 0   |                            | 1-                            | h              | 0, 00296   | 1  | $m^{3}$  | 7, 7190<br>8, 8590   |

[Date, January 4, 1883. Göttingen time. Instrument, the odolite magnetometer No. 11. Magnet  $L_{\nu\nu}$  Mass ring not used. Chronometer, Bond No. 188: 189–49 fast; daily rate, 3°, gaining on mean time. Observer, A. C. Park.

| lations            |       | Cii     | tin                        |                           | temp.             | Extreme<br>readin   |           |      | tions.                  | Comp  | utation.                              |                                   |
|--------------------|-------|---------|----------------------------|---------------------------|-------------------|---------------------|-----------|------|-------------------------|---|---------------------------------------|-----------------------------------|
| 0<br>8<br>16<br>24 |       | h.<br>4 | m.<br>28<br>29<br>30<br>31 | 8<br>47<br>50<br>52<br>54 | -12               | 18 ,                | 58        | m.   | 8.                      | Observed time of 80 oscil<br>Time of one oscillation<br>Correction for rate |                                       | 5<br>622, 50<br>7, 781<br>-0, 000 |
| 32<br>40           |       |         | 32<br>33                   | 56, 5<br>58, 5            | -12               | 27                  | 53        |      | :                       |   | T'                                    | 7, 781                            |
| 64<br>84<br>96     |       | 4       | 40                         | (9.5<br>12.0<br>11.5      | -12               | 27                  | 47        | 10   | 22, 5<br>22, 0<br>22, 5 |   |                                       | Log'ms<br>0, 8916<br>1, 7820      |
| 104<br>112<br>120  |       |         | 42                         | 17. 0<br>19. 0<br>11. 0   | . —12             | 29                  | 45        |      | 23 0<br>22 5<br>22 5    | t'-t= -0.5  | $1+\frac{h}{f}$ $1-(t'-t)\frac{f}{f}$ | 0, 0001<br>0, 0001                |
|                    |       |         | 7                          | leans                     | (2                |                     |           | 10   | 22.50                   |   | $T^{\varepsilon}$                     | 1,773                             |
| Co                 | effic | ient    | r-l t                      | orsien.                   |                   | Value of o          | ne scale- |      | ar thms.                | $\pi^2 M$   | (ar. co.) $T^2$<br>$m^2$<br>M         | 8, 2145<br>0, 9,43<br>9, 9405     |
| Tors.<br>ircle.    | Sn    | de.     | 2                          | Mean.                     | Differ-<br>ences. | aive ion            | 3'.69     | Loga | ar thms.                | $m H = \frac{\pi^2 M}{T^2}$ $m = 0.6730$                                    | m 11                                  | 9, 1511<br>8, 8030                |
| 15 2               | 9     | 45      |                            | 37. 0                     |                   |                     | -         |      |                         | H = 1.942   | H                                     | 0, 288                            |
|                    | 5     | 55      |                            | 50.0                      | 13.0              |                     |           |      |                         | Observations of deflection 4 02.5 a.m. Temp. to-                            |                                       | 1; hem                            |
|                    | 8     | 3.)     |                            | 28, 5                     | 21, 5<br>0, 5     | ย 461.<br>54907 ± i |           |      | 3, 73565                | ***************************************                                     | m<br>II<br>m II                       | 8, 5747<br>9, 1514                |
| 15 , 3             | 96    | 40      |                            | 38. 0                     | D. 17             | SHID (a)            | r. co.)   |      | 6, 26761                |   | $m^t$                                 | 7, 7261                           |
|                    |       |         | o = - 11                   |                           |                   | 1+                  | n         | 1    | 0.00326                 |   | 114                                   | 8, 8636                           |

H. Ex. 41---80

t used.

used.

[Date, January 14, 1883. Göttingen time. Instrument, theodelite magnetemeter No. 11. Magnet L<sub>B</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 18° 50°; daily rate, 18.75, losing on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.           | Chronomete<br>time.  | Tomp.            | Extreme<br>reading                    |      | Time of 80 os-<br>cillations.                         | Cor  | aputation.  |  |
|-------------------------------------|--|------------------|---------------------------------------|------|---|--|---|--|
| 0<br>8<br>16<br>24<br>32<br>40      | h. m. s.<br>6 51 32,<br>52 34<br>53 36<br>54 38<br>55 40<br>56 41. |                  |                                       | 59   | 114. 4.   | Observed time of 80 os<br>Time of one oscillation<br>Correction for rate |   | 8.<br>618, 92<br>7, 736<br>+ 0, 600<br>7, 736      |
| 80<br>88<br>96<br>104<br>112<br>120 | 7 01 51<br>02 53<br>C3 55<br>04 57<br>C5 59<br>07 00.              | -30. 0<br>-30. 0 |                                       | 47   | 10 18, 5<br>19, 0<br>19, 0<br>19, 0<br>19, 0<br>19, 0 | t' → t==0. 9   | $\begin{matrix} T' \\ T'^2 \\ 1 + \frac{h}{f} \\ 1 - (t' - t) \end{matrix} q$ | Log'me<br>0, 8885<br>1, 7771<br>0, 0032<br>0, 0000 |
|                                     | Mean:  | ·                |                                       |      | 10 18.92  | $mH = \frac{\pi^2 M}{\pi^2}$   | (ar. co.) T <sup>2</sup>  | 1.7-08<br>8 2190                                   |
| Tuna                                | cient of torsic  |                  | Value of on<br>division :=            |      | Logarithms.   | m = 0.0738   | m H   | 9, 1568<br>8, 86c0                                 |
| 15 30. 5<br>105 27. 3               |  | 10.40            |                                       |      |   | H = 1.942  Observations of defle hour, 6 27.5 a.m. T                     |   | 0 286<br>nrv 11                                    |
| 285   17. 0<br>15   33. 0           | ,  | 11.05            | v = 40°, 7<br>5400° + v°<br>5400 (ar. | co.) | 3, 73565<br>6, 26761                                  |  | m<br>II<br>m II   | 8, 5797<br>9, 1563                                 |
| M.                                  | sin r = 11, 03   |                  | $1 + \frac{h}{c}$                     |      | 0. 00326  |  | $m_3$   | 7, 7360<br>8, 8680                                 |

(Date, January 21, 1881. Gottingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>10</sub>. Mass ting not used Chronometer, Bond No. 188: 19\*\*07\* fast, daily rate, 39.5, gaining on mean time. Observer, A. C. Dark.]

| No. of oscil-<br>lations.                | time.  | t'                      | Extreme scale<br>readings.              | cillations.                                     | Com   | putation.   |   |
|--|--|-------------------------|---|---|---|---|---|
| 0<br>8<br>16<br>24<br>32<br>40           | b = κ,<br>4 36 55<br>57 55 4<br>39 01 0<br>40 03 8<br>41 06 5<br>42 09 6 | ⇒30, 0<br>⇒30, 0        | 17. 0 45. 0                             | m. s.   | Observed time of 80 osc<br>Time of one oscillation<br>Correction for rate |   | 8.<br>627, 65<br>7 ×156<br>-0 0000<br>7, 8456       |
| 80<br>88<br>96<br>104<br>112<br>120      | 4 47 23 6<br>48 26 3<br>49 29.0<br>50 31 5<br>51 35.8<br>52 26.8         | -30.0                   | 26.0                                    | 10 28.0<br>27.9<br>28.0<br>27.7<br>27.3<br>27.0 | t'-t=0.0  |   | Log'ms<br>0, 8946<br>1, 7×92<br>0, 0032<br>0, 0000  |
| 120                                      |  |                         |   | 10 27.65  |   | 1-(v-t) q   | 1. 7924   |
| T  | cient of torsion.  | Differences.            | Value of one scale-<br>division = 3'.69 | Logarithms.                                     | $mH = \frac{\pi^2 M}{T^2}$ $m = 0.0731$                                   | $\begin{array}{c} (\text{ar. co.}) \ \frac{T^2}{\pi^2} \\ M \\ mH \\ v \end{array}$ | 8, 2075<br>0, 9942<br>9, 9424<br>9, 1442<br>8, 8629 |
|  |  |                         |   |   | H = 1.907   | 11  | 0 2803  |
| 15   27, 2<br>105   31, 0<br>285   15, 0 | 56. 0 43. 5<br>30. 0 22. 5   | 12. 3<br>21. 0<br>10. 0 | $r = 40^{\circ}.0$                      | 3, 73560  | Observations of deflections, 4h 17m a.m.; Ten                             | np. t305<br>m<br>H  | н, 5835   |
| 15   30, 0                               | 35.0 32.5  |                         | 5400 (ar. co.)                          | 6. 26761  |   | mH  | 9. 144:   |
| Mı                                       | san v = 10. 83   |                         | $1+\frac{h}{\ell}$                      | 0.00321   |   | 911. <sup>12</sup>  | 7, 7278<br>8, 8639                                  |

[Date, February 14, 1883. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>ij</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 19 31; daily rate, 3.5, gaining on mean time. Observer, A. C. Dark.]

| No. of o<br>lation             |                | Chro           | nom                          | eter  | Te  | mp.          | Extren                 | ings.                  | Time o |                                  | Con   | putation.                                    |  |
|--------------------------------|----------------|----------------|------------------------------|---|-----|--------------|------------------------|------------------------|--------|----------------------------------|---|--|--|
| 0<br>8<br>16<br>24<br>33<br>40 |                | 4              | 47 4<br>48 8<br>49 5<br>50 5 | #,<br>16, 5<br>53, 0<br>56, 0<br>59, 0<br>02, 5 |     | 6. 0<br>6. 0 | 01                     | 78                     | m.     | 8.                               | Observed time of 80 osc<br>Time of one oscillation.<br>Correction for rate    |  | 632. 08<br>7. 9010<br>-0. 0003<br>7. 9007  |
| 80<br>88<br>96<br>104          |                | 5              | 58 3<br>59 3<br>00 3         | 18. 5<br>21. 5<br>25. 0<br>28. 0                | -   | 6. 0         | 18.5                   | 60                     | 10     | 82. 5<br>32. 0<br>32. 0<br>32. 0 | <i>t'</i> − <i>t</i> =+2°. 0  | T' 1+ h                                      | Log'ma<br>0, 80707<br>1, 79533<br>0, 00300 |
| 112<br>120                     |                |                |                              | 31. 0<br>34. 5                                  | -   | 6. 0<br>6. 0 | 20. 2                  | 52. 2                  | 10     | 32. 0<br>32. 0<br>32. 08         |   | $1 - (t' - t) q$ $T^{q}$                     | 9, 9902<br>1, 7975                         |
| (                              | Conflic        | ient o         | f tor                        | rsion   |     |              |                        |                        | 1      |                                  | $mH = \frac{\pi^2 M}{\pi^2}$  | (ar. co.) $\frac{T^2}{\pi^2}$ $M$            | 8, 2024<br>0, 9943<br>9, 9425              |
| Tors,<br>circle.               | 8c             | ale.           | Me                           | Pap.  | Dif | fer-         | Value of<br>division   | one scale<br>n = 3'.69 | Loga   | rithms.                          | m=0.0711  | m H<br>m                                     | 0. 1392<br>8. 8518                         |
| t                              | 20. 2<br>43. 0 | 50. 2<br>50. 0 | 1                            | 5. 2  |     | . 8          |                        |                        |        |                                  | H=1.938  Observations of deflections, 4 <sup>k</sup> 20 <sup>m</sup> a.m.; Te | tions: Date, February, $\ell = -8^{\circ}$ . | 0. 2874<br>nary 14                         |
|                                | 16. 0          |                | 27                           | 7. 9  |     | . 6<br>. 6   | v=37<br>5400′-<br>5400 |                        |        | 8. 73539<br>6. 26761             |   | т<br>П<br>т И                                | 8, 5644<br>9, 1392                         |
| -                              |                | ean r=         |                              |   |     |              |                        | + h                    |        | 0. 00800                         |   | $m^2$  | 7. 7037<br>8. 8518                         |

it used

[Dute, February 28, 1883. Göttingen time. Instrument, theodolite magnetomater No. 11. Magnet L., Mass ring not used Chronometer, Bond No. 188; fast 290; daily rate, 38.5, gaining on mean time. Observer, A. C. Dark.]

| lations.                            | Chi    | tim                              |  | temp.             | Extrem               |                               | cillat |  | Com  | putation.                              |   |
|-------------------------------------|--------|----------------------------------|--|-------------------|----------------------|-------------------------------|--------|--|--|--|---|
| 0<br>8<br>16<br>24<br>32<br>40      | h. 4   | m. 44<br>45<br>46<br>47<br>48    | 8.<br>23. 0<br>25. 5<br>28. 5<br>30 5<br>33 0<br>36. 0 | 13. 0             | 1.0                  | 56. 0<br>47. 0                | 976.   | 8.   | Observed time of 80 osc<br>Time of one oscillation.<br>Correction for rate |  | 7.810   |
| 80<br>58<br>96<br>104<br>112<br>120 | 4      | 54<br>55<br>56<br>57<br>58<br>00 | 48. 9<br>50. 5<br>53. 0<br>55. 5<br>58. 9<br>00. 5     | -13. <b>0</b>     | 7. 0                 | 42. 0<br>42. 0                | 10     | 25. 0<br>25. 0<br>24. 5<br>25. 0<br>25. 0<br>24. 5 | t'-t=+0.5  | $T'$ $1 + \frac{h}{f}$ $1 - (t' - t)g$ | Log'n<br>0, 8920<br>1, 7853<br>0, 0021<br>9, 9998 |
| Coeff                               | icient |                                  | feans<br>orsion.                                       |                   |                      |                               | 10     | 24. 83   |  | $T^3$ (ar. co.) $T^2$                  | 1. 7872<br>8. 2127<br>0. 9943                     |
|                                     |        |                                  | dean.  | Differ-<br>ences. | Value of<br>division | f <b>one</b> scal<br>m =31.69 | Log    | withms.  | $mH = \frac{\pi^2 M}{\hat{T}^2}$ $m = 0.0725$                              | <i>M mH m</i>                          | 9, 9425<br>9, 1495<br>8, 6604                     |
| 15   11. 5<br>105 - 12. 0           |        |                                  | 26. 75<br>23. 0  | 3.75<br>12.00     | 10.004.000           |                               |        |  | H - 1.946  Observations of deflects 4.15 a. m. Temp. t.                    |  |   |
| 285 02. 6<br>15 16. 5               |        |                                  | 11. 0<br>23. 75  | 12.75             | n 9<br>5400<br>5400  |                               |        | 3, 73450<br>6, 26761                               |  | m<br>H<br>m H                          | 8, 5711<br>9, 1495<br>7, 7208                     |
| _                                   | dean i |                                  |  |                   | 1.                   | + <sup>h</sup>                |        | 0.00211  |  | 171                                    | 8, 8601   |

[Dute, Marc't 14, 1873. Göffungen time. Instrument, the additive magnetometer No. 11. Magnet L<sub>in</sub>. Mass ring not used. Chronomater. Bond No. 1884, fast 208-415.5; daily rate, 19.5, gaining on mean time. Observer, A. C. Dark.]

| of ose<br>tions.         |           |      | oricte<br>me.                           | r Temp  | Extre   | me seale .<br>diugs. | Time o<br>cillat | t so os-                         | Com  | putation.                                 |   |
|--------------------------|-----------|------|---|---------|---------|----------------------|------------------|----------------------------------|--|---|---|
| 0<br>8<br>16<br>14<br>32 | h 5       | 17   | 3 37. 0<br>7 30 0<br>8 41. 5<br>9 45. 6 |         |         | 43. 0                | m.               | e                                | Observed time of 80 asc<br>Time of the oscillation.<br>Correction for rate |   | 6:0 42<br>7, 1678<br>-0, 0001<br>7, 8077    |
| 40                       |           | 13   | 61.5                                    | -8.0    | 26. 5   | 38, 0                |                  |                                  |  |   |   |
| 80<br>1.8<br>90          | 5         | 11   | 0.0, 0                                  |         | 35. 0   | 28. )                | 16               | 29. 5<br>30. 0<br>30. 5<br>29. 5 |  | T'4 1+ h                                  | Log ms.<br>0. 89555<br>1. 79170<br>0. 00224 |
| 112                      |           | 31   | 17.0                                    | 1       | 30. 0   | 35. 0                |                  | 29. 0<br>28. 0                   | t'-t = -5, 0   | 1-11-119                                  | 0.0018                                      |
| 120                      |           |      | Means                                   |         | _       |                      | 10               | 29, 42                           |  | $T^{3}$                                   | 1.7957                                      |
| Co                       | oofficien | t of | torsio                                  | а.      | Value o | f one scale          |                  | :                                | $mH = \frac{\pi^2 M}{T^2}$   | (ar. co.) T <sup>2</sup> # <sup>2</sup> M | 0, 9043                                     |
| s,<br>le.                | Scale.    |      | Mean                                    | Differ- | divisi  | on == 3',69          | Loga             | rithms.                          | m = 0.0725   | m H<br>m                                  | 8, 8601                                     |
|                          |           |      |   |         |         |                      |                  |                                  | H = 1.910  | II  | 0, 5F00                                     |
| 15                       | 30 35     |      | 32.5                                    | 6, 0    |         |                      | 1                |                                  | Observations of deflect<br>4.55 g.m. Temp. t=                              | ions: Date, March                         | 14; hos                                     |
| 05                       | 84   43   |      | 38.5                                    | 15.0    | 1       |                      |                  |                                  |  | m   | B. 570%                                     |
| R5                       | 14 33     | -    | 23. 5                                   | 9, 25   |         | ' + v'               |                  | 3. 73463                         |  | n H                                       | 9. 1411                                     |
| 15                       | 29 36     | 5    | 32. 75                                  |         | 5400    | (ar. eo.)            |                  | 6, 26761                         |  | m²  |   |
|                          | Mean      | 1    | -                                       |         | 1       | + h                  | ,                | 0.00224                          |  |   | 8, 5001                                     |

[Date, March 31, 1883. Göttingen time. Instrument theodolite magnetometer No. 11. Magnet, L<sub>ov.</sub> Mass ring not used. Chronometer, Bond No. 188; fast, 21= 32; daily rate, 5; gaining on mean time. Observer, J. C. Maxfield.]

|  |          |                            |   |                   |                         |                          |                  |  |  |   | -                             |
|--|----------|----------------------------|---|-------------------|-------------------------|--------------------------|------------------|--|--|---|-------------------------------|
| No. of oscil-<br>lations.              | Ch       | rono<br>tim                |   | · Temp.           | Extren<br>read          | ie scale<br>ings.        | Tim - c<br>cilla | f 100 cs-<br>1.0100                                | Compi  | station.  |                               |
| 0<br>10<br>20<br>31                    | h<br>4   | 45<br>46<br>48<br>49<br>50 | 28. 5<br>48. 5<br>(7. 5<br>33. 0<br>52. 5 | 21. 5             | 13.0                    | 45. 4                    | n.               | 8.   | Observed time of 100 oscil<br>Time of one oscillation<br>Correction for rate |   | 795, 92<br>7 9502<br>-0 10° 7 |
| 100<br>110<br>120<br>131<br>141<br>151 | 5        | 58                         | 2 t. 0<br>49, 5<br>09, 0                  | 21. 0<br>20. 5    | 18. 0<br>24. 0<br>29. 8 | 41. 0                    | 13               | 15, 5<br>15, 0<br>15, 5<br>16, 5<br>16, 5<br>16, 5 | v - t = -5.25  | $1 - \frac{T^2}{1 + \frac{h}{h}}$ $1 - (t' - t) \eta$ | 0, 00159                      |
|  |          |                            | Means                                     | 20.75             |                         |                          | 13               | 15, 92   |  |   | 8, 19618<br>0, 66430          |
| Tors. Sc                               | ale.     |                            | mean.                                     | Differ-<br>ences, |                         | f one scale<br>n = 27 69 | · Log            | arithm .   | $mH = \frac{\pi^2 M}{T_+}$<br>m = 0.0701<br>H = 1.945                        | . m.H<br><br><br>                                     | 9 13403                       |
| 133 29.4<br>223 37.6                   | 38       |                            | 34. 1<br>30. 0                            | 5. 9              |                         |                          |                  |  | Observations of deflection 3.57 a.m., by Bond No.                            | us: Date, March 1<br>188. Temp. t . 15                | 31; hour,                     |
| 43 22.8                                | 36<br>54 | . 4                        | 20. 6<br>34. 6                            | 10 4<br>5. 0      | r == 1<br>540e²<br>5400 |                          |                  | 3, 73298<br>6 26761                                |  | т<br>И<br>т.И   | 5, 55676<br>9, 13463          |
|  |          | r=:                        |   |                   |                         | + 4                      |                  | 0. 00139   |  | $m^2$   |                               |

#### EXPEDITION TO POINT BARROW, ALASKA.

#### Magnetic observations at Uglaamie, Alaska-Continued.

[Date, April 14, 1883]. Göttingen time. Instrument, the adolite magnetometer No. 11. Magnet Lo. Mass ring not used. Chronometer, Bond No. 188; fast, 22m 20m daily rate, 5, 25, gaining on moan time. Observer, A. C. Dark.]

ned.

57920 . 14110 . 72030 . 86015

not used.

Log 198-0, 1634 1,80168 0,00159 0,00159 1,10521 1,10521 1,10521 0,10530 0,10530 0,10530 1,1053 1,10

| No. of esell-            | Chro   | non            |                                  | Temp.          | Extreme scale readings.                | Tiv-       | 028.           | Computa  | tion.   |   |
|--------------------------|--------|----------------|----------------------------------|----------------|--|------------|----------------|--|---|---|
| 0<br>8<br>16<br>24<br>32 | 4      | 53<br>54<br>55 | #,<br>57, 0<br>01, 0<br>05, 0    | 23.0           | 20, 8 50, 0                            | $\eta_1$ . | 8.             | Observed time of 80 oscillat<br>Time of one oscillation<br>Correction for rate |   | #.<br>539, 50<br>7, 9931<br>0, 0000     |
| 40                       |        |                | 12. 5<br>16. 6                   | 22.0           | 34.0 48.5                              |            | ì              |  | 1' -  | (. yan                                  |
| 80<br>88<br>90<br>104    |        | 03<br>04       | 36, 0<br>40, 0<br>44, 0<br>48, 0 | 22. 0          | 36.0 48.0                              | 10         | 39<br>39<br>39 | t'-t=-2°   | T's 1+h   | Log'ms<br>0, 9027<br>1, 8054<br>0, 0003 |
| 112<br>120               |        | 06             | 52. 5<br>57. 0                   | 21. 0          | 38. 2 47. 0                            |            | 40             |  | 1 - (t' - t) q                                      | 0, 0007                                 |
| 1                        |        | Me             | ana                              | . 22.0         | "                                      | 10         | 39. 50         |  | $T^3$   | 1.806/                                  |
| Coeffic                  | ient o | ľ to           | rsion.                           | ,              |  |            | 1              |  | (ar. co.) T <sup>2</sup> <sup>π<sup>2</sup></sup> M | 8, 1934<br>0, 944<br>9, 942             |
| Tors. Ser                | ıle    | м              | n 11                             | Differ-        | Value of one scale<br>division = 3',69 | Log        | nrithma.       | $mH = \frac{\pi^2 M}{\tilde{T}^2}$ $m = 0,0600$                                | m II  | 9. 130<br>8. 839                        |
|                          |        | _              | _                                |                |  |            |                | H = 1.056  | H   | 0.291                                   |
| 249 38.2<br>159 38.9     | in 0   |                | 1.05                             | 1, 55          |  |            |                | Observations of deflections<br>4.40 a.m., by Bond No. 188                      | Date, April 1<br>Temp. l= 24                        | 4; hou                                  |
| 389   41                 | 40.8   |                | 4, 05                            | 3, 00<br>0, 65 | n = 4'.8<br>5400' + n'                 |            | 3, 73278       |  | m<br>11   | 8. 547                                  |
| 249 41 8                 | 45. 1  | -              | 0. 10                            | 51 (1)         | 5400 (ar. co.)                         |            | 6. 26761       |  | m H   | 9. 130                                  |
|                          | 11)    | 1.3            | 20                               |                | $1 + \frac{h}{c}$                      |            | 0. 00039       |  | m <sup>2</sup>                                      | 7. 678<br>8. 839                        |

[Date, April 30, 4813]. Göttlagen time. Instrument, theodolife magnetometer No. 11. Magnet, L<sub>m</sub>. Massering not used. Chro-non-cier, Bond No. 1881; first 23% 30% daily rate, gaining 58.0 on mean time. Observer, A. G. Dark.]

|  |                | ometer<br>me.            | Temp.        | Extrem<br>readi     | io scale<br>ings. | Time of<br>cillation |                  | Co  | mputation.  |  |
|--|----------------|--------------------------|--------------|---------------------|-------------------|----------------------|------------------|---|---|--|
| 0<br>8<br>16<br>24                       | 1              | 3 52. 0<br>4 56. 0       | 26, 0        | 26. 0               | 47. 5             | m.                   | ø.               |   | scillations   | g,<br>640, 00<br>E, 0000<br>←0, 0000                               |
| 32<br>40                                 | 5<br>5         | 7 04.0                   | 26, 0        | 27.5                | 44                |                      |                  |   | T =   | 7, 999;<br>Logines   |
| 86<br>88                                 | 5 0            |                          | 29 0         | 29. 0               | 42.5              | 10                   | 40, (0           | 0   | T'  | 0, 9030  |
| 96                                       | 0.             | 5 36.0                   |              |                     |                   |                      | 40.60            | t'-t=0.0  | $T^{c_2}$   | 1. 80613   |
| 104<br>112                               | 0              | 7 44.0                   |              |                     |                   |                      | 40. 00<br>40. 00 |   | 1+ h  | 0, 6005  |
| 120                                      | 0              | 8 48.0                   | 26, 0        | 30.0                | 40.8              |                      | 40.00            |   | 1-(t' t) q  | 0,000  |
|  | 1              | Means                    | 26.0         |                     |                   | 10                   | 40.00            |   | P4  | 1, 806:  |
|  |                |                          |              |                     |                   |                      |                  |   |   |  |
| coefficient of                           | torsion        | . Value                  | of one se    | ale divisi          | ion == 3'.t       |                      |                  |   |   | 0.9941   |
| Coefficient of                           | torsion        | . Value                  | of one se    | ale di <b>vi</b> si | ion == 3'.t       |                      | ithms.           | $mH = \frac{\pi^{\gamma}M}{T^{I}}$ $m = 0.0090$ | π2  | 9, 941.7<br>9, 1303  |
| Tors. G.                                 |                |                          | Differ-      | ale di <b>vi</b> si | ion == 3'.€       |                      | rithms.          | 4 '   | $\frac{\pi^2}{M}$ $mH$ $m$  | 0.9941.7<br>9.941.7<br>9.1303<br>8.8390                            |
| Tors. Scircle. Sc                        | cale.          |                          | Differences. | ale divisi          | ion == 3′.€       |                      |                  | m = 0.0090 $Hz = 1.95$                          | m II  m  II  dections: Date, April (  | 0, 9941.7<br>9, 941.7<br>9, 1303<br>8, 8390<br>0, 2913             |
| Tors. Scircle. Scircle. 185 30.0 95 29.5 | 40. 8          | Mean.<br>35. 4           | Differences. | nle divisi          |                   |                      |                  | m = 0.0090  H=. 1,95)  Observations of defi     | m II  m  II  dections: Date, April (  | 0 994; 7<br>9, 94; 7<br>9, 1303;<br>8, 8390<br>0, 2913<br>30; hour |
| Tors. Scircle. Scircle. 185 30.0 95 29.5 | 40. 8<br>37. 6 | Mean.<br>35. 4<br>33. 55 | Differences. | n=. 6<br>5400'      | . 8               | Logar                |                  | m = 0.0090  H=. 1,95)  Observations of defi     | $\begin{array}{c} \pi^2\\ M\\ mH\\ m\\ M\\ \end{array}$ (ections: Date, April 5<br>o, 188.   Tamp, $t=26$ . | 0, 9941.7<br>9, 941.7<br>9, 1303<br>8, 8390<br>0, 2913             |

[Date, May 14, 1883. Göltingen time. Instrument, thesdolite magnetometer No. 11. Magnet, Lin. Mase ring not used. Chronometer, Bond No. 188, 23%:20° fast, daily rate, 30.5, losing on mean time. Observer, A. C. Dark.]

| No of osell-<br>lations.                        | Chro           | ime                        |   | Temp.            |            | no scale<br>lings. | Time of<br>cillati |                                  |  | Computation.   |  |
|---|----------------|----------------------------|---|------------------|------------|--------------------|--------------------|----------------------------------|--|--|--|
| 0<br>8<br>16<br>24<br>32<br>10                  |                | 55<br>56<br>57<br>58<br>59 | 23<br>23<br>26<br>30<br>33, 5             | 35. 0            | 12         | 30                 | m.                 | •.                               | Observed time of<br>Time of one oscil<br>Correction for ra | llation  | 8.<br>634, 92<br>+ 7 9365<br>+ 0. 0003<br>7, 9368                                    |
| 80<br>83<br>96<br>104<br>112                    |                | 06<br>07<br>09<br>10       | 50<br>53<br>57<br>61, 5<br>65, 5<br>69, 0 | 35. 0            | 16         | 25.8               | 10                 | 35<br>34<br>34<br>35, 5<br>35, 5 | t'−t=0.0   | $T'$ $1 + \frac{h}{f}$ $1 - (t'-t) \cdot g$  | 1. 79929<br>0. 00037<br>0. 00000   |
| 120   |                |                            | 00,0                                      | 1101 0           | 2010       | 1                  |                    | 1,5471 49                        |  | 1-(v-t)q   | 01 00000   |
|   |                | M                          | e#1134                                    | 35. 0            |            |                    |                    | 34. 93                           |  | $T^{q}$  | 1. 79966   |
| oefficient of                                   | torsio         | M<br>n.                    | eans<br>Value                             | 35. 0 of one sca |            |                    |                    | 34. 93                           | $mH = \frac{\pi^2 M}{T^2}$                                 |  | 1, 79906<br>8, 20034<br>0, 99430<br>9, 94281<br>0, 13746                             |
| oefficient of                                   |                | M<br>n.                    | e#1134                                    | 35. 0            |            |                    | 0                  | 34. 93                           | 173. / /   | Ti<br>(ar. co.) To<br>ma<br>M  | 1, 79966<br>8, 20034<br>0, 99436<br>9, 9428  |
| ors. Sci  | torsion        | M<br>n. M                  | eans<br>Value                             | 35. 0 of one sca |            |                    | 0                  | 34. 93                           | mit="Te  | T <sup>3</sup> (ar. co.) T <sup>3</sup> n <sup>3</sup> M  n H  | 1, 7996<br>8, 2003<br>0, 9943<br>9, 9428<br>0, 1374<br>8, 8432                       |
| ors. Sci<br>200 - 19.0                          | torsio         | M<br>n. '                  | eans<br>Value                             | 35. 0 of one sea |            |                    | 0                  | 34. 93                           | mH = 7;<br>m = 0.697<br>H = 1,969                          | T <sup>4</sup> (ar. co.) T  T  M  m H  | 1, 7996<br>8, 2003<br>0, 9943<br>9, 9428<br>0, 1374<br>8, 8432<br>0, 2941<br>14; hou |
| ors. Sci<br>290 19.0                            | torsionale.    | M<br>n. 1<br>M             | cans<br>Value<br>can.                     | 35. 0 of one sea | ale divis  | ion == 3'.0        | Lioguar            | 34. 93<br>rithma.                | mH = 7;<br>m = 0.697<br>H = 1,969                          | (ar. co.) T <sup>o</sup> (ar. co.) T <sup>o</sup> m  m  m  m  m  f deflections: Date, May  | 1, 7996<br>8, 2003<br>0, 9943<br>9, 9428<br>0, 1374<br>8, 8432<br>0, 2941<br>14; hou |
| ors. Sci<br>200 - 19.0<br>200 - 12.0<br>20 14.0 | 23. 0<br>28. 5 | M                          | eans<br>Value<br>ean.<br>1. 0             | 35. 0 of one sea | nle divisi | ion == 3'.0        | Lioguar            | 34. 93                           | mH = 7;<br>m = 0.697<br>H = 1,969                          | $T^{u}$ (ar, co.) $T^{u}$ $T^$ | 1,7990<br>8,2003<br>0,9943<br>9,9428<br>0,1374<br>8,8432<br>0,2941<br>14; hou        |

[Date, May 31, 1883]. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet L<sub>ii</sub>. Mass ring not used. Chronometer, Bond No. 188; fast 23= 43°, daily rate, 3°.5, gaining on mean time. Observer, A.C. Dark.]

| No. of oscil-<br>lation  |                  | ometer<br>ne.                                       | Temp.          | Extrem                  |           | Time o |                                  | Computation.   |  |
|--------------------------|------------------|---|----------------|-------------------------|-----------|--------|----------------------------------|--|--|
| 0<br>8<br>16<br>24<br>32 | h. m             | 2 17. 0<br>3 21. 0<br>4 25. 0<br>5 29. 0<br>3 33. 0 | 39, 5          | 41. 3                   | 52.0      | m.     | a.                               | Time of one oscillation  | 8. 0812<br>0. 0003<br>8. 0809                            |
| 10                       | 4                | 37, 0   | 39, 5          | 44. 0                   | 53. 0     |        |                                  |  |  |
| 80<br>88<br>96<br>104    | 5<br>5<br>5<br>5 | 1 07.0<br>5 11.0<br>8 15.5                          | 40.0           | 39. 0                   | 51. 0     | 10     | 46. 0<br>46. 0<br>46. 0<br>46. 5 | r-t=1°   | og'ms.<br>). 90746<br>1. 81492<br>). 00031               |
| 112<br>120               | 5                |   | 10. 0          | 40. 1                   | 54. 2     |        | 47. 0<br>47. 5                   | · · · · · · · · · · · · · · · · · · ·  | 0.00037  |
|                          |                  | Means   | 39.75          |                         |           | 10     | 46. 50                           | $T^2$  | . 81560  |
| Coefficient or           |                  | Value<br>Mean.                                      | Of one sea     | de-divisi               | on = 3'.6 |        | rithms.                          | $mH = rac{\pi^2 M}{T^2}$ $m = 0.0682$ $m = 0.0682$  | 3, 18440<br>0, 99430<br>0, 94284<br>0, 12154<br>3, 83400 |
| 258 40.1                 | 54. 2            | 47. 15  |                |                         |           |        |                                  |  | ). 28754   |
|                          | 48.0             | 46.10   | 1. 05          |                         |           |        |                                  | Observations of deflections: Date, May 31; her a. m.; by Bond, No. 188. Temp. $t=:40^{\circ}.75$ | ır, 4.15   |
| 348 44.6                 | 51.2             | 47. 90<br>46. 65                                    | 1. 80<br>1. 25 | v=3:<br>5400'<br>5400 ( |           |        | 3. 73270                         | mH 9   | 0.54647<br>0.12154                                       |
|                          |                  |   |                | 1-                      | h         |        | 6. 26761                         |  | . 66801<br>. 83400                                       |
| M                        | ean r=           | 1.03  |                | 1-                      | 1         | 1      | 0.00031                          | m e  | . 03400  |

#### Magnetic observations at Uglaamie, Alaska-Continued.

[Date, June 14, 1883. Göttingen time. Instrument, the delite magnetometer No. 11. Magnet L<sub>iji</sub>. Mass ring not need. Chronometer, Bond No. 188, fast 24=21-5; daily rate, 1-75, gaining on mean tim. Observer, A. C. Dark.]

| No. of oscil-<br>lations.           | Chrone                                 |   | Temp.          | Extreme scale<br>readings.           | Time of<br>cillati | 80 oa-   | Com  | putation.  |   |
|-------------------------------------|--|---|----------------|--------------------------------------|--------------------|--|--|--|---|
| 0<br>8<br>16<br>24<br>32<br>40      | \$\hbar{h}\$. \$m\$. 47 48 49 50 51 52 | 8,<br>10, 0<br>14, 5<br>10 0<br>24, 0<br>20, 0<br>34, 0 | 43. 0          | 13. 0 30. 0<br>13. 2 33. 0           | 901 .              | A.   | Observed time of 80 os<br>Time of one oscillation<br>Correction for rate | T  | #.<br>648. 00<br>8. 1000<br>0. 0003                 |
| 80<br>88<br>96<br>104<br>112<br>120 | 4 57 59 5 60 01 02 03                  | 58. 0<br>03. 0<br>07. 0<br>12. 0<br>17. 0<br>21. 5      | 43. 0<br>43. 0 | 16, 5 21, 5                          |                    | 48. 0<br>48. 5<br>48. 0<br>48. 0<br>48. 0<br>47. 5 | $t' - t = +1^{\circ}$  | $T'$ $1 + \frac{h}{f}$ $1 - (t' - t)q$ $T''$     | 1. 8169<br>0, 0008<br>0, 0008<br>0, 0008<br>1, 8169 |
| Cors. Scr                           | ī                                      | Value   | of one aca     | alo-division = 3'.6                  | Logar              | ithus.   | $mH = \frac{\pi^2 M}{f^2}$ $m = 0.0676$                                  | (ar. co.) $\frac{T^2}{\pi^2}$ on $mH$            | 8, 183<br>0, 994<br>9, 942<br>9, 120<br>8, £50      |
| 260 16.2                            | 27. 8                                  | 32. 0<br>20. 2  | 1.8            |                                      |                    |  | H=1.951 Observations of deflect 4.32.5 a.m., by chrone t=42°.            | II<br>tions: Date, June 1<br>ometer Bond No. 188 | 0, 290;<br>4; hou<br>l. Tenj                        |
| 50 18.3<br>260 18.3                 | 27. 7<br>27. 5                         | 23, 0<br>22, 9  | 0.1            | v=4'.4<br>5400'+v'<br>5400 (ar. co.) |                    | . 73275<br>. 26761                                 |  | m<br>H<br>m H                                    | 9, 539<br>9, 120<br>7, 660                          |
| M                                   | an r= 1.                               | 18  |                | $1+\frac{h}{f}$                      |                    | . 00036  |  | 921 <sup>12</sup>                                | 8, 830  |

014. 965-

Chro

[Date, June 30, 1883. Göttingen time. Instrument, theodolite magnetometer No. 11. Magnet 1<sub>m</sub>. Mass ring not used. Chronometer, Bond No. 188; 28° 53° alow; daily rate, 4.0 gaining on mean time. Observer, A. C. Dark.]

| No. of c<br>lation    |                |        | ime             | noter                                  | Temp.          | Extre | me scale<br>lings.        | Time e | f 80 os-<br>ions.            | C                       | omputation.                                   |                                  |
|-----------------------|----------------|--------|-----------------|--|----------------|-------|---------------------------|--------|------------------------------|-------------------------|---|----------------------------------|
| 0<br>8<br>16<br>24    |                | 3      | 51<br>52<br>53  | 8.<br>44. 5<br>49. 5<br>54. 5<br>59. 5 | 52. 0          | 19. 7 | 41.1                      | m.     |                              |                         |   | 8. 139<br>-0, 000                |
| 32<br>40              |                |        |                 | 04. 5<br>09. 5                         | 52. 0          | 22. 5 | 33. 5                     |        |                              |                         | T   | 8, 1396                          |
| 80<br>88<br>96<br>104 |                | _      | $\frac{02}{03}$ | 85. 5<br>40. 5<br>45. 5<br>50. 5       | 52. 0          | 19. 5 | 42.0                      | 10     | 51 0<br>51.0<br>51.0<br>51.0 |                         | T° 2  |                                  |
| 112<br>120            |                |        | 05              | 56. 0<br>01. 0                         | 52. 0          | 19. 3 | 41. 2                     |        | 51. 5<br>51. 5               | t'-t=10                 | $1 + \frac{h}{f}$ $1 - (t'-t) q$              | 0. 0003                          |
|                       |                |        | M               | eans                                   | 52. 0          |       |                           | 10     | 51. 17                       |                         | $T^2$   | 1. 8221                          |
| (                     | Coeffici       | ient o | f to            | rsion.                                 |                | -     |                           |        |                              | $mH=\frac{\pi^2M}{T^2}$ | (ar. co.) $T^2$<br>$\pi^2$                    | 8, 1778;<br>0, 99456<br>9, 9429; |
| Tors.                 | Sea            | ıle.   | М               | lean.                                  | Differ-        |       | f one scal-<br>on = 3'.69 | Loga   | rithme.                      | m = 0,0665              | $mH \atop m$                                  | 9. 11508<br>8. 82303             |
|                       |                |        |                 |  |                |       |                           | -      |                              | H = 1.959               | H   | 0. 29203                         |
| 130                   | 18. 0<br>20. 5 |        | 1               | 30. 5<br>2. 85                         | 2, 35          |       |                           |        |                              |                         | ections: Date, June :<br>d, No. 188. Temp. t= |                                  |
| 310                   | 15. 0          | 42. 0  |                 | 28. 5                                  | 4. 35<br>1. 90 | v=7   | ′. 9<br>′-⊦- •′           |        | 3. 73303                     |                         | $m \\ H$                                      | 8, 53100                         |
| 40                    | 19.7           | 41. 1  |                 | 30.4                                   | 1. 50          |       | (ar. co.)                 |        | 6. 26761                     |                         | mH  | 9, 11502                         |
|                       | Mes            | an v=  | 2. 1            | '<br>lâ                                |                | 1 -   | $+\frac{h}{f}$            |        | 0.00064                      |                         | m²<br>m                                       | 7, 64600<br>8, 82302             |

# Magnetic observations at Uglaamie, Alaska-Continued.

[Date, July 14, 1883. Göffingen time. Instrument, the dollie magnetometer No. 11. Magnet L<sub>iv</sub>. Mass ring not used. Chronometer, Bond No. 188, 28-07 slow, daily rate, 3-0, gaining on mean time. Observer, A. C. Dath.]

| No. of oscil-<br>lations,           | Chro   | nometer<br>inse.   | Temp.          | Extreme scalo<br>resdings. | Time of 80 os-<br>ciliations.                | Computs  | tion.   |
|-------------------------------------|--------|--|----------------|----------------------------|--|--|---|
| 0<br>8<br>16<br>24<br>32<br>49      |        | 99. 8.<br>14 14<br>15 10.5<br>16 25.0<br>17 30.5<br>18 35.5<br>19 41 | 80. 0<br>83. 0 | 18, 0 43, 0<br>24, 0 41, 0 | 976. 8.                                      | Observed time of 80 oscillat<br>Time of one oscillation<br>Correction for rate | 5. 10≻8<br>   |
| 80<br>88<br>96<br>104<br>112<br>120 |        | 25 08<br>26 19.5<br>27 18.5<br>28 23.5<br>29 29.0<br>30 34.0         | 53. 0<br>53. 0 |                            | 10 54. 0<br>54. 0<br>53. 5<br>53. 0<br>53. 5 | . $t'-t=0.0$   | $T = \begin{bmatrix} \text{Log/ins.} \\ 0.01214 \\ \hline T^3 & 1.82428 \\ 1+\frac{h}{f} & 0.00061 \\ 1-(t'-t) & q & 0.00000 \end{bmatrix}$ |
|                                     |        | Means  | 53. 0          |                            | . 10 53, 50                                  |  | T <sup>2</sup> 1, 82489<br>(ar. co.) T <sup>2</sup> 8, 17511  |
| Coeffic                             | ient o | f torsion.   |                | Value of one sea           | le Locarithne                                | $mH = \frac{\pi^2 M}{T^2}$   | $\frac{\pi^4}{M} = 0.03470$<br>M = 0.04202  |
| Fors. Sc                            | ale.   | Mean.  | Differ-        | division 3'.69             | Logaritonos                                  | m = 0, 0675  | m H   0, 11230<br>m   8, 82957  |
| irele.                              |        |  | ella est       |                            |  | H = 1.918  | H = 0, 2e270  |
| 120 31.0                            | 41.0   | 36, 0  | 2.1            |                            |  | Observations of deflections<br>3h 50m a. m., by Bond, No.                      |   |
| 210   36.8                          | 39, 4  | 38.1   |                |                            |  | 5" 50" a. m., oy boad, 20.   | tee. renific our.o  |
| 30 32.2                             | 36. E  | 34. 5  | 3. 6           | v 7'.6                     |  |  | H 8,54(7)   |
| 120 33.8                            | 40. 2  | 37. 0  | 2. 5           | 5400 (ar. co.)             | 3, 73100<br>0, 267 <b>61</b>                 |  | mH 9, 1123  |
| M                                   | ean ø= | 2.05   | 1              | 1+1                        | 0.00061                                      |  | m <sup>2</sup> 7, 6590<br>m 9, 8195   |

[Date, July 31, 1983. Gottingen time—Instrument, the cololite magnetometer No. 11. Magnet, Lo. Masse ting not used. Chronometer, Bond No. 188. slow 27% 15, 5% daily rate, 4%, gaining on mean time. Gioserver, A. C. Dark.]

| No. of oscil-<br>lations. | Chi     | 1 in                       | meter<br>c.                      | Temp.          | Extreme scale<br>readings.              | Time of 80 os-<br>cillations.    | Computation.  |                                  |
|---------------------------|---------|----------------------------|----------------------------------|----------------|---|----------------------------------|---|----------------------------------|
| 0<br>8<br>16<br>24        | h.<br>3 | m.<br>45<br>46<br>47<br>48 | 38. 5<br>43. 5<br>43. 0<br>52. 5 | 44. 0          | 17. 5 47. 0                             | m <b>4.</b>                      | Time of one oscillation   | #<br>646, 33<br>8, 079<br>0, 000 |
| 32<br>40                  |         | $\frac{49}{51}$            | 57 5<br>02.0                     | 44.0           | 20. 8 43. 0                             |                                  | T'=-  | 8, 078                           |
| <b>140</b>                | 3       |                            | 21.0                             | 44. 0          | 23, 5 44, 5                             | 10 47.5<br>47.0                  | T' 1  | Log'ms<br>0.1070                 |
| 96<br>104<br>112<br>129   | 4       | 59<br>09                   | 31, 5<br>38, 5<br>43, 0<br>47, 5 | 44. 0          | 21.0 34.5                               | 46, 5<br>46, 0<br>45, 5<br>45, 5 | $t'-t=0.0$ $1+h$ $1-(t'-t)\frac{f}{g}$  | 1, 8140<br>0, 0007<br>0, 0000    |
| 120                       |         |                            | leans                            | 44. 0          |   | 20 46, 33                        | T <sup>2</sup>  | 1, 815                           |
| Coeffic                   | ient -  | of a                       | orsion.                          |                | ;                                       |                                  |   | 8, 1847<br>0, 9943<br>9, 9428    |
| Tors Se                   | ul».    |                            | Gean.                            | Differ-        | Value of one scale-<br>division = 2'.69 | Logarithms.                      |   | 0. 12.17<br>8. 8.1.4             |
| 359 + 21, 0               | 24      |                            | 27, 75                           |                |   |                                  | $\frac{m}{H} = \frac{0.0691}{1.143}$ H  | 0.1865                           |
| 80 26 4                   | 36 (    |                            | 31.4                             | 3, 65<br>3, 40 |   | !                                | Observations of deflections; date, July 31; he a.m., by Bond, No. 188. Temp. t = 449, 0 | our, ÷1                          |
| 260 - 25, 0               |         |                            | 28. 0                            | 3. 40          | v = 9t, 3<br>540'0' + v'                | 3, 73314                         | 1h<br>11  | 8, 5443                          |
| 359 28.0                  | 34. 0   | J                          | 31.0                             |                | 5400 (ir. co.)                          | 6. 26761                         | m II  | 9, 1217                          |
| Me                        | an r    | . 2                        | 51                               |                | $1 + \frac{h}{\ell}$                    | 0. 00075                         |   | 7 - 660<br>8, 8331               |

## Magnetic observations at Uglaamie, Alaska-Continued.

[Date, August 14, 1883. Güttingen time. Instrument, theodolite magnetometer No. 11. Magnet, L<sub>m</sub>. Mass ring not used. Chronometer, Bond. No. 188; alow 26° 28°; daily rate, 4°, gaining on mean time. Observer, A. C. Dark.]

| No. of oncil-<br>lations.           | Chronomotes   | Temp.                   | Extreme scale ; readings.        | Time of 80 os-<br>cillations.                   | Computation.  |
|-------------------------------------|---|-------------------------|----------------------------------|---|---|
| 0<br>8<br>16<br>24<br>32<br>40      | A. 18. e.<br>4 17 57. 5<br>10 02. 0<br>20 04. 5<br>21 11. 0<br>22 15. 5<br>23 20. 0 | 47. 0                   | 15, 0 39, 2                      | 114. 6.   | Observed time of 80 oscillations  |
| 80<br>88<br>90<br>104<br>112<br>120 | 4 28 40, 0<br>20 51, 5<br>36 57, 0<br>32 02, 0<br>35 07, 0<br>34 12, 0<br>Means     | 47. 0<br>47. 0<br>47. 0 | 14. 3 40. 0<br>17. 2 35. 3       | 10 48.5<br>49.5<br>50.5<br>51.0<br>51.5<br>52.0 | $ \begin{array}{cccccccccccccccccccccccccccccccccccc$   |
| Coeffic                             | ient of torsion.  |                         | Value of one scale               | 1   | (αr. co.) T <sup>y</sup> × 17.32<br>π <sup>y</sup> 0.99136<br>M 9.9126  |
| Tors.<br>circle.                    | wle. Mean.  | Differ-                 | division = 2.00                  | Logarithma.                                     | $mH = \frac{\pi^{0}M}{T^{0}}$ $mH = \frac{mH}{T^{0}}$ $mH = \frac{mH}{T^{0}}$ $mH = 0.0008$ $mH = 0.0008$ $mH = 0.0008$ |
| 78 17. 2<br>168 18. 8<br>348 18. 5  | 35, 3 26, 25<br>34, 2 26, 5<br>28, 0 23, 25   | 0. 25<br>3. 25<br>0. 15 | e 3r. 4<br>5400r  - et           | 3, 79267  | Observations of deflections; date. August 14; hom<br>4, 05 a.m., by Eond, No. 188. Temp. $t=47^{\circ}, 5$              |
| 78 17.2                             | 29.0 - 23.1 ean $v = 0.91$  |                         | 5400 (ar. co.) $1 + \frac{h}{f}$ | 6, 26761<br>0, 00028                            | m H = 0, 10 4<br>m = 7, 450-1<br>m = 8, 9250  |

### Recapitulation of results for H and m.

| Date.     | Н                          | 62 ° F.            | Date            | . 1              | H                          | 620 F.             | Dat  | e,                | Н                | 62 F.   |
|-----------|----------------------------|--------------------|-----------------|------------------|----------------------------|--------------------|------|-------------------|------------------|---------|
|           | 1, 929<br>1, 932<br>1, 934 |                    | 1882.<br>June 1 | 17               | 1, 947<br>1, 916<br>1, 946 |                    |      | 1  <br>14  <br>31 | 1.942            |         |
|           | 1, 932                     | 0.0671             |                 |                  |                            | 0.0690             |      |                   | Acres 1 1        | 0.0681  |
| 19        | 1. 925<br>1. 910           |                    | July            |                  | 1, 920<br>1, 920<br>1, 920 |                    | Feb. |                   | 1, 938           |         |
| 20        | 1.913                      | 0, 0003            |                 |                  | 1.924                      | 0, 0695            | Mar. | 14                | 1.942            | 0. 0875 |
| Feb. 16 : | 1, 979<br>1, 8×2           |                    |                 | 17 -<br>18<br>19 | 1. 10.1                    | 0, 0093            |      |                   | 1. 945           | 0.0683  |
|           | 1, 930                     | 0. 0690            |                 |                  | 1, 948                     | 0,0685             | Apr. | 1.1               | 1, 956           |         |
| Mar. 17   | 1 931                      |                    | 1 1             | 31<br>14<br>3.1  | 1, 957                     |                    |      | 1                 | 1. 956           | 0.0660  |
| 19        | 1, 500                     | 0, 0696            |                 |                  | 1, 9,49                    | 0, 0685            |      | 14 i<br>31        | 1, 569<br>1, 959 |         |
| Apr. 17   |                            |                    | Oct.            |                  | 1. 19.519                  |                    |      |                   | 1, 954<br>1, 951 | 0, 0676 |
| 18<br>19  | 1.910                      |                    |                 |                  |                            | 0.0686             |      | 10                | 1, 959           |         |
| May 17    | 11.5                       | и се <b>90</b><br> | Nov.            | 50               | 1.661                      |                    | July | 14                |                  | 0.0662  |
| 18        | 7, 91 +<br>1 936           |                    | Dec             | 1 1              | 1 972                      | 0. 0682<br>0. 0679 | ,    | 31 :              | 1, 943           | 0, 0670 |
| 1         | 1. 923                     | 0,0692             |                 |                  |                            |                    |      |                   |                  | 0.0660  |

Chro-

## APPENDIX No. 5.

OBSERVATIONS MADE AT UGLAAMIE, ALANKA, IN 1881, 1882, AND 1883 FOR DETERMINING THE MAGNETIC DIP AND THE MAGNETIC INTENSITY BY MEANS OF THE DIPPING NEEDLE, TOGETHER WITH THE COMPUTATION AND A RECAPITULATION OF RESULTS.

## [Computer, E. H. Courtenay.]

[Date, November 30, 1881. Göttingen time. Station, Uglannic, Alaska. Dip circle No.23. Needle No.1. Observer, M. Smith. Time of beginning 10<sup>k</sup> 15<sup>m</sup> p. m.; time of ending, 10<sup>k</sup> 47<sup>m</sup> p. m.;

|              | I       | ola  | rity        | of   | mar      | ke  | lene            | t B  | nor  | th.  |                |      |                |      |          |    | 1    | Pola | rity | of           | mar      | ked | ene          | i A   | nort     | th. |             |        |                      |     |                      |       |              |
|--------------|---------|------|-------------|------|----------|-----|-----------------|------|------|------|----------------|------|----------------|------|----------|----|------|------|------|--------------|----------|-----|--------------|-------|----------|-----|-------------|--------|----------------------|-----|----------------------|-------|--------------|
| Circle o     |         |      | irel<br>ace |      |          | 1   | Jire<br>flice   | le w | est. |      |                | le w | est.           |      |          |    | est. |      |      | le w<br>o ea |          |     | lire<br>face |       |          |     | Circ<br>fac |        | ян <b>t</b> ,<br>яt. | (   | direle in<br>prime   |       |              |
| S.           | N.      |      | 3.          |      | N.       |     | S.              |      | Ν.   | -    | 8.             | Ī    | N.             |      | S.       |    | N.   |      | S.   | 1            | N.       |     | s.           | 1.    | N.       |     | S.          |        | N.                   | 1   |                      |       |              |
| , .          | 3       | 2    |             | 3    |          |     |                 |      |      | )    |                | 3    |                | э    |          | э  |      | ٥    |      | 3            |          | 0   |              | , 0   |          | 10  |             | $\sim$ |                      |     | Circ                 | le N  |              |
| 1 41 8<br>42 | 1 21    | 81   | 35<br>37    | 81   | 15<br>17 | .81 | $\frac{27}{24}$ | 81   | 10   | 81   | 18<br>17<br>19 | к1   | 22<br>18<br>21 |      | 25<br>23 |    |      | 81   |      | 81           | 20<br>22 |     | 35<br>38     | 81    | 14<br>16 | 181 | 30<br>32    | ,81    | 10                   |     | redlo N.<br>cedlo S. |       | 45.5<br>47.5 |
|              |         |      |             |      |          |     |                 |      | 15   |      | 16             |      | 17             |      |          |    |      |      |      |              |          |     |              | i     |          |     |             |        |                      |     | Circ                 | le N. |              |
| 1 41.58      | 1 19. 5 | 81   | 36          | 81   | 16       | 81  | 25.             | 5 81 | 12.  | 7 81 | 17.            | 5 81 | 19.            | 5 81 | 24       | 81 | 16   | 81   | 16.  | 5 81         | 21       | 81  | 36.          | 5 8 1 | 15       | 81  | 31          | 81     | 09                   |     | eedle N.<br>codle S. |       |              |
| 810 30       | Y. 5    |      | 815         | 26'. | 0        |     | 812             | 19:  | . 1  |      | 81             | 18   | . 5            | -    | 810      | 20 | . 0  | ;=   | 81-  | 18           | . 8      | 1   | 810          | 25    | . 8      |     | 810         | 20     | . 0                  | . 3 | dag. men             | . 11  | 29. 3        |
|              | 810     | 28'. | 2           |      |          | !   |                 |      | 810  | 18'  | 8              |      |                | ı    |          |    | 810  | 19.  | 4    |              |          |     |              |       | 810      | 22  | 9           |        |                      | 1.  |                      |       |              |
|              |         |      | Mes         | in . |          |     | 813             | 231  | . 5  |      |                |      |                |      |          |    |      |      | Ме   | :111         |          |     | 81           | 21    | 1.1      |     |             |        |                      | ;   |                      |       |              |
| -            |         |      |             | -    |          |     |                 |      |      |      | Re             | ault | 11112          | dip, | 810      | 22 | 3    |      |      |              |          |     |              |       |          |     |             |        |                      |     |                      |       |              |

[Date, December 17, 1881. Gottingen time. Station, Ughamie, Alaska. Dip circle No. 23. Needlo No. 2. Observor, J. Cassidy.]

| Polarity of marked                                  | end B north.               |                         |             | 1           | Polarity o | of mark     | ed end $A_{-l}$ | iorth.          |           |          |
|---|----------------------------|-------------------------|-------------|-------------|------------|-------------|-----------------|-----------------|-----------|----------|
|   |                            | rele west,<br>see west. |             | west.       | Circle (   |             | Circle of       |                 | Circle es |          |
| s. N. + s.   N.                                     | 8. N. S.                   | N.                      | 8.<br>      | N           | 8.         | N.          | s. :            | N.              | 8.        | N.       |
| 81 51 81 40 81 50 81 30 8<br>47 81 37 81 50 81 30 8 | 1 23 81 16 81 3<br>20 16 2 | 0<br>80 81 35<br>28 24  | 81 40<br>34 | 81 43<br>85 | 81 18      | 81 07<br>07 | 81 43 - 6<br>40 | 81 28   8<br>28 | 1 30 8    | 08<br>07 |
| st 49   81 38, 5   81 49   81 28, 5   8             | 1 21. 5 81 16 81 2         | 81 24.5                 | 81 37       | 81 39       | 81 17      | 81 07       | , 81 41, 5      | 81 28 - 8       | 1 30 8    | 07.      |
| 811 43.7 43.8                                       | 812 18.7 81                | 126.8                   | 81,         | 34.0        | 810 1      | 2'. 0       | 817 34          | .7              | 810 18    | . 8      |
| 81 41.2   | 81 1 22 8                  |                         |             | 815         | 25 0       |             |                 | 81 26           | . 8       |          |
| Mean  | 812 32.0                   |                         |             |             | Mea        | n           | . al / 25       | . 9             |           |          |
|   |                            | Resulting di            | ip, 81° 2   | 8.9         |            |             |                 |                 |           |          |

(Date, December 18, 1881 - Göttingen time. Station, Uglaamie, Alaska. Dip circle No. 23. Needle No. 1. Observer, J. Murdoch. Time of beginning, 18 652 a.m.; time of coding, 18 652 a.m.;

| Circle in magne<br>prime vertical | aust,    | ele e<br>e ea: |     |    |     |     | f co     |     |    | li w |     |      |     |     | lirel<br>face |    |     |     | face |     |     |      | 'ite!<br>face |      |          |    | livel<br>face |      |    | leen |    |
|-----------------------------------|----------|----------------|-----|----|-----|-----|----------|-----|----|------|-----|------|-----|-----|---------------|----|-----|-----|------|-----|-----|------|---------------|------|----------|----|---------------|------|----|------|----|
|                                   | N        |                | S.  |    | N.  | ,   | S.       | 1   | N. |      | 7.  |      | N.  |     | 8             |    | N   |     | 8    |     | N   |      | 5.            |      | N        |    | 5             |      | Ν. |      | 8  |
| Oircle N.                         | ,        | : 0            |     | 0  | ,   | 1.3 |          | 0   | ,  | 10   |     | 10   |     | 10  |               | 0  | /   | >   |      | э   |     | 10   |               | 3    |          |    |               |      |    |      |    |
| Needle N.<br>Needle S.            | 20<br>20 | 81             | 35  | 81 | 11  | 781 | 35<br>35 | (81 | 26 | 81   | 08  | -141 | 23  | 81  | 25<br>25      | 81 | 21  | -81 | 10   | 8)  | -04 | 81   | 0.5           | 81   | 23<br>22 | 81 |               | 18   |    |      | 35 |
| Circle S.                         | 20       | 5.81           | 37. | 81 | 12  | 81  | 35       | 81  | 99 | 5 81 | 05. | 81   | 2.3 | 81  | 25            | 81 | 25  | 61  | 24   | 81  | 04  | 5 bl | 05,           | 5.81 | 99       | 81 | 17            | 5.81 | 03 | 81   | 35 |
| Needle N.<br>Needle S.            | .7       |                |     | Ì  | . 5 | 23  | RE2      |     | н  | 13   | 81  |      | 0   | 24. | 819           |    | . 5 | 24. | 81 - |     | 7   | 01   | 81            |      | 1.8      | 34 | 817           |      | 9  | 195  | 81 |
| Mag mer. 119 3                    |          |                | l   | 26 | 81  |     |          |     |    |      | 9   | 18   | 81- |     |               |    |     |     | b    | 1.1 | ы   |      |               |      |          |    | U             | 1377 | βŢ |      |    |
|                                   |          |                |     |    | 5   | 2.2 | nl       |     |    | em   | M   |      |     |     |               | 1  |     |     |      |     | 4   |      |               |      |          | n  | M.            |      |    |      |    |

[Date, December 19, 1881. Göttengen time Station, Uglaamie, Alaska. Dip circle No. 23. Needle No. 2. Observer, J. Cassidy.]

THE MAG-OGETHER

ith Time of

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Circle N 0 N. 11° 45 5 0 S. 47 5 Circle S. 0 N. 11 42.5 0 S. 10 42.0

mer. 11 29, 375

f. Cassidy.]

Circle cast,

30 81 08 30 07 30 81 07.5

urdoch. Time of

rele in magnetic prime vertical.

Circle N.
edle S.
Circle S.
edle N.
edle S.
edle N.
edle S.
lag mer 112 30

|   |      | lo e<br>e ea |          |    |              |      |          |      | lirel<br>fac |       |     |     |    |    |     |      |     |     |       |      |    |      |     |     |          | h o<br>we |          |    | lirel<br>face |     |    |
|---|------|--------------|----------|----|--------------|------|----------|------|--------------|-------|-----|-----|----|----|-----|------|-----|-----|-------|------|----|------|-----|-----|----------|-----------|----------|----|---------------|-----|----|
| , | S    |              | N        |    | S.           |      | N.       |      | 8.           |       | N.  | ,   |    |    |     | -    | s.  | . , |       |      |    | :    |     |     | S.       |           | N.       | :  | 8.            |     | N. |
|   | 31   |              | 14<br>10 |    | $^{47}_{48}$ |      | 20<br>23 |      | 21<br>15     | 81    |     |     | 30 |    |     |      |     | 81  | 18    | 81   | 18 |      | 19  |     | 11<br>10 |           | 18<br>18 | 81 | 41<br>38      | 81  | 21 |
| 1 | 32   | 61           | 12       | 81 | 47.          | 5.81 | 21       | 5.81 | 13           | :81   | 18. | 581 | 30 | 81 | 39. | 5 81 | 14  | 81  | 19. 5 | 5 81 | 18 | 81   | 21  | -81 | 10.      | 5 81      | 18       | 81 | 30. f         | -81 | 20 |
|   | ×1.3 | * } * 1      | t)       |    | 81.          | 34   | 5        |      | 51           | 14.   | 2   |     | ~1 | 34 | . 8 |      | ĸ1. | 16. | 7     |      | ы. | 19.  | . 5 |     | -1       | 29        | . 2      | 1  | 81 '          | 29. | В  |
|   |      |              | -1       | 2. | .1           |      |          |      |              |       | ь1  | 26  | 5  |    |     |      |     |     | 81,   | I×   | 1  |      |     |     |          |           | 81       | 29 | , 5           |     |    |
|   |      |              |          |    | 3            | len  | 11       |      | 1 :          | 271.4 |     |     |    |    |     |      |     |     |       |      | 3  | tear | ì   | ;   | -1       | 21.4      |          |    |               |     |    |

[Date, January 18, 1882. Station, Unbanase Alaska. Dip circle No. 23. Needle No. 3. Observer, J. Cassidy. Time of beginning P to a.m.: time of ending, P 50° a.m.: Gattingen time [

|   |   |               |     |   |    |    |      | 1  | ١, |    | : 18 | Ņ       | oť  | И  | iit  | kı | d  | èΒ  | đ    | .1  | 110 | rtl      | i. |    |    |     |      |     |               | ì     |     |          |     |    |     |          | P  | 01  | arit       | y  | οľ   | 111 | 134  | ke | d  | ene | 1 1 | li r | or   | th. |      |     |    |      |      |    |
|---|---|---------------|-----|---|----|----|------|----|----|----|------|---------|-----|----|------|----|----|-----|------|-----|-----|----------|----|----|----|-----|------|-----|---------------|-------|-----|----------|-----|----|-----|----------|----|-----|------------|----|------|-----|------|----|----|-----|-----|------|------|-----|------|-----|----|------|------|----|
|   |   | 'ir<br>fac    |     |   |    |    |      |    |    |    |      | le<br>W |     |    |      |    |    |     |      | 0:  |     | at,      |    |    |    |     |      |     | nt.           |       |     |          |     |    |     |          |    |     | ire<br>fac |    |      |     |      |    |    |     |     |      |      |     | ĺ    |     |    | le e |      |    |
|   |   |               |     |   |    | Ŋ. |      |    |    | 7. |      |         |     | N  | ,    |    | 1  | ì.  | _    |     | 1   | ٧.       |    |    | S. |     |      |     | ٧.            |       | 1   | 5        | _   |    | 3   | ί.       | 1  | 2   | š.         |    | _    | N.  |      |    |    | s.  |     |      | N    |     | i    | 8.  |    | i    | ,    | \  |
|   | 1 | 7<br>47<br>50 |     |   |    | 22 |      |    | 41 |    | 1 3  |         |     | 1  | 5    |    |    | 07  |      | 1 8 |     | 20<br>22 |    | 81 | 16 |     | . 19 | 1   | 23<br>21      | . 1   | 81  | 35<br>34 |     | 8  | 1   | 29<br>29 | Ĺ  | 81  | 14<br>15   | į  | 81   | 1   | 7    | ŀ  | 81 | 51  | ;   |      | 1.0  | 8   | - 81 | 3   | 7  |      | 31   | 1: |
| 3 | 1 | 18            | . 5 | ı | 51 | 2  | 1. : | )  | Вĺ |    | 2    |         | 81  | 1  | 3. : | ,  | -1 | ()H | . 5  | . 8 | 11  | 21       |    | 81 | 10 | , 5 | ď    | 1   | ()+)<br>0- ii | , 1   | 81  | .13      | . 5 | 8  | 1 : | 29       | 1  | 31  | 14.        | 51 | 81   | 1   | 7. 5 |    | 81 | 53  |     | 81   | - 12 | 9   | 8    | 1 3 | 6  | , 8  | 11   | 1  |
|   |   | <i>r</i> -1   |     | ò |    | u  |      |    |    |    | l    |         |     | 8  |      |    |    | - 1 | ì    | 14  | . 7 | ī        |    |    | 41 |     | 198  | . 3 |               | 1     |     | 81       | )   | 11 | . н |          |    |     | 81         | 1  | 6.   | 0   |      |    |    | к   | 3   | 11   | . () |     |      |     | 12 | 5.   | ٧. ا | ā  |
|   |   |               |     |   |    |    | l    | -1 |    | 9  |      |         |     |    |      |    |    |     |      |     |     | 81       | l  | ;  | 1) |     |      |     |               |       |     |          |     |    |     | 41 '     | 23 | . ! | )          |    |      |     |      |    |    |     |     |      | S    | 1   | 33.  | . 3 |    |      |      |    |
|   |   |               |     |   |    |    |      |    |    |    |      | М       | :11 | n. |      |    | 81 | ,   | 1+ J | įŝ  |     |          |    |    |    |     |      |     |               | 1     |     |          |     |    |     |          |    |     |            | M  | 412B | H.  |      |    | 81 | ٠.  | !5  | G    |      |     |      |     |    |      |      |    |
|   |   |               |     |   |    |    |      |    |    |    |      |         |     |    |      |    |    |     |      |     |     |          |    |    |    | ŀ   | ies. | 111 | ltit          | lig t | 115 | 1, 2     | 1   | 2  | ٦.  | В        |    |     |            |    |      |     |      |    |    |     |     |      |      |     |      |     |    |      |      |    |

[Date, January 19, 1882. Station, Ughamie, Alaska. Dip circle No. 21. Needle No. 2. Observer, J. Cassidy. Time of beginning, 19 for a.m., time of ending, 19 45m a.m. Gottingen time.]

|    |     |            |      |     | 1   | 0  | :17 | 11  |     | 1    |     | .11 | k e | d   | en | d  | R  | 11 -        | ∘h. |     |      |      |      |    |     |          |    |          | Pe | l.i | it;      | 01  | 111         | rk  | ed | em          | 1.4  | 110  | 1-4] | 7   |          |     |     |    | 1   |                           |         |
|----|-----|------------|------|-----|-----|----|-----|-----|-----|------|-----|-----|-----|-----|----|----|----|-------------|-----|-----|------|------|------|----|-----|----------|----|----------|----|-----|----------|-----|-------------|-----|----|-------------|------|------|------|-----|----------|-----|-----|----|-----|---------------------------|---------|
|    |     |            | le e |     | at, |    |     |     |     |      | .1H |     | (   |     |    |    |    | est,<br>st. |     |     |      |      | est. |    |     |          |    |          |    |     |          |     | est<br>ist. |     |    | lire<br>ace |      |      |      |     |          |     |     |    | 1   | Circle in n<br>pri , a ve |         |
| -  | S   |            |      | N   | Ι.  |    |     | š.  |     |      | N   |     |     | 8   | š. | ,  | *  | N _         |     | S   |      |      | N.   |    |     | š.       | į  | N.       | 1  |     | 5        |     | N.          | -   |    | 8.          |      | N.   |      |     | 8.       |     | Þ   | ı. | -H  |                           |         |
| 0  |     | ,          | 0    | 0   | 1   |    | ٥   | ,   | i   | ٥    |     |     |     |     | 1  |    | 0  |             |     | 9 : |      | 7    |      |    | 3   |          | 10 |          | -  | 0   |          |     | ,           |     |    |             | 1 '  | 0 /  |      |     | 1        |     | 3   | ,  | li. | Clircle                   | N.      |
| 81 | 4   | 139<br>133 | 81   | 1   | 12  | н  | 1   | 35  |     | 81   | 1   |     | 3   |     | 19 |    |    | 20<br>20    | - 8 | 1 0 |      | 81   | 13   |    | 1 : | 24<br>36 | 81 | 25<br>27 |    |     | 16<br>16 |     | 06          |     |    | 15<br>16    |      | 1 12 |      | 181 | 16<br>20 |     | 41  | 06 |     | Needle N<br>Needle S      |         |
| 81 | 4   | 11         | 181  | 1   | 12  | 18 | 1   | 33. | ô   | 81   | 1   | i   | 8   | 1 : | 22 | 2  | 1  | 20          | 8   | 1 0 | 7. 3 | 5'81 | 13   | H  | 1 2 | 25       | 81 | 26       |    | 31  | 16       | 81  | 06          | 5 6 | 1  | 15,         | 5.81 | 1 1  | 7, 5 | 81  | 18       | , 5 | 1   | 07 | 1   | Circle                    | N.      |
|    | . 8 | 310        | 26   | 3'. | 5   | -  |     | BI  | , , | 3-)  | . 3 |     |     |     | 31 | 2  | 1′ |             |     | . 8 | 1    | 10   | , 2  |    | {   | 310      | 25 | . 5      | 1  |     | ~1·3     | 11  | . 3         |     |    | 810         | 10   | ř. 5 |      |     | 81       | , 1 | Ð′. | 5  | ij  | Needle N<br>Needle S      |         |
|    |     | _          |      | 5   | 310 | 24 | ۲.  | 4   |     |      |     |     |     |     |    |    |    | <1 :        | 10  | , ú |      |      |      |    |     |          |    | 81       | 3  | 87. | 4        |     |             |     |    |             |      | В    | )    | 1 ‡ | 5        |     |     |    |     | Mag. mor.                 | 11 1 25 |
|    |     |            |      |     |     |    |     | 1   | M   | -:11 | 11  |     |     | 81  |    | 20 | .0 |             |     |     |      |      |      | i  |     |          |    |          |    |     | ħ        | lea | и           |     | Н  | 1 1         | ti   | 1    |      |     |          |     |     |    | ij  |                           |         |
|    |     | -          |      |     |     |    |     |     |     |      |     |     |     |     |    |    |    |             |     | ì   | ζų.  | -111 | en.  | di | р,  | 810      | 16 | 1. 2     |    |     |          |     |             |     |    |             |      |      |      |     |          |     |     |    | Ì   |                           |         |

[Date, January 20, 1882. Station, Uglaamic, Alaska. Göttingen time. Observer, J. Cassidy. Din circle No. 23. Needle No. 1. Time of beginning, 15 105 a.m.; time of ending. 15 405 a.m.;

| Brele east, Circle was face east. S. N. S. | L.   face west.                                  | S. N.   S.  | ee east. face west.   | ., .   |
|--|--|---|---|--|
|  | N. 1 S. 1 N.                                     | 8. N. 1 S.  | N. S. I N.  |  |
|  |  |   |   | 151 24.  |
| 40 81 20 81 05 81                          | 04 81 30 81 27                                   | 81 26 81 17 81 27<br>23 81 17 81 27   | 7 81 25 81 50 81 13   | 81 38 -81 22   Needle N. 41 22   Needle N. Needle S.   |
|  | , 1  |   |   | Needle N.  |
| 2  | 810 167. 8                                       | 81° 23′. 0  | 810 8   | 30', 9 Mag. mer. 11  |
| Mean 81° 19′. 5                            |  | 1   | Mean 81° 26.9   |  |
| 4:   | 2 21 07<br>81 20.5 81 08 81<br>10 30'.7 810 05'. | 2   21    07    04    30    27    1    81 20 5 81 00    81 04    81 30    81 27    10 30', 7    81 0 05', 0    81 0 28', 5    81 0 16', 8 | 2 21 07 04 30 27 23 17 2<br>1 81 20.5 81 06 81 04 81 30 81 27 81 24.5 81 17 81.2<br>10 304.7 810 054.0 810 284.5 810 204.8 8<br>810 164.8 810 234.0 | 2 21 07 04 30 27 23 17 24 25 45 10<br>81 20.5 81 08 81 04 81 30 81 27 81 24.5 81 17 81.25.5 81 25 81 47.5 81 14.5<br>10 304.7 810 054.0 810 284.5 810 204.8 810 254.2 810 314.0<br>810 164.8 810 234.0 810 234.0 |

[Date, February 16, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. Cassidy. Dip circle No. 23. Needle No. 2. Time of loginning, 15 [105] a.m.; time ending 15 405 a.m.]

|      |          |    |     |          | P  | la  | rity | of  | ms  | rk | ed  | em   | 17  | 1 1101        | th. |     |       |             |      |    |               |      |       | Pol | arit        | y of | ma   | rke  | d en         | id B         | no          | rth. |             |              |             | - 1 |                                     |
|------|----------|----|-----|----------|----|-----|------|-----|-----|----|-----|------|-----|---------------|-----|-----|-------|-------------|------|----|---------------|------|-------|-----|-------------|------|------|------|--------------|--------------|-------------|------|-------------|--------------|-------------|-----|-------------------------------------|
|      |          |    |     |          |    |     |      |     |     |    |     |      |     | rest,<br>ist. |     |     |       | wei<br>vest | ŧŧ,  | C  | lire)<br>face | 0 V  | rest. |     | Circ<br>fac | le w | est. | 1    | Circ<br>face | le e<br>e wo | aнt,<br>нt. | i    | Cire<br>fac | le e<br>c ea | ast,<br>st. | l   | Circle in magnetic prime vertical.  |
|      | S.       | -  |     | N.       | 1  |     | S.   | Ĺ   | N.  |    | 9   | Α,   | 1   | N.            |     | S.  |       | N           |      |    | 8.            | 1    | N.    | 1   | S.          | 1    | N.   | 1    | S.           | !            | Ν.          | !    | 8.          | ,            | N.          | . " |                                     |
| -    | 46<br>47 | ı, |     | 38<br>34 |    | 1   |      | 81  | 39  | 8  | 1 : | 38   | 81  | 27<br>31      | 81  | 20  | - 1   | 81 2        | 0    | 81 | 22            | 81   | 23    | 81  | 27          | 81   | 18   | 81   | 49<br>53     | 81           | 11          | 81   | 40          | н1           | 15<br>17    | ť   | Circle N.<br>Needle N.<br>Needle S. |
| ı    | 46.      | 5  | 31  | 36       | .8 | 1   | 39   | 81  | 41  | .8 | 1 : | 37   | 81  | 29            | 81  | 17  | . 5 1 | 31. 2       | 0    | 81 | 23.           | 5 81 | 23.   | 581 | 25.         | 581  | 17.  | 5 81 | 51           | 81           | 12          | .81  | 42          | 81           | 16          |     | Circle S.                           |
| -    | 819      | 4  | 1′. | 2        | +  |     | 810  | 40  | . 0 | i  | 8   | 310  | 33  | . 0           | -   | 81  | 1     | 8', 8       | -    | -  | 810           | 23   | . 5   |     | 819         | 21/  | . 5  | -    | 810          | 31/          | . 5         |      | 810         | 29/          | 0           | -   | Needle N.<br>Needle S.              |
|      |          |    |     | 81       | 4  | 0′، | 6    |     |     | 1  |     |      |     | 810           | 25  | . 9 |       |             | 1    |    |               |      | 819   | 22  | 5.5         |      |      | 1    |              |              | 810         | 30′. | 2           |              |             |     | Mag. mer. 32° 10'.                  |
| - 14 |          |    |     |          |    |     | M    | Pai |     |    | 8   | 10 3 | 3′. | 3             |     |     |       |             |      |    |               |      |       |     | M           | lean |      |      | 810          | 26'.         | 4           |      |             |              |             |     |                                     |
| _    |          |    |     |          |    | _   |      |     |     |    |     |      |     |               |     | Re  | sul   | ting        | z di | р, | 810           | 29   | . 8   | _   |             |      |      |      |              |              | ***         |      |             |              |             |     |                                     |

[Date, February 17, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 28 [100 a. m. : time of ending, 28 [500 a. m. ]

|                |      |    | Po  | n   | rity        | of   | ma | irke | d e  | nd   | A    | nor | th. |          |      |     | -            |     |    |     | Pol | arit       | yot  | ma       | rke | d en     | d B  | nor  | th. |               |      |     | - 1 |                                       |
|----------------|------|----|-----|-----|-------------|------|----|------|------|------|------|-----|-----|----------|------|-----|--------------|-----|----|-----|-----|------------|------|----------|-----|----------|------|------|-----|---------------|------|-----|-----|---------------------------------------|
| Circle<br>face |      |    |     |     | irel<br>ace |      |    |      |      |      |      |     |     |          |      |     | , † <b>(</b> |     |    |     |     |            |      |          |     |          |      | ast, |     |               |      |     |     | Circle in magnetic<br>prime vertical. |
| S.             |      | N. |     | _   | s.          |      | N. |      | S.   |      |      | N.  |     | S.       | 1    | Х.  | 1            | S.  | Ì  | N.  |     | S.         |      | N.       |     | S.       |      | N.   | i   | 8.            | i    | N.  |     |                                       |
| 42<br>42       |      | 22 |     | 31  | 45<br>43    |      | 31 |      | 1 10 | 0    | 81   | 05  | 81  | 27<br>90 | 81   | 28  | 81           | 91  | 81 | 18  | 81  | 17<br>21   | 81   | 17<br>15 | 81  | 35<br>33 | 013  |      | .81 | ,<br>44<br>44 |      | 21  | 1   | Circle N.<br>Needle N.                |
| 42             | 81   |    |     | _   |             |      | _  |      |      |      |      |     |     |          |      |     |              |     |    |     |     | en en belo | -    |          |     |          |      |      | -,- |               | - ~~ |     | -,  | Needle S. Circle S.                   |
| 810            | 32'. | 2  | 8   |     | R10         | 37′. | 3  |      | 81   | lo ( | 07′. | 8   |     | 810      | 281  | . 2 | 1            | 810 | 10 | , 5 |     | 810        | 17   | . 5      | 1   | 810      | 26   | . 5  |     | 810           | 38/  | . 5 |     | Needle N.<br>Needle S.                |
|                |      | 81 | 0 3 | 4'. | 8           |      |    |      |      |      |      | ۲1  | 11  | , 0      |      |     |              |     |    | 811 | 18  | . 5        |      |          |     |          |      | 21:  | ЭС: | 0             |      |     |     | Mag. mer. 320 10                      |
|                | _    |    |     |     | M           | an   |    |      | 81   | 20   | 5.4  |     |     |          |      |     |              |     |    |     |     | M          | lear | ١        |     | 819      | 244. | 2    |     |               |      | -   |     |                                       |
|                |      |    |     |     |             |      |    |      |      |      |      |     |     | Res      | ulti | ng  | dip,         | 810 | 25 | . 3 |     |            |      |          |     |          |      |      |     |               |      | -   |     |                                       |

[Date, February 18, 1882. Station, Uglaamie, Alaska. Observer, J. Casaidy. Dip circle No. 23. Needle No. 1. Time of beginning, 16 10%; a. m.; time of ending, 16 45% a. m.]

Time of

11 15 0

2. Time of

de N.
cle S.

32 / 16/, 0

1. Time of

rele N.

r. 322 10'. 0

|   |             |     |     |          | Po  | lar  | ity  | of | ma       | rk | øđ      | ene      | d B  | no       | rth |      |      |     |     | ŧ    |               |     |            | P | ola | rity     | of  | m   | rke     | d e  | nd   | A        | nor | th. |     |      |      |   |                                       |
|---|-------------|-----|-----|----------|-----|------|------|----|----------|----|---------|----------|------|----------|-----|------|------|-----|-----|------|---------------|-----|------------|---|-----|----------|-----|-----|---------|------|------|----------|-----|-----|-----|------|------|---|---------------------------------------|
| 4 | Circ<br>fac |     |     |          |     |      |      |    |          |    |         |          |      |          |     |      |      |     |     |      | Circl<br>face |     |            |   |     |          |     |     |         |      |      |          |     |     |     | de e |      |   | Circle in magnetic<br>pr.me vertical. |
|   | S.          |     |     | N.       | Ĺ   | В    |      |    | N.       | į  |         | H.       | 1    | N.       | !   | 5    | 4.   |     | N.  |      | 8.            | Ì   | N.         |   |     | ß.       |     | N.  | 1       | S.   |      |          | N.  |     | М.  |      | N.   |   |                                       |
|   | 14<br>13    | 1   | K1  | 24<br>21 | 8   | 1 5  | 0    |    | 35<br>35 |    | c<br>41 | 42<br>41 | 181  | 19<br>19 | 1   | 81 : | 21   |     | 22  | 81   | 15<br>19      | , a | 1 18<br>18 |   |     | 23<br>25 | 81  | 26  | o<br>81 | 3:   | 2 1  |          | 10  |     |     | ы    |      |   | Circle N.<br>Needle N.<br>Needle S.   |
| 1 | 13          |     | 31  | -313     | 5.8 | 5    | 0. 3 | 81 | 35       | 1  | 41      | 41.      | 5 81 | 19       | - 1 | 61   | 22   | 81  | 22. | 5.81 | 17            | F   | 1 18       | 3 | 81  | 24       | 81  | 26. | 5.81    | 1 3. | . 5  | 81       | 10  | .81 | 40  | 81   | 26   |   | Circle S.                             |
|   | 81          | 0 1 | 74. | . 5      | į   | 8    | 10   | 42 | . 7      | ı  |         | 810      | 30   | . 2      | 1   |      | Nfo. | 221 | . 3 | ī    | 810           | r   | 74. 5      |   |     | 810      | 25  | . 3 | E       | 8    | 10.1 | <br>21/. | . 2 | í   | 81  | - 33 | '. O | 1 | Needle N.<br>Needle S.                |
|   |             |     |     | ×1:      | 30  | '. I |      |    |          |    |         |          |      | ×1       |     | 167. | 3    |     |     | ŀ    |               |     | 81         |   | 21  | 4        |     |     | 1       |      |      |          | 8-1 | 27  | . 1 |      |      |   | Mag. mer.   32º 10'                   |
|   |             |     |     |          |     |      | Mι   | an |          |    | 8       | r:       | 28'. | 2        |     |      |      |     |     | ĺ    |               |     |            |   |     | M        | ean |     |         | ь1   | 24   | 4. 2     | 2   |     |     |      |      |   |                                       |
|   |             | -   |     |          |     |      |      |    |          |    |         |          |      |          |     |      | Res  | nlt | ing | dij  | , 81          | 2   | 6′.2       |   |     |          |     |     |         |      |      |          |     |     |     |      |      |   |                                       |

† Date, March 17, 1882. Station, Uglaamie, Alaska. Observer, J. Caesidy. Dip circle No. 23. Needle No. 1. Time of beginning, 16 20% a.m., time of ending, 16 52% a.m.,

|   |          |     |      |          | Pol | υi  | γ.  | οť | 111 | ar | ke | l e         | nd | 4    | 11111    | th. |     |     |     |          |     |          |     |        |    | Pol  | ırit     | ž. 0  | f nu               | ırk | ed | eme         | d L  | 3 11 | ort  | h.  |     |              |      |      |                          |       |
|---|----------|-----|------|----------|-----|-----|-----|----|-----|----|----|-------------|----|------|----------|-----|-----|-----|-----|----------|-----|----------|-----|--------|----|------|----------|-------|--------------------|-----|----|-------------|------|------|------|-----|-----|--------------|------|------|--------------------------|-------|
|   |          | e i |      | st.      |     |     | de  |    |     |    |    | ir c<br>fac |    |      |          |     |     |     |     | st.      |     |          |     |        |    |      |          |       | rest<br>ist.       |     |    | irel<br>ace |      |      |      |     |     | le e<br>e er |      |      | Circle in m<br>prime ver |       |
|   | S.       | į   |      | Ν.       |     | S.  |     |    | N.  |    |    | S.          |    |      | N.       |     | S.  |     | 3   | N.       |     | 8.       |     | N      |    |      | S.       |       | N.                 |     | 1  | М.          |      | N    |      |     | S.  |              | N    |      |                          |       |
| 0 | ,        | İ   | 0    | ,        | 10  | ,   | 1   | 0  | ,   |    | 0  | ,           | !  | 0    | ,        | 0   | ,   | 1   | 0   | 1        | 10  | ,        |     | 0      | ,  | 0    | ,        | , (   | ,                  | ,   | 0  | ,           | 10   |      |      | 6   | ,   |              | ,    |      | Circle                   | N.    |
|   | 62<br>58 |     |      | 31<br>30 | ۲1  | 33  |     | 81 | 14  |    | 81 | 23<br>27    |    |      | 29<br>19 | 81  | 15  |     |     | 18<br>18 |     | 27<br>25 |     | 1 2    |    |      | 08<br>08 |       | 1 12<br>10         |     |    | 50<br>46    | 8    | 1 2  |      | 81  | 36  |              | 11   |      | Needle N.<br>Needle S.   |       |
| 1 | 60       |     | Ηl   | 31       | 81  | 37  |     | -1 | 14  | -  | ×1 | 25          | ,  | 81   | 29       | K1  | 16  | 8   | 1   | 18       | 181 | 26       |     | 1 2    | 7. | 5 81 | (18,     | 58    | 1 11               |     | 1  | 48          | 81   | 1 2  | 2. 5 | 10  | 37. | 5.8          | 1 10 | 0. 5 | Circle                   | S.    |
|   | 81       | 0 4 | 154. | 5        | İ   | 8   | 0   | 25 | . 8 |    |    | ы           | 0  | 27   | . ()     |     | 81  | n 1 | 7'. | 0        |     | 81       | . 1 | G      | ī  |      | 81       | 2 (9) | ) <sup>2</sup> , 8 |     |    | 810         | 38   | v. 2 | 2    |     | 81  | × 24         | ·. 0 |      | Needle N.<br>Needle S.   |       |
|   |          |     |      | ٤1       | 35  | . G |     |    |     |    |    |             |    |      | sr       | 22  | , 0 |     |     |          |     |          |     | 8      | 1  | 18   | . 2      |       |                    |     |    |             |      | 8    | 10   | 20. | . 6 |              |      |      | Mag. mer.                | 36 10 |
|   |          |     |      |          |     |     | le. | ın |     |    |    | -1          | 2  | ٠. ا |          |     |     |     |     |          |     |          |     |        |    |      | 7        | Iou   | 1                  |     | 8  | 1           | 231. | 9    |      |     |     |              |      |      |                          |       |
|   |          |     | -    |          | -   |     |     |    |     |    |    |             |    |      |          |     | 1:  | esu | lti | ing      | dip | , 51     | 2   | var. 2 | :  |      |          |       |                    |     |    |             |      |      |      |     |     |              |      |      |                          |       |

[Date, March 18, D82. Station, Ughamie, Alaska. Observer, J. Cassidy. Dip circle No. 13. Needle No. 2. Time of beginning, 15 20% a [m. time of ending, 15 55% a.m.]

|     |    |     |      | иt.      |               |     |     | nst.     |     | irch<br>facu |      |     |      |          | W.C. |          |      | irele<br>face |     |          |    |          | e w<br>e ea |          |      |          |      | ast.<br>ъt. |     |          | le es<br>s cas |          | Circle in magnetic prime vertical. |
|-----|----|-----|------|----------|---------------|-----|-----|----------|-----|--------------|------|-----|------|----------|------|----------|------|---------------|-----|----------|----|----------|-------------|----------|------|----------|------|-------------|-----|----------|----------------|----------|------------------------------------|
|     | S. | ĺ   |      | N.       |               | S.  |     | N.       |     | S.           |      | N.  |      | S.       |      | N.       |      | S.            |     | N.       |    | S.       |             | Ν.       |      | S.       |      | N.          |     | s.       |                | N.       |                                    |
| . ) | ,  | 1   | 0    | ,        | v             | ,   |     | ,        | Ç.  | ,            |      | ,   |      | ,        | С    | ,        | 0    | ,             | O   | ,        | r  | ,        | c           |          |      | ,        | c    | ,           |     | ,        | 0              | ,        | Circle N.                          |
|     | 41 |     |      | 20<br>13 | <b>&gt;</b> 1 | 41) | 81  | 20<br>20 |     | 25<br>22     | *1   | 23  | ×1   | 21<br>21 | 81   | 25<br>26 |      | 36<br>35      |     | 32<br>32 |    | 26<br>26 |             | 25<br>24 |      | 48<br>51 | ×1   | 34<br>34    |     | 20<br>34 | ×1             | 15<br>16 | Needle N.<br>Needle S.             |
| 1.  | 43 | 3.  | 81   | 21       | 581           | 35  | 581 | . 20     | 1-1 | 23 3         | 5.81 | 23  | 5.81 | 21       | 14   | 25,      | 5 81 | 35, 3         | 581 | 32       | 81 | 26       | ÷1          | 24.      | 5 81 | 49.      | 5.81 | 54          | ١٨  | 32       | اد             | 15.5     | Circle S.                          |
|     | 81 | ٠.; | 32". | 5        |               | 81  | 29  | . 3      |     | 817          | 23   | . 5 |      | 815      | 23'. | 3        |      | 810           | 33/ | . 7      |    | 81       | 25          | . 2      |      | 81       | 41   | . 7         |     | 81       | 237            | ۸.       | Needle N.<br>Needle S.             |
|     | -  |     |      | 810      | 30'           | . 9 |     |          |     |              |      | 819 | 237  | . 4      |      | -        |      |               |     | 810      | 20 | . 5      |             |          |      |          |      | ьr          | 327 | . 7      |                |          | May, met. 32 - 10                  |
| -   |    |     |      |          |               | M   | ean |          | 8   | 10 2         | 277. | 1   |      |          |      |          |      |               |     |          |    | М        | ean         |          | 8    | ĸi       | 314. | 1           |     |          | -              | -        |                                    |

[Date, March 19, 1772. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 12 150 a.m.; fine of ceding, 12 50 a.m.]

| Polarity of marked end B no   | th.            |                            | Polarity of marke       | ed end A nort              | h                          |                                       |
|---|----------------|----------------------------|-------------------------|----------------------------|----------------------------|---------------------------------------|
| Circle east, Circle east, Circle west<br>face east, face west, face east.                                   | Circle west,   | Circle west,<br>face west. | Circle west, face cast. | Circle east,<br>face west. | Circle cast,<br>face cast. | Circle in magnetic<br>prime vertical. |
| $\mathbf{S}_{r} \rightarrow \mathbf{N} + \mathbf{S}_{r} - \mathbf{N}_{r} + \mathbf{S}_{r} + \mathbf{N}_{r}$ | S. N.          | 8. N.                      | 8. N.                   | 8. N.                      | 8. N.                      |                                       |
| 1 0 1 2 1 2 1 2 1   |                |                            | 10.                     | 0 / 0 /                    | 81 42 81 23                | Circle N.                             |
| 4 33  81 10 81 54 81 30 81 17 81 18<br>34   09 51 29 13 14  | ×1 35 c 4      | 81 22   81 20<br>24   20   | 81 22 81 20 8<br>23 23  | 40   81 21<br>40   19      | 45 22                      | Needle N.<br>Needle S.                |
| 1 33, 5 81 09, 5 81 52, 5 81 29, 5 81 15 81 16  | 81 35, 5 81 35 | al 23 ,81 20               | 81 22, 5 81 21, 5 8     | 1 40  81 20                | 81 43, 5 81 22, 5          | Circle 8.                             |
| 810 217.5 810 477.0 810 457.5   | 819 357, 3     | 810 21/ 5                  | 810 22'. 0              | 81° 30′. 0                 | 810 334.0                  | Needle N.<br>Needle S.                |
| 81° 31′. 2  | 254.4          | 810                        | 21'. 7                  | 810                        | 31'. 5                     | Mag. mer. 320 10                      |
| Mean 51 25 4  |                |                            | Mean                    | 81° 26′, 6                 |                            |                                       |
|   | Besulting d    | ip, 81° 27', 5             |                         |                            |                            |                                       |

[Date, April 17, 1882. Station, Ugluamic, Alaska, Observer, J. Cassidy, Dip circle No. 23. Needle No. 1 Time of beginning, 28 128 a.m. time of ending, 28 408 a.m.]

|                     |     | Pol  | arity         | of         | mail | ked     | Le me         | 1.1  | Hai  | rth. |       |      | -     |     |              |     |       | Pol  | arit        | y of | nia         | rkee | i en         | d <i>B</i> | noi  | rth. |               |      |             | ř |                                       |
|---------------------|-----|------|---------------|------------|------|---------|---------------|------|------|------|-------|------|-------|-----|--------------|-----|-------|------|-------------|------|-------------|------|--------------|------------|------|------|---------------|------|-------------|---|---------------------------------------|
| Circle e<br>face ea |     | (    | lirel<br>face | 0-0;<br>We | ist. | С       | ireli<br>face | n w  | est. | (    | Jire! | lo v | vest. | . ( | Hrel<br>face | o v | rest. | (    | lire<br>fac | le w | est.<br>st. | !*(  | 'irc<br>face | le e       | ast, | 1    | Circl<br>face | le e | ast.<br>st. | 1 | Circle in magnetic<br>prime vertical, |
| S.                  | N.  | 1    | S.            |            | N.   |         | s.            |      | N.   | !    | S.    |      | N.    |     | В.           |     | N.    |      | s.          | :    | N.          |      | S.           | -          | N.   | -    | S.            | į.   | N.          | j |                                       |
|                     | 54  | -    | 0.0           | -1         | 00   | )<br>40 |               |      |      |      |       |      | 1.00  |     |              |     |       |      |             | 80   |             |      |              |            |      |      | 24            | -81  | 15          | 1 | Oircle N.                             |
|                     | 5.1 |      | .3-3          |            |      | (10     |               |      |      |      | 09    |      | 0.3   |     | 22           |     | 10    |      | 05          | 81   | .0          | 1.   | 36           |            | 38   |      | 24            |      | 16          |   | Needle N<br>Needle S                  |
| 81 15 80            | 58. | ə 81 | 2.            | 2.1        | 59   | 50      | 58            | 81   | ()5, | 5.8  | 08.   | 5 81 | 01    | 81  | 94           | P1  | 15.   | 5-61 | 01.         | 5-×0 | 59          | 81   | 36.          | 5-81       | 37.  | 5.61 | 24            | .81  | 15,         |   |                                       |
| 810 06              | . 8 |      | 412           | 10.        | 5    |         | 810           | 01'. | . 8  |      | 819   | 04   | . 7   |     | 81           | 18  | . 3   |      | 81          | 01'  | 7           | 1    | 810          | 37         | . 0  | i    | 810           | 104  | . 8         |   | Needle N<br>Needle S                  |
| -                   | 81  | 108. | 8             |            |      |         |               |      | 810  | 03   | . 3   |      |       | 1   |              |     | 81    | 10   | . 0         |      |             | Í    |              |            | 81   | 28/  | . 4           |      |             | ŀ | Mag. mer. 329 10'.0                   |
|                     |     |      | M             | san        |      | 8       | 1 - 0         | 5.9  |      |      |       |      |       |     |              |     | -     |      | N           | Ican |             | 8    | 1101         | 9'. :      | 2    |      |               |      |             | 4 |                                       |
|                     |     |      |               |            |      |         |               |      |      |      | Ro    | aul  | ting  | dip | , 81         | 12  | . 6   |      |             |      |             |      |              |            |      |      |               |      |             | i |                                       |

[Date, April 18, 1882. Station, Uglamme, Alaska. Observer, J. Cassidy, Dip. circle No. 23. Needle No. 2. Time of beginning, 1<sup>h</sup> 15<sup>m</sup> a. m.; time of ending, 1<sup>h</sup> 45<sup>m</sup> a. m.]

| : |             |     |   |      | Pol | (11) | ty   | 01  | 111-1    | tke | d i | nd   | 1    | 1:01 | th. |      | -   | ~    |          | -    |              |     | -   | Po   | lar | ty  | of | 111:3    | rke  | d er        | nd i | В   | nort     | h   |             |           |     | i   | w war-spike            | -     |      |
|---|-------------|-----|---|------|-----|------|------|-----|----------|-----|-----|------|------|------|-----|------|-----|------|----------|------|--------------|-----|-----|------|-----|-----|----|----------|------|-------------|------|-----|----------|-----|-------------|-----------|-----|-----|------------------------|-------|------|
|   | Cire<br>fac |     |   |      |     |      |      |     | nst,     |     |     |      |      | est. |     |      |     |      |          |      | irel<br>face |     |     |      |     |     |    |          |      | Ciro<br>fac |      |     |          |     | Circ<br>fac |           |     |     | Circle in 1<br>prime v |       |      |
|   | S.          | 1   | ľ | ć.   |     | Ñ.   |      |     | N.       |     | 8   |      |      | N.   |     | S.   |     |      | N.       | -    | 8.           | ļ., | N.  |      | S.  |     |    | N.       | -    | S.          |      | 1   | Ñ.       |     | S.          |           | N.  |     |                        |       |      |
| 1 |             |     | J |      | ,   |      |      |     |          |     |     |      |      |      |     |      |     |      |          |      |              | 1   |     |      | ,   |     | ,  |          |      |             |      | о   |          | ١,  |             | í -       |     |     | threl                  | e N.  |      |
|   | L 24<br>25  |     | 1 | 2 () | К   | 4:   | 3    |     | 26<br>24 | 8   | -1  | 3    |      | 27   |     | 27   |     |      | 24<br>25 | [3]  |              |     | 43  |      |     |     | 81 | 28<br>27 | 1    | 45<br>45    |      |     | 20<br>21 | 81  | 26<br>28    | 181       | 10  |     | Needle N<br>Needle S   |       |      |
| n | 24          | 5 1 | 1 | 14   | -   | . 1: | 1, 5 | -1  | 25       | E   | 4   | 1. 5 | 41   | 27   | 8   | 1 27 |     | 81   | 24.      | 5.81 | 36           | B   | 42. | БВ   | 1 2 | 1   | 31 | 27.      | 5.81 | 45          | В    | 1   | 20. (    | -81 | 27          | ъ.        | 09  | . 5 | Circl                  | e 8.  |      |
| - | 81          | u • | 1 | -    |     |      | 1 :  | 357 | . 7      |     | 8   | 10   | 151. | 2    |     | 81   | 0   | 254  | Н        | ;    | A10          | 39  | . 2 |      | В   | 1 ' | 24 | 3        | i    | 81          | 35   | 37. | 7        | 1-  | 81          | :<br>- 18 | . 3 | -   | Needle N<br>Needle S   |       |      |
|   |             |     |   | n I  | 21  | ()   |      |     |          |     |     |      |      | 81   | 30  | 4.5  |     |      |          |      |              |     | 81  | - 31 | 1.7 |     |    |          | -    |             |      |     | 810      | 254 | . 5         |           |     | -   | Mag. mer               | 329 1 | 04.0 |
| ì |             |     |   |      |     |      | 31 - | ın  |          |     | 81- | 27   |      |      |     |      |     |      |          |      |              | -   |     |      |     | M.  | an |          |      | 819         | 28′. | 6   |          |     |             |           |     |     |                        |       |      |
| į |             |     |   |      |     |      |      |     |          |     |     |      |      |      |     | R    | 186 | ilti | ng       | dip. | к1э          | 27  | 9   |      |     |     |    |          |      |             |      |     |          |     |             |           |     |     |                        |       |      |

[Date, April 19, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 1<sup>b</sup> 15<sup>m</sup> a. m. time of ending, 1<sup>b</sup> 35<sup>m</sup> a. m.]

inning, 14 15m

in magnetic 3 vertical.

er. 32º 10'.0

inning, 2h 12m

n magnetic vertical.

rele N.
N.
S.
rele S.
N.
S.
w. 32° 10'.0

nning, 15 15 m

n magnetic vortical.

rcle N.

r 329 104.0

irele N. N. S. irele S. N. S.

|  | e east, Circle wes<br>west. face east                       | t. Circle west, | Circle west.                        | Cimila mont                |   |                        | 11  |
|--|---|-----------------|-------------------------------------|----------------------------|---|------------------------|---|
| S. N. S.   |   | THEO WORK       | face west.                          | Circle west,<br>face east. |   | rcle east,<br>ce east. | Circle in magnetic<br>prime vertical.                       |
|  | N. 8. N   | 8. N.           | 8. N.                               | S. N.                      | 8. N. S.  | N.                     |   |
| 2 10 81 49 81 55<br>12 11 81 48.5 81 55.<br>81° 59', 7 81° | 81 33 81 20 81 1<br>5-81 33 81 21 81 1<br>44′, 2 81° 19′, 5 | 81 32 81 30     | 81 34 81 27<br>36 27<br>81 35 81 27 | 25 16                      | 81 50 81 16 81 33<br>47 17 81 33<br>81 48 5 81 16 5 81 33 | 08                     | Oircle N. Needlo N. Needlo S. Oircle S. Needlo N. Needlo N. |
| 819 52'. 0   |   | 0 25/. 1        |                                     | 25′. 9                     | 81° 26′. 1  | 1011                   | Mag. mer. 32° 10′.  |
| M  | ean 81º 38/. 6  |                 |                                     | Mean                       | 81° 26′. 0  |                        | 1   |

[Date, May 17, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 2\* 15\*\* a.m.]

|     |     | enst<br>int |      |     |        | unt,<br>est. |         |     | le w    | est. |      | ircb<br>face |    |     | 1   | Circl<br>face |      |     |      | Circle |      |       |      |     |     | ant,<br>est. |      | Circl<br>face |      |    | Circle in magnetic<br>prime vertical. |
|-----|-----|-------------|------|-----|--------|--------------|---------|-----|---------|------|------|--------------|----|-----|-----|---------------|------|-----|------|--------|------|-------|------|-----|-----|--------------|------|---------------|------|----|---------------------------------------|
| s.  |     | N.          | -    | s.  |        | N.           |         | S.  |         | N.   |      | Ħ.           | -  | N.  |     | 8.            |      | N.  |      | À      |      | N.    |      | 8.  |     | N.           |      | 8.            |      | N. |                                       |
| 31  |     | o .         | 0 81 | 37  | n1     | 1.19         | o<br>81 | 11  | o<br>81 | , 13 | 81   | 21           | 81 | 18  | 81  | 1 94          | 0 81 | 19  | 91   | , 00   | 0 81 | 00    | 0    | 43  | 0   | 12           | 81   | 28            | 81   | 02 | Oire to N                             |
| 182 |     | 0.6         |      | 40  |        | 17           |         | 15  |         | 14   |      | 21           | _  | 19  | !_  | 21            |      | 19  |      | 00     |      | 03    | -i   | 43  |     | 13           | -    | 27            | 1    | 02 | Needle N. 372 46<br>Needle S. 38 48   |
| 31  |     | 1 08        | 181  | 31% | . 5.81 | 1.18         | 81      | 14. | 3.81    | 13.  | 5 81 | 21           | 81 | 18. | 5 8 | L 22.         | 5 81 | 19. | 0.81 | 00     | 81   | 01. 5 | 5-81 | 43  | 81  | 13.          | 5 81 | 27. !         | 61   | 02 | Oircle 8<br>Nee-lle N. 34 30          |
| 81  | 2 2 | 0.0         | 1    | 81  | u 28   | 1.2          |         | 810 | 14      | . 0  |      | 810          | 19 | 8   | -   | 810           | 20   | . 7 | -    | 810    | -00  | . 8   |      | 810 | 27  | . 7          |      | 810           | 141. | 8  | Needle S. 36 22                       |
|     |     | 81          | 241  | . 1 |        |              |         |     |         | 810  | 16   | . 9          |    |     | -   |               |      | 81  | 10   | . 8    |      |       | 1    |     |     | 819          | 21   | . 2           |      |    | Mag. mer. 36 51                       |
|     |     |             |      | N   | len    |              |         | 12  | 20      | i    |      |              |    |     |     |               |      |     |      | M      | an   |       | 8    | 11) | 164 | ()           |      |               |      |    |                                       |

(Date, May 18, 1882 - Staton, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 2. Time of beginning, 16 20m a m time of ending, 19 30m a.m.]

|         |   |      |    |     | 1             | ol | ar | its | ıfı         | 111.1 | rk | 296 | (3) | nd   | A   | ne   | rti | ١. |             |     |     |                  | Ì   |      |     |    |            | P   | ola | rit         | 7 0 | ť m | ar   | ked | let         | ıd . | B    | nor      | th. |     |             |    |     | į   |                                     |
|---------|---|------|----|-----|---------------|----|----|-----|-------------|-------|----|-----|-----|------|-----|------|-----|----|-------------|-----|-----|------------------|-----|------|-----|----|------------|-----|-----|-------------|-----|-----|------|-----|-------------|------|------|----------|-----|-----|-------------|----|-----|-----|-------------------------------------|
| (       |   | rel  |    |     |               |    |    |     | 60<br>5 (2) | 41    |    |     |     |      |     |      | t,  |    | lire<br>fac |     |     |                  | ļ   |      |     |    | esi<br>at. |     |     | lire<br>fac |     |     |      |     | lire<br>fac |      |      |          |     |     | rele<br>ice |    | at, |     | Circle in magneto<br>prime vertical |
|         | S |      |    | 5   |               |    | 5  |     |             |       |    |     | S.  |      | !   | 45   |     |    | S.          | . 1 |     | N.               |     |      |     |    | N.         |     |     | S.          | 1.  | N   |      | 4.  | S.          | -    | 1    | N.       | -   | 8   |             |    | N.  |     |                                     |
| o<br>81 |   |      | 81 | 1 1 | ,<br>10<br>10 | 81 | 4  | 18  | HT.         |       |    | 81  | 11  |      |     | 0:   |     | 81 | 27<br>29    |     |     | 25<br>2 <b>6</b> |     | 1 2  | 0   |    | 16<br>17   |     |     | 19<br>19    | 8   | 1 1 |      | 81  | 38<br>38    | - la |      | 19<br>18 | 1.  | 3   | I)          | 81 |     |     | Oirele N<br>Needle N.<br>Needle S   |
| 81      | 3 | 12   | 8  | 1   | 0.            | К  | 1  | 7.  | 61          |       |    | н1  | 16  | 5. 5 | 81  | L 0  | 3   | 81 | 28          | 8   | 31  | 25,              | 5,8 | 1 2  | 0   | 81 | 16         | . 5 | 81  | 19          | 8   | 1 1 | 8. 5 | 81  | 38          | .8   | 81   | 18.      | 5.8 | 1 3 | 0           | 81 | 04. | . 5 |                                     |
|         | ŧ | 31 2 | 21 | r.  | D             |    | ł  | 31  |             |       |    |     | 8   | 12   | 0:1 | ۲. ۲ |     |    | 81          | o 2 | 6′. | 7                | -   | -8   | 110 | 18 | . 2        |     |     | 813         | 18  | 3 6 | 1    | 1   | 81          | D 2  | 181. | 9        |     | 8   | 10          | 17 | . 2 | 1   | Needle S.<br>Needle S.              |
|         |   |      |    | é   | 31 2          | 29 |    |     |             |       |    | 1   |     |      |     | 8    | 1 . | 13 | . 2         | -   |     |                  | -   |      |     |    | 81         | 9 1 | H.  | 5           | -   |     |      |     |             |      |      | 81       | 131 | . 7 |             |    |     | ii  | Mag mer 362.51:                     |
|         |   |      |    |     |               |    |    |     |             |       |    | . 1 | (1) | - 13 | 3   | 7    |     |    |             |     |     |                  |     |      |     |    | W          |     |     | M           | ear | n.  |      | . 1 | i)          | 20   | r (i |          |     |     |             |    |     |     |                                     |
|         |   |      |    |     |               |    |    |     |             |       |    |     |     |      |     |      |     | -  | Re          | เมย | lti | ng               | diş | ), 8 | 10  | 22 |            |     |     |             |     |     |      |     |             |      |      |          |     |     |             |    |     |     |                                     |

[Date, May 19, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 15 20m a. m. j time of ending, 15 52m a. m. j

|              |            | I,   | ola  | rit      | of   | ma       | rke | l en     | d B | no  | rth. |            |      |          |     |          |             |            | Pe   | lari      | ty e        | of ma        | irke | d en | III A | noi          | rth. |                 |              |          |                                    |
|--------------|------------|------|------|----------|------|----------|-----|----------|-----|-----|------|------------|------|----------|-----|----------|-------------|------------|------|-----------|-------------|--------------|------|------|-------|--------------|------|-----------------|--------------|----------|------------------------------------|
| Circle e     | 648<br>848 | t,   |      |          |      | ast.     |     | Circ     |     |     | t, : | Circ       | de v | reat     | .   | Ch<br>fa | ele<br>ee v | west.      |      | Cir<br>fa | clo<br>ce e | west<br>ast. | 1    |      |       | ant,<br>ent. |      |                 | de e<br>e ca | ast,     | Circle in magnetic prime vertical. |
| 8.           | 2          | 7.   |      | S.       | 1    | N.       |     | 8.       |     | N.  |      | в.         |      | N.       |     | В.       | 1           | N.         | 1    | 8,        |             | N.           | 1    | S.   |       | N.           |      | s.              |              | N.       |                                    |
|              | 0          | ,    | 1 0  | ,        |      | 0 /      |     | 0 /      | 1   | 0 / | i    | 0 1        | 1    | . /      | i   | 0        |             | 0 /        |      | 0         | 1           | 0 /          | 1    | 0 /  | -     | 0 /          | C    | - 7             | , (          | 0 /      | Uirele N.                          |
| 1 37 8<br>39 | 1 1        | 5    | 81   | 52<br>58 | 81   | 30<br>30 | 81  | 15<br>15 | 8   | 12  |      | 1 36<br>36 |      | 32<br>32 |     | 1 24     |             | 1 19<br>20 |      | 20        |             | 1 20<br>20   |      | 39   | 81    | 13           | 81   | $\frac{37}{37}$ | 81           | 15<br>15 | Needle N.<br>Needle S.             |
| 1 38 .8      | 1 1        | 4. 5 | 81   | 52.      | 5.81 | 30       | 8   | 15       | 81  | 11. | .58  | 1 36       | 81   | 32       | 8   | 1 24     | . 8         | 1 19       | . 58 | 1 22      | . 58        | 1 20         | 81   | 38.  | 5.81  | 13           | 81   | 37              | 81           | 15       | Circle S.                          |
| 810 26       | y, 2       |      |      | 810      | 41   | . 2      |     | 819      | 13  | . 2 | -    | 819        | 34   | . 0      | 1   | 81       | 21          | ·. 7       | 1    | 81        | 0 21        | 4.3          |      | 810  | 25    | . 7          |      | 810             | 26           | . 0      | Needle N.<br>Needle S.             |
|              | 8          | 10   | 33′. | 7        |      |          | İ   |          |     | 819 | 25   | . 6        |      |          |     |          |             | 819        | 21   | <br>'- 5  | ,           |              | -    |      | -     | 810          | 25'. | 9               | -            |          | Mag. mer. 39º 51                   |
|              |            |      |      | ħ        | lear | ١        |     | 810      | 287 | 7   |      |            |      |          |     |          |             |            |      |           | Mea         | n            |      | 810  | 23/.  | 7            | -    |                 |              |          |                                    |
|              | _          | -    |      |          |      |          |     |          |     |     |      | Re         | enlt | ine      | din | - 81     | o 941       | . 0        |      |           |             | -            |      |      |       |              | -    |                 |              |          |                                    |

[Date, June 16, 1882, Göttingen fime. Station, Uglaamie, Alaska, Observer, A. C. Dark, Dip circle No. 23, Needle No. 1. Time of beginning, 11<sup>h</sup> 15<sup>m</sup> p. m.; time of ending, 11<sup>h</sup> 45<sup>m</sup> p. m.]

|              |     |      |          | P   | oli | arit         | у о | f n  | ar | ke | l en         | d A  | no       | rth. |               |     |      |      |               |     |          | Pol      | rit      | y of | mat      | ked | er       | nd I  | 3 1 | iort          | h. |    |              |    |   |  |
|--------------|-----|------|----------|-----|-----|--------------|-----|------|----|----|--------------|------|----------|------|---------------|-----|------|------|---------------|-----|----------|----------|----------|------|----------|-----|----------|-------|-----|---------------|----|----|--------------|----|---|--|
| Cire<br>face |     |      |          |     |     | Sire<br>face |     |      |    | 0  | irel<br>face | e w  | est,     | 1    | Circl<br>face | e w | eat, | 1    | Sire!<br>face | e w | est,     | ;        |          |      | est.     |     |          | ele e |     |               |    |    | le e<br>e on |    |   | Circle in magneti<br>prime vertical.       |
| s.           |     |      | N.       | 1   | _   | s.           |     | N    |    |    | S.           |      | N.       |      | s.            |     | N.   |      | S.            |     | N.       |          | s.       | -    | N.       | -   | ß.       |       | 1   | Ñ.            |    | S. |              | N. |   |  |
| 27<br>30     | 11. |      | 07<br>12 |     |     | 35<br>38     | 8   | 1 3  |    |    | 25<br>27     | 81   | 20<br>23 |      | 31<br>33      |     | 22   | -81  | 27<br>25      | 61  | 30<br>33 | 61<br>81 | 20<br>17 | 81   | 19<br>16 |     | 42<br>39 |       |     | ,<br>22<br>19 |    |    | , c<br>,FI   |    |   | Circle N. Needle N. 361 48 Needle S. 27 42 |
| 28.          | 5.8 | 1    | 09.      | 5   | 81  | 36.          | 58  | 1 3  | 5  | 81 | 26           | 81   | 21.      | 5 81 | 32            | H   | 22.  | 5 81 | 26            | 81  | 31.      | 5 81     | 18.      | 581  | 17.      | 581 | 40.      | .58   | 1 : | 20. 5         | 81 | 33 | .81          | 63 | _ | Circle 8.                                  |
| 810          | 11  | )′.: | 0        | 1   |     | 819          | 3.5 | 54.8 |    |    | 81-          | 23   | .7       |      | 815           | 27  | .3   |      | 81:           | 28  | .7       |          | 819      | 18   | .0       |     | 81       | ÷ 30  | ٧., | ;             |    | 81 | 18           | 0  |   | Needle N. 76 46<br>Needle S. 56 B          |
|              |     |      | 81       | 0 5 | 7'. | 4            |     |      |    |    |              |      | 81       | 25   | .5            |     |      |      |               |     | ۶1°      | 23       | .4       | -    |          |     |          |       |     | 810           | 21 | .2 |              |    |   | Mag. mer. 36 43                            |
|              |     |      |          |     |     | 2            | 1ea | in   |    | 8  | 12.2         | 67,4 |          |      |               |     |      |      |               |     |          |          | 2        | Ien  | n        |     | 11.      | 23'.8 | 3   |               |    |    |              |    |   |  |
| _            |     |      |          |     |     |              |     |      |    |    |              |      |          | . *  | Res           | ult | ng   | din  | , R10         | 25  | .1       |          |          |      |          |     |          |       |     |               |    |    |              |    |   |  |

[Date, June. Station, Uglaamie, Alaska. Observer, A. C. Dark. Dip circle No. 23. Needle No. 3, 4 deflecting.]

| Circle east,<br>Mic. D,<br>face east. | Mi          | le east.<br>c. R.<br>cast. |             | e west.     | Circle<br>face |             | Circle<br>face |             |             | c cast,     |
|---------------------------------------|-------------|----------------------------|-------------|-------------|----------------|-------------|----------------|-------------|-------------|-------------|
| 8. N.                                 | s.          | N.                         | s.          | N.          | s.             | N.          | S.             | N.          | S.          | N.          |
| 9 01 58 31<br>00 29                   | 42 30<br>30 |                            | 65 40<br>38 | 65 26<br>24 | 08 09<br>08 08 | 67 39<br>36 | 65 45<br>47    | 65 02<br>04 | 07 04<br>06 | 66 17<br>20 |
| 9 00.5: 58 30                         | 42 30       | 41 23.5                    | 65 39       | 65 25       | 68 07. 5       | 67 37. 5    | 65 46          | 65 03       | 67 05       | 66 18.      |
| 58 - 451.3                            | 41-         | 56.7                       | 6,          | - 32        | 67             | 521.5       | 65             | 24'.5       | €60         | 41'.7       |
|                                       |             |                            |             | 660         | 421.3          |             |                | 660         | 037.1       | -           |

[Date, June 18, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 2. Time of beginning, 2h 20m a. m. time of ending, 2h 40m a. m.]

| Circle cast      |   |            |           |           |      | . 1711  | 1188         | , 01         | 1111 | 1.46  | d en          | 11 21 | 16() } | cre, |              |      |     |    |     |     |     | . (71) |     | 178  | 121651 | n e'ti | lend | - 28 | 141787 | es i |     |         |         |             |      |
|--|---|------------|-----------|-----------|------|---------|--------------|--------------|------|-------|---------------|-------|--------|------|--------------|------|-----|----|-----|-----|-----|--------|-----|------|--------|--------|------|------|--------|------|-----|---------|---------|-------------|------|
| 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 /  | C | h c<br>fac | de<br>e e | en<br>ran | int, | : (     | žire<br>face | le e<br>e we | ant. |       | Cire!<br>face | lo w  | rat,   |      |              |      |     |    |     |     |     |        |     |      |        |        |      |      |        |      |     |         |         |             |      |
| 135 81 10 81 37 81 (0 81 37 81 08 81 20 81 21 81 12 81 00 81 30 81 34 181 05 81 90 81 47 81 28 81 35 81 20 81 35 81 20 36 13 38 10 3 | 1 | 8.         |           |           | N.   |         | 8.           |              | N.   |       | 8.            |       | N.     | 1    | 8.           | 1    | N.  |    | S.  | :   | N.  |        | 8.  |      | N.     |        | S.   |      | N.     |      | Ħ,  |         | N.      |             |      |
| 36   10   38   09   20   22   13   09   39   33   06   00   47   29   35   29   Needle N. Needle S.     35, 581   10   81   37, 581   08, 581, 20   81   21, 581   12, 581   09   81   39   81, 33, 581   05, 581   00   81   47   81   28, 581   35   81   29     61° 22°.7   81° 23°.0   81° 20°.7   81° 10°.8   81° 36°.2   81° 02°.8   81° 37′.7   81° 27′.5   Needle N. Needle S.     81° 22°.0   81° 15°.7   81° 10°.5   81° 32°.6   Mag. mer. 36   44° 381   32°.6     61° 22°.0   81° 15°.7   81° 10°.5   81° 32°.6   Mag. mer. 36   44° 381   32°.6   Mag. mer. 36   4   |   |            |           |           |      | 0<br>81 | 37           | S KI         | 7    | - 1   | 1 90          | 91    | 91     | 0 81 | 19           | -    |     |    |     |     |     |        |     |      |        | 0 81   | 47   | 0 81 | 112    | 0 81 | 28  | 5<br>81 | 7<br>90 | Circle 1    | V.   |
| Circle 8.   S10 227.7   S10 237.0   S10 207.7   S10 107.8   S10 307.2   S10 027.8   S10 377.7   S10 277.5   Needle N.   Needle S.   Needle S.   S10 227.0   S10 107.7   S10 107.5   S10 327.6   Mag. mer. 36 48  | _ | _          | _         | -         | _    | _       | 38           |              |      |       | 20            | -     | 23     |      | 13           |      | 0.0 |    | 39  | _   | 33  |        | 06  |      | 00     |        |      | _    |        |      |     |         | 20      |             |      |
| 81° 22°.0 81° 15′.7 81° 10′.5 81° 32′.6 Needle S Mag. mer. 30° 4   | ì | 35.        | 5         | 81        | 10   | 81      | 37.          | 5.81         | 4,8  | . 5.8 | 1. 20         | 81    | 21.    | 5.81 | 12.3         | 5.81 | 09  | 81 | 39  | 81. | 33. | 5.81   | 05, | 5.81 | 00     | 81     | 47   | 81   | 28.7   | 5.81 | 35  | 81      | 20      | Circle .    | 8.   |
| Mag.mer. 36 4  |   | 819        | 0 9       | 2:27      | 7    | i       | 81           | 23           | '.0  |       | 81-           | 20'   | .7     |      | 8 <b>t</b> ° | 10   | .8  |    | 810 | 36′ | .2  |        | 810 | 02/  | 8,     | -      | 810  | 37/  | .7     |      | 810 | 27'     | d,      |             |      |
| Mean81° 1973 Mean81° 26.1  |   | _          |           |           | 810  | 134)/   | .0           |              |      |       |               |       | 819    | 15/  | .7           |      |     | !  |     |     | 810 | 19/    | .5  |      |        | ł      |      |      | 81     | 32   | 5.6 |         |         | Mag. mer. 3 | 6 45 |
|  |   |            |           |           |      |         | 7            | Hea          | n    |       | 810           | 194.3 |        |      |              |      |     |    |     |     |     |        | 2   | fear | 1      |        | 40.9 | 6.1  |        |      |     |         |         | 1           |      |

(Date, June 18 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip. circle No. 23. Needle No. 4, weighted. Time of heginning, 35 10m a. m.]

| Needle No. 4               | , weighted.  | 1  | Needle No. 3,  | No. 4 deflecting  |
|----------------------------|--|--|--|---|
| Circle east,<br>face west. |  |  | Circle east,<br>Mic. D.<br>face east.  | Circle east,<br>Mic. R<br>face east.  |
| 8. N.                      | 8. N.  | S. N.  | S. N.  | 8. N.   |
| 66 05   65 20<br>05   21   |  | 66 40   66 17                                    | 58 48 59 18<br>52 22   | 42 04 41 22<br>08 20  |
| 68 05 65 20, 5             | 69 48 69 26  | 66 40.5 66 17.5                                  | 58 50 59 20  | 42 06 41 21   |
| 65° 42′.7                  | 690 37'.0  | 662 297.0  | 59° 05′.0  | 41° 43′.5   |
| 124,6                      | 68   | > 03.  |  |   |
|                            | Circle east, face west.  8. N. ; 66 05   65 20   66 05   65 20   66 05   65 20,5 | face west. face east.    8.   N.   8.   N.     0 | Circle east, face east, face west, face west, face west, face east, face west | Circle east, face west, face west, face west, face west.  S. N. S. N. S. N. S. N. S. N.  60 05 65 20 69 48 69 26 66 40 66 17 58 48 59 18 60 60 65 65 20 50 48 69 26 66 40 5 66 17 5 58 50 59 20 65 42 7 69 37 0 66 29 0 56 0 50 0 |

[Date, June 19, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning. 1<sup>h</sup> 20<sup>m</sup> a. m.; time of ending. 1<sup>h</sup> 45<sup>m</sup> a. m.]

|   |    |           |    |      |               |     | 1  | 0   | nı       | İŧŅ | 1   | ť   | ma       | rl | ed | eı | ıd | B        | na   | rth      | ١. |     |             |     |       |          |    |     |     |      |           |     |       | Į,  | ols | ıri           | v | of          | mı       | ırk | æd | eı   | nd | 4 1  | 101 | th. |     |           |     |     |      |
|---|----|-----------|----|------|---------------|-----|----|-----|----------|-----|-----|-----|----------|----|----|----|----|----------|------|----------|----|-----|-------------|-----|-------|----------|----|-----|-----|------|-----------|-----|-------|-----|-----|---------------|---|-------------|----------|-----|----|------|----|------|-----|-----|-----|-----------|-----|-----|------|
|   |    | ele<br>ce |    |      |               |     |    |     | ire      |     |     |     |          |    |    |    |    | ea<br>ea |      | ıt,      | 1  |     | Circ<br>fac |     |       |          |    |     |     |      | We<br>Wes |     | t,    |     |     | rel           |   |             | st,      |     |    |      |    | e es |     |     |     | Cir<br>Eu |     | en  |      |
| 6 | ĸ. |           | ı  | 7    | ř.            |     |    | 6   | 5.       |     |     | D   | r.       |    |    | S. |    |          | N    | r.       |    |     | S.          |     |       | N.       |    |     | S.  |      |           | N.  |       |     | 8   |               | ! | 1           | N.       |     |    | S.   |    | 1    | N.  |     |     | 8.        |     |     | N.   |
| 0 |    | 'n        |    |      | ,<br>11<br>12 |     |    | 1   | 42<br>42 |     |     | 1   | 19<br>18 |    |    | 1  | 2  |          | 1    | 14<br>14 | 1  |     | 21          |     | 81    | 18<br>18 |    | 81  |     | •    | 81        | 1   |       | 8   | 1 2 | ,<br>25<br>25 |   | 81          | 23<br>24 |     | 81 | 4    | 4  |      | 1 1 | 9   |     | 45        |     |     | 2121 |
| 1 | 3  | 5         | 1  | 1    | 11            | . 5 | 8  | 1   | 41       | _   | 8   | 1   | 18.      | 5  | 8  | 1  | 3  | 18       | 1    | 14       |    | 81  | 21          | . 5 | 81    | 18       |    | 81  | 18  | 3, 5 | 81        | . 1 | 14, 1 | 8   | 1 : | 25            | 1 | 81          | 23       | . 5 | 8  | 1. 4 | 4  | 8    | 1 1 | 9   | 81  | 15        | . 5 | 81  | 22   |
|   | H  | 10        | 23 | '. : | 2             |     |    |     | ۶,       |     | 30  |     |          |    |    | 8  | 10 | 13       | '. E | ,        | 1  |     | 81          | 0   | 9'.   | 7        |    |     | 81  | 0    | 16′.      | 5   |       |     | 1   | 810           | 2 | <b>4</b> ′. | 3        |     |    | 8    | 10 | 31   | . 5 |     |     | 81        | - , | 33. | 7    |
|   |    |           |    |      | 81            | ٦   | 26 | . 1 | 3        |     |     |     |          |    |    |    |    |          |      | 81       | 1  | 6'. | fi          |     |       |          |    |     |     |      |           | þ   | 17    | 201 | . 4 |               |   |             |          |     |    |      |    |      | ×   | 1 - | 32. | ti        |     |     |      |
|   |    |           |    |      |               |     |    |     |          | 3   | lei | 131 |          |    | .8 | 10 | 21 | .7       |      |          |    |     |             |     |       |          |    |     |     |      |           |     |       |     |     |               | M | 246.1       | 1        |     | 8  | 10   | 26 | 7,5  |     |     |     |           |     |     |      |
| - | -  |           |    |      |               |     |    |     |          |     |     |     |          |    |    |    |    |          |      |          |    |     | В           | est | ılt i | ng       | di | in. | 819 | 0 2  | 47.       | ,   |       |     |     |               |   |             |          |     |    |      |    |      |     |     |     |           |     |     | _    |

II. Ex. 44——82

15 °0′° a. m. 3

ele N.

r. 36° 51'

1. Time of

nungnetic vertical.

[Date, June 19, 1882. Station, Uglnamic, Alaska. Observer, J. Casaidy. Dip circle No. 23. Needlo No. 4, weighted. Time of beginning, 35 105 a.m.]

|             |         | N     | sedle No.        | 4, weight      | ed.   |        |                  |   | Needle      | No. 3, 2               | vo. 4 defi   | ecting.     |
|-------------|---------|-------|------------------|----------------|-------|--------|------------------|---|-------------|------------------------|--------------|-------------|
|             | e east, |       | e east,<br>west. | Circle<br>face |       |        | e west,<br>west. | ı |             | enst,<br>. D,<br>cast. | , Circle Mic |             |
| 8.          | N.      | S.    | N.               | 8.             | N.    | 8.     | $\mathbb{N}.$    |   | 8.          | N.                     | 8            | N.          |
| 66 53<br>53 | 66 08   | 65 54 | 65 09            |                |       | 05 21  | 65 00<br>00      |   | 59-08<br>09 | 59 04<br>05            | 41-45<br>10  | 41 II<br>16 |
| 66 53       | 66 08.2 | 65 55 | 05-08-5          | 64 32.5        | 68 11 | 65 22  | 65 00            |   | 59 08.5     | 59 04, 5               | 41 45 5      | 11.15       |
| 66          | 30.7    | 450   | 315.8            | 680 2          | 1'. 7 | 650    | 11'. 0           |   | 590 (       | 964. 5                 | 41           | 30.3        |
|             | 662     | 014.2 |                  |                | 66    | 46'. 4 |                  |   |             |                        |              |             |
| -           |         |       | dean             | . 66 1 234.    | н     |        |                  | , |             | u' 39                  | ° 41′, 6     |             |

| Date July 17, 1882, Station, Uglaamie, Alaska. | Dip circle No. 23. | Needle No. 2. | Time of beginning, 15 40% a m.]

| Circle east,<br>face west. |  |                       |                                      |  |  | Circle in magnetic prime vertical.   |
|----------------------------|--|-----------------------|--------------------------------------|--|--|--|
| S. N.                      | S. N.  | S. N.                 | S. N.                                | . S. N.  | 8. N. S. N.  |  |
| 81 36 ->1 15               | 81 00 81 02  | 81 23 81 24           | 81 17 81 19                          | 81 14   81 05  | 81 26 81 97 81 35 81 13  | Circle N. Needlo N. Needlo S   |
| H 37 81 15                 | 81 01 81 02.5  | 81 24 81 23           | 81 17.581 19                         | 81 14. 5 81 04.  |  | Circle 8.  |
| 81 26 , 0                  | 81 01.7  | 81 - 23', 5           |                                      | 810 09, 5  |  | Needle S   |
| 0/. 5                      | 810  | 12'. 6                |                                      |  | 81° 20′. 6   | Mag. mer. 369-45',   |
| Mean                       | . 81 16.6  |                       |                                      |  |  |  |
|                            | face west.  S. N | Tace west   Face Gast | Tace west.   Face west.   Face west. | Tare west.   Face west.   Face west.   Face west.   Face west.   Face west.   Face west.   Face west.   St. N. S | Tare west   Face oast   Face west   Face | Tace west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face east.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face west.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Face west.   Face east.   Face west.   Fac |

[Date, July 17, 1882. Station, Uglaamie, Alaska, Observer, J. Cassidy. Dip circle No. 23. Time of ending, 1<sup>h</sup> 50<sup>m</sup> a. m.]

| 30 37.5<br>        |             | 40 02.5               |             | 66 15, 5<br>65° ! |             |             | 65 50.5     | 67 01.5 6<br>66° 39 |            | 66 45       | 22', 5           |
|--------------------|-------------|-----------------------|-------------|-------------------|-------------|-------------|-------------|---------------------|------------|-------------|------------------|
| 0 /<br>30 37<br>38 | 60 18<br>20 | 40 02<br>03           | 41 16<br>18 | 66 15<br>16       | 65 32<br>32 | 66 35<br>37 | 65 50<br>51 |                     | 6 18<br>18 | 66 45<br>45 | 66 00<br>0i      |
| S                  | N.          | 15.                   | N.          | S.                | N.          | S.          | N.          | 8.                  | N.         | S.          | N.               |
| Mic<br>face o      |             | Circle<br>Mic<br>face | . R.        | Circle<br>face    |             |             | west.       | Circle e<br>face we |            |             | e cast.<br>east. |

Date, July 18, 1882. Station, Ughannie, Alaska. Observer, J. Cassudy. Dip circle No. 22. Needle No. 1. Time of beginning, 18188 a, m.]

|             |   |    |    | ola  | rit, | y o  | 1  | nar | kee | tene        | l A | no:  | rth |       |      |      |      |               |    |          | Pol  | la i     | ty e | of n | mrk | rel | en          | d I | l noi    | rth. |     |   |      |    |                                       |
|-------------|---|----|----|------|------|------|----|-----|-----|-------------|-----|------|-----|-------|------|------|------|---------------|----|----------|------|----------|------|------|-----|-----|-------------|-----|----------|------|-----|---|------|----|---------------------------------------|
| Circ        |   |    |    |      |      | le e |    |     |     | irel<br>fn: |     |      |     | Sire! |      |      |      | Treli<br>face |    |          | . (  |          | ie i |      |     |     | irel<br>ace |     |          |      |     |   | cen  |    | Circle in magnetic<br>prime vertical. |
| S.          |   | ,  | '  |      | Ħ.   |      | P  | i.  |     | 4           |     | N    |     | 8.    |      | N    |      | 8             |    | N.       |      | Н.       | ,    | N    |     | 9   | 4.          |     | N.       |      | 8.  |   | N    | ī. | _                                     |
| 1 1         |   |    | ,  |      |      |      |    |     |     |             |     |      |     | . , * |      | ,    |      |               |    | ,        |      |          | -1,  | . ,  |     |     |             | o   |          |      |     |   |      |    | Circle N.                             |
| 51 42<br>42 |   |    | 17 | 41   | 36   |      |    |     |     | 26<br>26    |     | 10   |     | 11    |      |      |      | 25            |    | 23<br>22 |      | 20<br>21 | В    |      | 5 H |     | 18          |     | 32<br>32 | ×I   | 21  |   | 111  |    | Needle N<br>Needle S                  |
| 81 42       | 2 | 41 | 10 | 5.41 | 36.  | 5.8  | 1  | 11  | н1  | 26          | h1  | 18.  | 58  | 10    | 5.81 | 08.  | à al | 25            | 81 | 22       | 5 KI | 20       | 5 H  | 1.1  | 5 1 | 1   | 17.         | 81  | 32       | 81   | .29 | 5 | 81 1 | 05 | Circle 8                              |
| 71          | 2 | 1) | :; |      | 81   | - 2' |    | 7   |     | 8)          | 201 | 9    |     | ×1    | 09   | 5    |      | ol.           | 21 | 7        |      | 81       | · 1  | 7. 7 |     |     | 81          | 34  | 7        |      | 81  |   | 11   | 7  | Needle 3<br>Needle 8                  |
|             |   |    | -1 | 26'  | 5    |      |    |     |     |             |     | ri l | 15  | 9     |      |      |      |               |    | ×1       | 20   | . 7      |      |      |     |     |             |     | 81       | ч.   | 7   |   |      |    | Mag. mer. 36 ' 4                      |
| _           |   |    |    |      | 3    | 110  | 11 |     |     | 1 2         | 1 1 |      |     |       |      |      |      |               |    |          |      |          | Mes  | ın.  |     | .81 | 2           | 2 : | 2        |      |     |   |      | ٠  |                                       |
|             |   |    |    |      |      |      |    |     |     |             |     |      |     | Res   | ulti | 21 C | dio. | 81            | 21 | 7        |      |          |      |      |     |     |             |     |          |      |     |   |      |    |                                       |

| | Date July 18, 1882. Station Agia onic Alaska. Observer, J. Cassidy. | Dip circle No 23.

in magnetic se veri cal

met. 362-455.

Creete N e S. Circle S.

| Needle        | N   | 1 6 | So | (d)  | 11s                    | 1111, |     |              |      |     | ,    | See | He i | No. | 4, 11 | reigl    | hted |          |     |                 |     |       |
|---------------|-----|-----|----|------|------------------------|-------|-----|--------------|------|-----|------|-----|------|-----|-------|----------|------|----------|-----|-----------------|-----|-------|
| Circle<br>Mrc | 1   | ),  |    | 31   | le e<br>ic. Ii<br>e en |       |     | Suc.<br>thee |      |     |      |     |      |     |       |          | Wes  |          |     |                 |     |       |
| S.            |     | N.  |    | S    |                        | N.    |     | 8            |      | N   |      | 8.  | -    | N.  | 1     | 8.       | 1    | N.       | 1   | S.              |     | N     |
|               | - 3 |     | 2  |      |                        |       | 1   |              |      |     | ٥    | ,   |      | 1   |       | ,        | 0    | 1        | 5   |                 | 5   | 1     |
| 60 45<br>46   | 61  | 11  |    |      |                        | 13    |     | 05           |      |     |      | 112 |      | 33  |       | 05<br>07 |      | 48<br>48 |     | $\frac{20}{22}$ | 65  | () \$ |
| 60 45 5       | 61  | 11  | 11 | 18.  | 5.41                   | 13.   | 5 % | 05           | (iti | 21. | 5 66 | 11. | 5 65 | 31  | 66    | 00       | 65   | 48       | 65  | 21              | 65  | 04    |
| (is)          | 58  | 2   |    | 11   | - 31                   | 0     |     | 66           | 431  | 2   |      | 650 | 51   | . 2 | i     | 650      | 571  | 0        |     | 65              | 127 | . 5   |
|               |     |     |    |      |                        |       |     |              |      | 66  | 17'. | 2   |      |     | i     |          |      | 650      | 341 | , н             |     |       |
|               | 11  |     | -  | 15.7 |                        |       |     |              |      |     |      | M   | lean |     | 6.    |          |      |          |     |                 |     |       |

(Date July 19, 1882 Station, Ughamie, Alaska. Obsorver, J. Cassidy Dip circle No. 23, Needle No. 2. Time of beginning, in 20 c f

|   |   |     |   |          | Pol | 31        | 113 | ot        | 111 | ar | K (*) | len         | и. | 13 21 | 101 | th. |               |      |          |       |      |     |     |     | Pol  | a Eri | ty ( | οť  | 1111111 | ke | ter | 1d . | A no        | rth  |      |           |      |              | j. |                                       |
|---|---|-----|---|----------|-----|-----------|-----|-----------|-----|----|-------|-------------|----|-------|-----|-----|---------------|------|----------|-------|------|-----|-----|-----|------|-------|------|-----|---------|----|-----|------|-------------|------|------|-----------|------|--------------|----|---------------------------------------|
|   |   | re1 |   | st.      |     |           |     | <b>₩€</b> |     |    |       | irel<br>fac |    |       |     |     | lire!<br>face |      |          |       |      |     | We: |     | C    |       |      |     |         |    |     |      | east.       |      |      |           |      | ant,<br>int. | 1  | Circle in magnetic<br>prime vertical. |
|   | ž |     |   | N        |     | 3.        | ١.  |           | N   |    |       | S.          |    | N     | ξ.  | :   | S.            |      | N.       |       | 8    |     |     | N.  | ,-   | S.    | -    |     | N.      |    | S.  |      | N.          | i    | 8    | s.        |      | N.           | -  |                                       |
|   | 4 |     | S | 92<br>92 | 3   |           | 18  | 81        | 2.  |    |       | 19<br>19    | 8  | 1 2   |     | 81  | 22<br>23      | 81   | 17<br>18 |       | 31 3 | 2   | 81  |     | 81   | 1     |      | 81  | 80      | 81 |     | . 8  | 31 26<br>26 |      |      | .32<br>31 |      | 08<br>06     | [  | Circle N. Needle N. Needle 8.         |
|   |   | 7.  |   |          | 7   |           |     |           |     |    |       |             |    |       |     |     | 23            |      |          | . 5 8 |      |     |     |     | 81   |       |      | -   |         | 81 |     |      | 0/. 7       | - 1  |      |           | 5 81 | 07           | F  | Circle 8 Needle N. Noedle S.          |
| - |   | -   |   | ٥.       | 3.  | -<br>', ' | -   |           |     |    |       |             |    | 8     | 312 | 20  | . 5           | -    |          | - 1   |      |     | -   |     | · 19 |       |      |     |         | -  |     |      | 81          | lo 5 | 28'. | 0         |      | _            | -  | Mag mer. 35 / 45/.                    |
|   |   |     | - |          |     |           | М   | car       | ١.  |    | . 8   | 12          | 28 | 1     |     |     |               |      |          | ,     |      |     |     |     |      |       | Me   | an. |         | 8  | 810 | 23   | . 9         | -    | _    |           |      |              | 1  |                                       |
| _ | _ |     |   | <br>-    |     |           |     |           |     |    |       |             |    |       |     |     | Re            | suli | ing      | g di  | р, 8 | 310 | 26  | . 0 |      |       |      |     |         |    |     |      |             |      |      |           |      |              |    |                                       |

[Date, July 19, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Time of ending, 15 50m.]

| N  | redl                | e N   | o, 3 | . N | (), | 4 det              | lee  | ting     |    |               |    |          |      | Ne   | edle | · No     | . 4, | wei | ghte | rd.      |      |              |    |     |
|----|---------------------|-------|------|-----|-----|--------------------|------|----------|----|---------------|----|----------|------|------|------|----------|------|-----|------|----------|------|--------------|----|-----|
| 1  | Circl<br>Mi<br>face | e. 1. | ),   |     |     | ireb<br>Mi<br>face | e. I | R.       |    | lire!<br>face |    |          | . (  |      | le w | est,     |      |     | le e |          |      | Hard<br>face |    |     |
|    | Ñ.                  |       | N.   |     |     | И.                 |      | N.       |    | 8.            | ,  | N.       | 1    | И,   | 1    | N.       | -    | н.  | 1    | N.       |      | 8.           | 1  | N.  |
| 60 | 45<br>45            | 60    | 23   |     |     | 48<br>47           | 41   | 42<br>42 | 67 | 00            |    | 16<br>15 | 65   |      |      | 08<br>08 |      | 26  | 66   | 04<br>05 | 65   | 24<br>24     | 65 |     |
| 60 | 45                  | 60    | 22   | 5-1 | 12  | 47. 7              | 41   | 42       | 67 | 00            | 60 | 15.      | 5 65 | 4×,  | 5 65 | 08       | 66   | 26. | 5 60 | 01.      | 5 63 | 24           | 65 | 14. |
|    | 600                 | 334   | 7    | 1   |     | 420                | 14   | ', 8     |    | 660           | 37 | . 7      |      | 661  | 28   | . a      | ļ    | 650 | 15'  | . 5      |      | 650          | 19 | 3   |
|    |                     |       |      |     |     |                    |      |          |    |               |    | 66-      | 08   | , () |      |          | 1    |     |      | 65       | 47   | 4            |    |     |
|    |                     | 11    |      | in. | 0 ; | 35.7               |      |          | ł  |               |    |          |      | 3    | lean |          | (    | 35  | 53%  | 2        |      |              |    |     |

[Date, August 17, 1882, Station, Ughamie, Alpska. Observer, J. Cassidy. Dip circle No. 23 Needle No. 1. Time of beginning, 15 15% a. m. 4 time of ending, 15 40% a. m. 1

|               |     | P   | oli | rit      | of      | nı   | arl  | ker   | Len           | 1 /  | no.        | rth |     |             |     | 1          |      |              |      |            | Po  | lo  | rity     | of   | 3111     | nke  | el e | nd,           | 4 2  | orth   |     |      |      |      | J |                                       |
|---------------|-----|-----|-----|----------|---------|------|------|-------|---------------|------|------------|-----|-----|-------------|-----|------------|------|--------------|------|------------|-----|-----|----------|------|----------|------|------|---------------|------|--------|-----|------|------|------|---|---------------------------------------|
| Circle e      |     |     |     | 'ire     |         |      |      |       | Sirel<br>fire |      |            |     |     | ireb<br>neo |     |            |      | Arcl<br>face |      |            |     |     | rele     |      |          |      |      | ele c<br>se w |      |        |     |      |      | ast. | i | Circle in magnetae<br>prime vertical. |
| 8.            | N.  | ij  |     | В.       | 1       | N    | ٠    |       | Ħ.            |      | N.         |     |     | ß.          |     | N.         |      | g,           |      | N.         |     | 2   | ń,       |      | N.       |      | н.   |               | N    |        | F   | i.   |      | N.   |   |                                       |
| 1 28 81<br>29 | 01  | 1   |     | 51<br>51 | 81      | 21   |      |       | 07<br>09      |      | 07<br>08   |     | ° 1 |             | 21  | 291<br>330 | - 81 | 24 24        | В    | 1 16<br>17 | 8   |     | 12<br>14 | 81   | 15<br>16 | h1   | 45   | [4]           | 1 1  | 8 8    |     |      |      | 11   |   | Circle N.<br>Needle N.<br>Needle S.   |
| 28, 5 81      | (14 |     | 81  | 51       | 81      | . 24 | 1. 5 | ь1    | ÚΝ            | 8    | 1 07       | . 5 | 81  | 32          | 81  | 29.        | 5.81 | 21           | 8    | 1 16       | .58 | L   | 13       | N    | 15.      | 5.81 | 45   | - 81          | 1    | FI FI  | 1 : | 15.  | 5 81 | 11   |   | Circle B.                             |
| 81° 16′       | . 2 | 1   |     | 810      | ;<br>37 | . 8  |      | _     | 810           | 07   | -<br>''. 8 |     |     | <br>81°     | 301 | . 7        |      | 810          | 20   | 04. 2      |     |     | 810      | 14'  | . 2      |      | 81   | - 31          | 15.1 |        | 1   | H111 | 23   | 4.3  |   | Needle N.<br>Needle S.                |
|               | 81  | 0 : | 27  | . 0      |         |      |      |       |               |      | 81         | 0   | 10' | . 2         |     |            |      |              |      | 81         | 0 1 | 7′. | 2        |      |          |      |      |               | .5   | 31 - 2 | 71. | 4    |      |      |   | Mag. mer. 680 51                      |
|               |     |     |     | 3        | lea     | n .  |      | . , į | 112.1         | 23'. | 1          |     |     |             |     |            |      |              |      |            |     |     | 3        | lear | 1        |      | 817  | 12-11         | . 3  |        |     |      |      |      |   |                                       |
|               |     | -   |     |          |         |      | ~    |       |               |      |            | -   | R   | esti        | tin | z d        | in.  | 817 :        | 14,7 | 7          |     |     |          |      |          |      |      |               |      |        |     |      |      |      |   |                                       |

[Date, August 17, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23.]

| N ere      | dle | r N                 | 0, 3, | No. | 4 di     | ·ilc  | ctin;              | g. I |            |      |     |    | Net | edle No          | . 4, w | eig | lite | d. |                   |             |                                       |
|------------|-----|---------------------|-------|-----|----------|-------|--------------------|------|------------|------|-----|----|-----|------------------|--------|-----|------|----|-------------------|-------------|---------------------------------------|
| 3          | Mi  | e er<br>c. E<br>ear |       |     | M        | ic. l | unt.<br>R,<br>ent. |      |            | le w |     |    |     | e west,<br>east. |        |     |      |    | Circle<br>face    |             | Circle in magnetic<br>prime vertical. |
| 8.         |     |                     | N.    |     | S.       |       | N.                 | ,    | s.         | 1.   | N.  |    | S,  | N.               | 5      | 3.  | ı    | N. | S.                | N.          | a dead                                |
| 3 58<br>58 | R   | 59                  |       |     | 45<br>46 | 41    | 35<br>35           | .64  | 5 26<br>26 | 65   | 08  | 65 | 59  | 65 32<br>33      |        | 50  | 65   |    | 65 15<br>16       | 05 30<br>30 | Virole N.<br>Noedle N.<br>Noedle S.   |
| 58         |     | 59                  | _     | _   | 45.      |       | . 35<br>4. 2       |      | 65         | •    |     |    |     |                  | -      |     | 1    |    | 65 15, 5<br>65° 3 |             | Circle S.<br>Needle N.<br>Noedle S.   |
|            | -   |                     |       |     |          |       |                    |      |            |      | 650 | 31 | . 2 | -                |        |     |      | 65 | 27'. 4            |             | Mag. mer. 680 51'                     |
|            |     | u                   | - 3   | 90  | 21'.     | 4     |                    |      |            |      |     |    | M   | lean             | 65     | 11  | 94.1 | ţ  |                   |             |                                       |

[Date, August 18, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 25. Needle No. 2. Time of beginning, 18 12m a. m.] time of ending, 18 35m a. m.]

|   |               | _   |     | 1 | OH   | irit | ()1  | ma       | rke  | 1 6/13       | 11. 11 | 11/11 | n.   |      |      |      |      |              |      |       | 1.019 | 1111 | y 01 | 41111 | 1 16 PH | Len         | 11 77 | HINF     | 186. |               | -      |       |                                 |     |
|---|---------------|-----|-----|---|------|------|------|----------|------|--------------|--------|-------|------|------|------|------|------|--------------|------|-------|-------|------|------|-------|---------|-------------|-------|----------|------|---------------|--------|-------|---------------------------------|-----|
|   | lirel<br>faci |     |     |   |      |      |      |          | (    | 'inc'<br>fac |        |       |      |      |      | est. |      | irel<br>face |      | i st. |       |      |      | rest. |         | Chi<br>faci |       |          |      | 'irel<br>face | 01 (1) | int.  | Chele in magne<br>prime vertica |     |
|   | H.            | ł   | N   |   |      | ß.   |      | N.       |      | 15.          |        | N.    |      | pl,  |      | N.   |      | g.           | ,    | N.    |       | Ы,   |      | N.    |         | 8.          |       | N.       |      | 8.            |        | N.    |                                 |     |
|   | ,             |     |     |   | 0    |      |      | ,        |      |              |        |       |      | ,    | -    |      |      |              |      |       | c     | ,    |      |       | 0       | ,           | 0     |          | 0    | ,             | .,     | ,     | Circle N.                       |     |
|   | 28<br>28      | 81  | 1   |   |      | 51   |      | 28<br>29 |      | 10           |        | 00    |      | 29   |      | 25   |      |              |      | 63    |       | 20   |      | 16    |         | 40<br>43    |       | 24<br>24 |      | 49<br>49      | 91     | 23    | Needle N.<br>Needle S.          |     |
| 1 | 28            | 81  | 1   | 1 | 81   | 81   | И1   | 28       | 5 11 | 10           | 81     | US.   | 5.81 | 29). | 5.81 | 25   | 81   | 08           | 81   | 03    | 81    | 19.  | 5 81 | 15    | 61      | 45          | 81    | 24       | ы    | 40            | *1     | 23, 5 | Circle H.                       |     |
|   | 810           | 19  | , s |   |      | 817  | 397  | . 7      |      | 81           | 07     | . 7   |      | 81   | 1177 | . 3  |      | 812          | 00   | . 8   |       | 8]   | 17   | . 3   |         | 81:         | 34    | , Б      |      | 810           | 361    | . 3   | Needle N.<br>Needle 8.          |     |
|   |               |     | 8   | 0 | 29'. | 6    |      |          |      |              |        | H12   | 17   | . 5  |      |      |      |              |      | 81    | 11'   | 4    |      |       |         |             |       | 812      | 354  | 4             |        |       | Mag. mer. 680 f                 | 11. |
|   |               | ~ ~ |     |   |      | λ    | lens | ١        | 8    | 1 :          | 237. ( | 3     |      |      |      |      |      |              |      |       |       |      | Mea  | n     |         | ejn j       | 201.  | i        |      |               |        |       |                                 |     |
|   |               |     |     |   |      |      |      |          |      |              |        |       |      | 120  | andr | inzi | lin. | h12          | -171 | 8     |       |      |      |       |         |             |       |          |      |               |        |       |                                 |     |

[Date, August 18, 1862. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23.]

|                                       | Needle      | No. 3, N             | o. Edet            | h ering.              |                         |                    |             |       | Nev         | die No. 4   | l, weigt    | ited.            |             |             |
|---------------------------------------|-------------|----------------------|--------------------|-----------------------|-------------------------|--------------------|-------------|-------|-------------|-------------|-------------|------------------|-------------|-------------|
| Circle east,<br>Mic. D,<br>face east. | Mic         | enst,<br>D,<br>cost. | M:                 | const.<br>ER<br>east. | Circle<br>Mic<br>face o | R.                 |             | west. | Circle      |             |             | e east,<br>West. |             | le cant,    |
| 8. N.                                 | 8.          | N.                   | М.                 | N.                    | 8.                      | N.                 | S.          | N.    | 8.          | N. ,        | 8.          | N.               | 8.          | N.          |
| 59 25 59 08<br>24 06                  | 59 93<br>83 | 50 31                | 0 /<br>42 35<br>35 | 41 39<br>32           | 42 20<br>10             | 5 /<br>41 05<br>05 | 65 21<br>21 | 00 CB | 05 58<br>52 | 65 30<br>95 | 65 19<br>19 | 64 39<br>40      | 66 40<br>40 | 65 54<br>55 |
| 59 24. 5 59 97                        | 59 03       | 59-34.5              | 42 35              | 41 31                 | 42 19.5                 | 41 05              | 65-21       | 65 00 | 65 52 8     | 65, 29, 5   | 65 19       | 64 39, 5         | 66. 40      | 65 54       |
| 590 15/. 7                            | 50~         | 18'. 7               | 400                | 037. 0                | 412-4                   | 2'. 2              | 6,50        | 10% 5 | 650 4       | 11'. 0      | 650         | 29/. 2           | 660         | 17'. 2      |
| 590                                   | 17'. 2      |                      |                    | 410                   | 52′. 6                  |                    |             | 650   | 25.7        |             |             | 650 !            | 53', 2      |             |
|                                       |             | u'=50°               | 25', 1             |                       |                         |                    |             |       | 31          | ean         | 650 39      | 7.5              |             |             |

[Date, August 19, 1882. Station, Uglaamie, Alaska. Observer, J. Cassidy. Dip circle No. 23. Needle No. 1. Time of beginning, 1<sup>h</sup> 10<sup>m</sup> a. m. 4 time of ending. 1<sup>h</sup> 35<sup>m</sup> a. m.]

| 81       | 36    |      | 10 3   | 2′. ( | 3    |      | -        |    |          |    | 810      | 17  | . 0      |     |          |      |                |      | 810      | 12/  | . 4 |      |          |       |          |     | 810      | 27'  | 4        |     |          | Mag. mer. 68° 51'.                   |
|----------|-------|------|--------|-------|------|------|----------|----|----------|----|----------|-----|----------|-----|----------|------|----------------|------|----------|------|-----|------|----------|-------|----------|-----|----------|------|----------|-----|----------|--------------------------------------|
| 81       | 36    | y. 7 | . !    |       |      |      |          |    |          |    |          |     |          |     |          |      |                |      |          |      |     |      |          |       |          |     |          |      |          |     |          |                                      |
|          | -     | _    | -      | {     | 310  | 28′. | 5        | -  | 810      | 18 | 2        |     | 810      | 15/ | . 8      |      | 810            | 17′. | 7        | -    | 810 | 07'. | 0        | * *** | 810      | 381 | 2        | 1    | 810      | 21  | 5        | Needle N.<br>Needle S.               |
| 48       | 8     | 1 2  | 5. 5 8 | 11 4  | 0    | 81   | 17       | 81 | 13       | 81 | 23.      | 581 | 18       | 81  | 13.      | 5.81 | 19             | 81   | 16.      | 5 81 | 09  | 81   | 05       | 81    | 45       | 81  | 21.      | 5.81 | 34       | ١.1 | 09       | Circle S.                            |
| 49<br>47 | 18    | 1 2  |        | 41 4  | 10   | 81   | 16<br>18 | 81 | 13<br>13 | 81 | 23<br>24 | 81  | 17<br>19 | 81  | 13<br>14 | 81   | 19<br>19       |      | 16<br>17 | 81   | 09  |      | 04<br>06 | 81    | 45<br>45 | 81  | 21<br>22 | 81   | 34<br>34 | 81  | 08<br>10 | Needle N.<br>Needle S.               |
| ,        | 10    | . /  | - 1    | 0     |      | 0    |          | 0  | ,        |    | ,        | 1 " | ,        |     | ,        |      | ,              | 0    |          | 1 -  | 1   | 0    | 1        | 0     | ,        | 0   | ,        | 0    | ,        | 0   | 1        | Circle N.                            |
| S.       |       | N    | -      | 8     |      | , :  | N.       |    | 8.       | 1  | N.       |     | S.       |     | N.       |      | S.             |      | N.       | 1    | S.  |      | N.       |       | 8.       |     | N.       | [    | 8.       | 1   | N.       |                                      |
|          | ele e |      |        |       | reli |      |          |    | fac      |    |          |     |          |     | est.     |      | 'irele<br>face |      |          |      |     |      |          |       |          |     | st.      |      | face     |     | ant,     | Circle in magneti<br>prime vertical. |

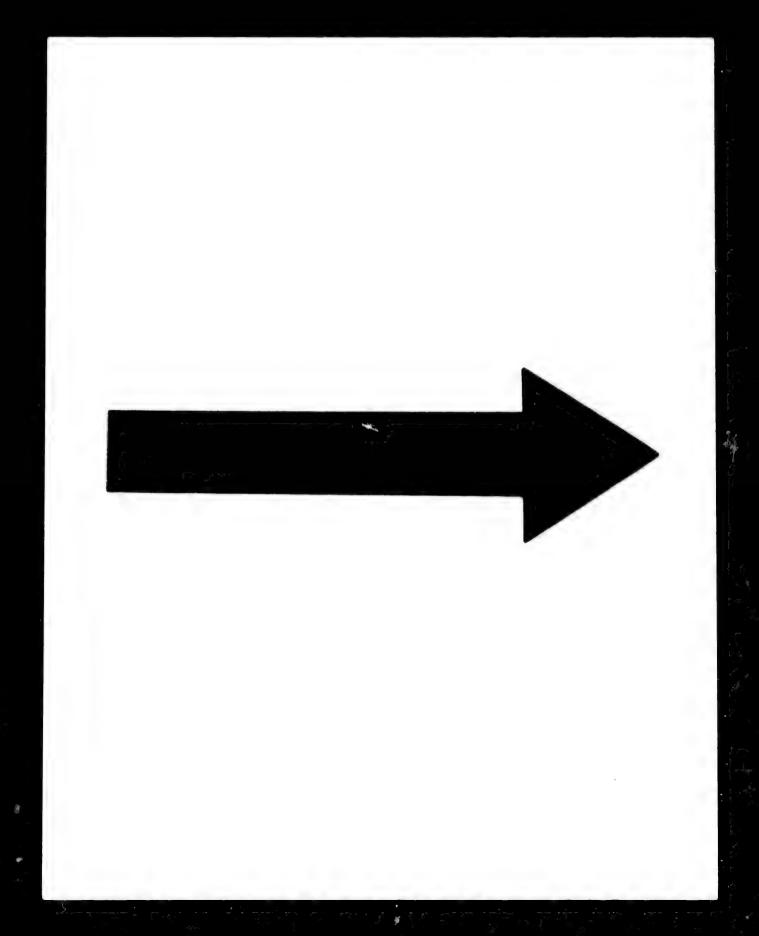
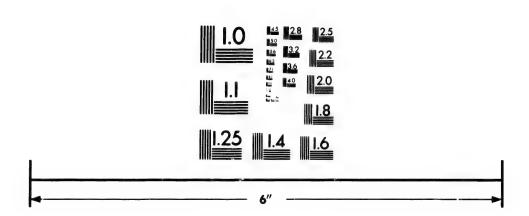


IMAGE EVALUATION TEST TARGET (MT-3)

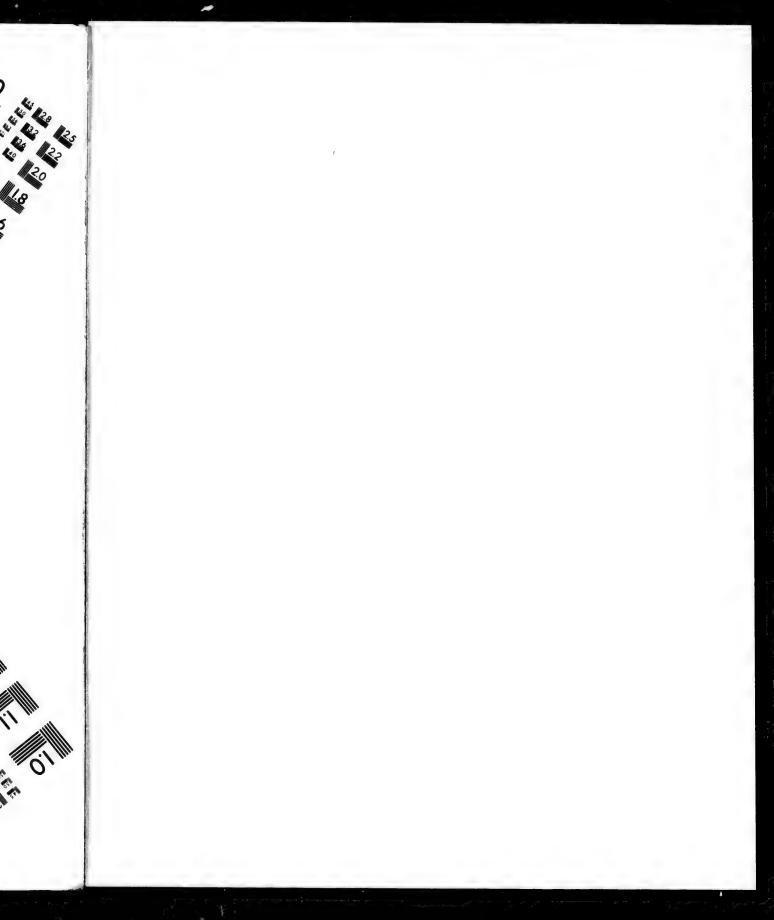


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23 WEST MAIN STREET WEBSTER, N.Y. 14580 (716) 872-4503

Brill Still



(Date, August 19, 1882. Station Uglaamie Alaska. Observer. J. Cassidy. Dip circle No. 23. Needle No. 2, 4 deflecting.]

|                       | ,    |          | N      | ceth          | 170    | . 3, 3   | No.  | 4 det               | lecti | ng.      | ~    |               |     |    |    |               |            |          |      | N           | eedle         | No.        | 4, w | eigh          | ited |                 |     |                |         |     |
|-----------------------|------|----------|--------|---------------|--------|----------|------|---------------------|-------|----------|------|---------------|-----|----|----|---------------|------------|----------|------|-------------|---------------|------------|------|---------------|------|-----------------|-----|----------------|---------|-----|
| Circle<br>Mic<br>face | . D, |          |        | irele<br>face |        |          |      | Circl<br>Mi<br>face | c. R. |          |      | Sircl<br>face |     |    |    | Uirel<br>Tave |            |          |      | Cire<br>fac | le w<br>c oau |            |      | Circl<br>face |      |                 | . 0 | Jirele<br>face | 08H     | вŧ, |
| 8.                    | 1    | N.       | 5      | ,             | N      | ī.       |      | S                   | 1     | N.       | , 1  | S.            |     | N. |    | S.            |            | N.       |      | 8.          |               | N.         |      | 8.            |      | N.              | 8   | 8.             | 1       | N.  |
| 59 30<br>81           | 59   | 50<br>50 | 59     | 23<br>24      | 50     | 00<br>00 | 41   | 56<br>56            |       | 05<br>05 |      | 223           | 41  | 15 | 65 | 16<br>16      | 64         | 54<br>54 | 6    | 34<br>35    | 6             | 5 14<br>16 | 65   | 35<br>36      | 6    | ,<br>1.56<br>56 | 66  | 43<br>44       | o<br>66 |     |
| 59 30, 5              |      |          |        | 23. 5         |        |          | 41   | 56                  | 41    |          | 42   | 22, 5         |     |    | 65 | 16            | 64<br>05/. | 54       | 1 62 | 850         | 5 68          |            |      | 35, !<br>650  |      |                 |     | 43.5<br>66°    |         |     |
| 500                   |      |          | 26/, ( | <br>190       | 11'. 8 |          |      | 410                 |       |          | 397. | 41°           | 48. |    |    | 0.0           | υσ.        | 65°      | 14/. |             | 24.           |            |      | 00"           | 10.  | 650             |     |                | £13°, q | ,   |
|                       |      |          | -      |               | 1/     | - 399    | 2 90 | , o                 |       |          |      |               | -   | -  |    |               |            |          |      | 1           | Mea1          | à          | 65   | o 32          | 1. 2 |                 |     | -              |         |     |

[Date, August 31, 1882 | Station, Ughamie, Alaska, Observer, J. E. Maxfield, Dip circle No. 28, Needle No. 1. Time of beginning, 21 10m a.m., time of ending, 22 40m a.m.]

|   |                 |    |                 | Po | аті       | ty | of | m        | ark   | ed  | en       | d A  | noi         | th. |             |      |          |     |               |    |          | Pel  | arit     | у о  | fma           | rke | d er         | d A  | 3 no     | rth. |          |     |               |                         |    |          |
|---|-----------------|----|-----------------|----|-----------|----|----|----------|-------|-----|----------|------|-------------|-----|-------------|------|----------|-----|---------------|----|----------|------|----------|------|---------------|-----|--------------|------|----------|------|----------|-----|---------------|-------------------------|----|----------|
|   | ire:            |    |                 | 1  | Cia<br>fa |    |    |          |       |     |          | r W  | est,<br>st. | , ( | Circ<br>fac |      | est.     |     | Circl<br>face |    |          | ; •  |          | le v | vest,<br>ast. |     | Circ<br>face |      |          |      |          |     | east,<br>ast. | Circle in m<br>prime ve |    |          |
| 1 | 3.              | Ī  | N.              | i  | s.        |    | Ĺ  | N.       |       | - ; | š.       |      | N.          | 1   | S.          |      | N.       |     | S.            |    | N.       |      | S.       |      | N.            | 1   | 8.           |      | N.       |      | 8.       | -   | N.            |                         |    |          |
| 5 | ,               | 0  | 1               | 10 | ,         |    | 0  |          |       | 0   | ı        | 0    |             |     | ,           |      | ,        | 0   |               | 0  | ,        | 0    | ,        | 0    | 1             | 0   |              | 0    | ,        | 0    |          | į   | ) /           | Circle                  | N. |          |
|   | $\frac{00}{02}$ | 81 | 28<br><b>30</b> |    | 51<br>51  |    | 8) | 27<br>26 |       | 81  | 29<br>27 | 81   | 27<br>25    | 81  | 26<br>24    | 81   | 21<br>19 | 81  | 31<br>29      | 81 | 29<br>26 | 81   | 19<br>16 | 81   | 16            | 81  | 53<br>54     | 81   | 28<br>28 | [8]  | 30<br>31 | 8   | 08<br>08      | Needle N.<br>Needle S.  |    |          |
| 1 | 01              | 81 | 29              | 8  | 5         | ?  | 81 | 26       | . 5 ( | 31  | 28       | 81   | 26          | 81  | 25          | 81   | 20       | 81  | 30            | 81 | 27.      | 5 81 | 17.      | 5 81 | 15            | 81  | 58.          | 5 81 | 28       | 81   | 30.      | 5 8 | 07            | Circle                  |    |          |
| _ | 810             | 15 | 0               | 1  | 81        | 0  | 39 | 2        | - 1   | _   | 810      | 27   | . 0         | -   | 810         | 22   | . 5      | -   | 810           | 28 | . 7      |      | 810      | 16   | . 3           | i   | 810          | 40   | 4.7      | -    | 819      | 18  | 7.7           | Needle N.<br>Needle S.  |    | 53<br>03 |
| - |                 | _  | 81              | 27 | . 1       |    |    |          | 1     |     |          |      | 810         | 24  | . 7         | _    |          | -   |               |    | 810      | 22   | 5        |      |               | ĺ   |              |      | 819      | 29   | . 7      |     |               | Mag. mer.               | 70 | 22.      |
| _ |                 | -  |                 |    | :         | Мe | an |          |       | 8   | 0 2      | 25'. | 9           |     |             |      |          | -   |               |    |          |      | Ъ        | fear | n             |     | 810          | 26′. | 1        |      |          |     |               |                         |    |          |
|   | _               | _  | _               | _  | _         | _  |    |          | -     |     |          |      |             |     | Re          | anlt | ing      | din | 810           | 26 | . 0      |      |          | -    |               |     |              |      |          |      |          |     |               |                         |    |          |

[Date, August 31, 1882. Station, Uglaamie, Alaeka. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning. 3\* 10\* a. m.; time of ending. 3\* 35\* a. m.]

| Need        | 110                             | 140  | . 0,          | 744 | y, 4    | · cre    | . 114. | cu   | щ           |   |           |          |     |     |          |     |     | 74.0 |    | 0 1 |             | ъ, | "      | eig      |    | cu.     | ·        |      |                         |      |          |                                  |         |
|-------------|---------------------------------|------|---------------|-----|---------|----------|--------|------|-------------|---|-----------|----------|-----|-----|----------|-----|-----|------|----|-----|-------------|----|--------|----------|----|---------|----------|------|-------------------------|------|----------|----------------------------------|---------|
| M           | Circle east, Mic. R, face east. |      |               |     |         |          |        | -    | Circ<br>fac |   | we<br>Wes |          |     |     |          | 6 W |     | ŧ,   |    |     | ire<br>face |    |        |          |    | Circ.   | le es    |      | Circle in m<br>prime ve |      |          |                                  |         |
| 8.          | i                               | N    | ,             | ,-  | 1       | 8.       | -      |      | N.          |   |           | s.       |     |     | N.       | ,   | S.  |      |    | N.  |             |    | 8      | 3.       |    | 1       | N.       | 1    | 8.                      |      | N.       |                                  |         |
| 59 09<br>07 | 1                               |      | ,<br>12<br>39 |     | o<br>42 | 43<br>40 |        |      | 30<br>32    |   | o<br>65   | 10<br>05 |     | 64  | 55<br>49 |     | 5 3 | 2    |    | 5 1 | 2           |    |        | 36<br>37 | 1  | 0<br>64 | 52<br>53 | 66   | 20<br>22                | 1 -  | 27<br>30 | Circle<br>Needle N.<br>Needle S. | N.      |
| 59 08       | 1                               | 58   | 10.           | 5   | 42      | 41.      | . 51   | 41   | 31          | 1 | 65        | 07       | . 5 | 64  | 52       | 6   | 5 3 | 2    | 6  | 5 1 | 1           | 6  | 5      | 86.      | 5  | 64      | 52. 5    | 66   | 21                      | 68   | 28. 5    |                                  | 8.      |
| 580         | 54                              | 7. 2 |               | 1   |         | 42       | 0      | 6. 8 | 5'          | - | -         | 64       | 0 5 | 9'. | 7        | ;   | Ð   | 50   | 21 | . 5 | -           |    |        | 650      | 14 | V. 1    | 5        |      | 650                     | 54'. | 7        | Needle N.<br>Needle S.           |         |
|             | 14                              | -3   | 190           | 29  | y. 7    | 7        | _      |      |             | - |           |          |     |     | 650      | 10' | 6   |      |    |     |             |    | remake |          |    |         | 650      | 34'. | 6                       |      |          | Mag. mer 7                       | 0° 22'. |
|             |                                 |      |               | -   | -       | _        | _      | _    |             | - | -         | _        |     |     |          | 10  | -   |      | Me |     |             | ١. | er.    | 0 2      | 97 |         | 00-      | ON.  |                         |      |          |                                  |         |

[Date, September 14, 1882. Göttingen time. Station, Uglaamie, Alaska. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1, Time of beginning, 15 17° a. m.; time of ending, 15 59°.]

ng.]

of beginning,

in mag**netic** ne vertical.

Circle N.

e N. 71^ 00'
e S. 72 34

Circle S.
e N. 68 53
e S. 69 03

mer. 70 22.5

ecting.

metic ical.

22', 5

|     |          |      |      | 1  | 'ol | arit     | of  | ma       | ike | d en          | d 1 | 3 no     | rth. |          |      |          | 1    |          |      | 1        | Pol | arit.    | y of        | ma         | ırk   | ed   | enc      | 1 4  | nor             | th. |               |     |          |                        |        |
|-----|----------|------|------|----|-----|----------|-----|----------|-----|---------------|-----|----------|------|----------|------|----------|------|----------|------|----------|-----|----------|-------------|------------|-------|------|----------|------|-----------------|-----|---------------|-----|----------|------------------------|--------|
|     |          | le e |      |    |     | lire     |     |          | İ   | Circl<br>face |     |          |      | Circ     |      | rest.    |      | Circ     |      | reat,    | Ī   |          |             | west       |       |      |          |      | nst,            |     | Circl<br>face |     |          | Circle in ma           |        |
| 8   |          | ,    | N    | ۲. |     | S.       |     | N.       |     | 8.            | Ī   | N.       |      | 8.       | Ĺ    | N.       | -    | 8.       | -    | N.       | -   | S.       | -           | N.         |       | 8    | 3.       | -    | N.              |     | 8.            | Ĺ   | N.       | 1                      |        |
| 0   | ,        | c    |      | ,  | 0   | ,        | 0   | ,        | 0   | -             | 10  | ,        | 0    | ,        | 0    | ,        | 10   | ,        | 0    | ,        | 0   | ,        | 10          | ,          | - 4   | 0    | ,        | ! 0  | 1               | 0   | ,             | 1 - | ı        | Circle                 | N.     |
| 1 1 | 20<br>23 | 8    | 5    |    | 81  | 34<br>38 | 81  | 11<br>15 | 181 | 09<br>07      | 81  | 15<br>13 | .81  | 28<br>25 | 81   | 34<br>30 | 81   | 10<br>07 | 81   | 03<br>01 | 81  | 26<br>22 | 8           | 1 27<br>24 |       | 11 4 | i1<br>i0 | 81   | $\frac{20}{18}$ | 81  | 37<br>41      |     | 15<br>19 | Needle N.<br>Needle S. |        |
| 1 : | 1.       | 5 8  | 4    | 8  | 81  | 36       | 81  | 13       | 81  | 08            | -81 | . 14     | 81   | 26.      | 5 81 | 32       | 81   | 08.      | 5 81 | 02       | 81  | 24       | 8           | 1 25       | . 5 8 | 31 4 | 10. 5    | 81   | 19              | 81  | 39            | 81  | 17       | Circle                 | 8.     |
| 8   | 110      | 34   | /. 8 |    |     | 810      | 24/ | . õ      |     | 810           | 11  | ,        |      | 819      | 29   | . 2      | -    | 819      | 05   | ·. 0     |     | 81       | . !<br>o 24 | r. 8       | 1     |      | 810      | 29   | . 8             |     | 810           | 28  | ,        | Needle N.<br>Needle S. |        |
|     |          |      | 8    | 1  | 204 | 6        |     |          |     |               |     | 810      | 20   | . 1      |      |          |      |          | _    | 81       | 0 1 | <br>5/   |             |            | -     |      |          |      | 810             | 28/ | . 9           |     |          | Mag. mer. 7            | 0° 22′ |
|     |          |      |      |    |     | M        | ean |          |     | R10 2         | 4'. | 9        |      |          |      |          | -    |          | -    |          |     | M        | [ear        | a          |       | 81   | 0 2      | 21'. | 9               |     |               |     |          |                        |        |
| -   | -        |      |      |    |     | -        |     |          | -   |               |     | 400.0    |      | Re       | ult  | ing      | dip. | 810      | 23   | . 4      |     |          |             |            |       |      |          |      | -               |     |               |     |          | i                      |        |

[Date, September 14, 1882. Göttingen time. Station, Uglaamie, Alaaka. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting.]

| Needle 1                      | No. 3, 1   | lo.   def   | lecting.                  | t.f         |                     | Ne          | edle No.    | 3, weighted.               |                            |                                       |
|-------------------------------|------------|-------------|---------------------------|-------------|---------------------|-------------|-------------|----------------------------|----------------------------|---------------------------------------|
| Circle e<br>Mic. I<br>face ea | D,         | Mi          | e east,<br>c. R,<br>east. |             | le west,<br>e west. |             | west,       | Circle east,<br>face west. | Circle east,<br>face east. | Circle in magnetic<br>prime vertical. |
| S.                            | N.         | S.          | N.                        | 8.          | N.                  | 8.          | N.          | 8. N.                      | S. N.                      |                                       |
| -                             | 9 26<br>28 | 42 19<br>21 | 42 26<br>28               | 65 36<br>28 |                     | 67 00<br>02 | 66 30<br>32 | 65 36 64 58<br>38 65 90    | 67 04 65 37<br>06 39       | Circle N.                             |
| 59 16 5                       | 59 27      | 42 20       | 42 27                     | 65 29       | 65 19               | 67 01       | 66 31       | 65 37 64 59                | 67 05 65 38                | Needle S.                             |
| 590 21                        | . 5        | 420         | 28'. 5                    | 68          | 5º 24'              | 660         | 46'         | 65° 18′                    | 66° 21′. 5                 | Needle N.<br>Needle S.                |
|                               |            |             |                           |             | 660                 | 05/         |             | 65°                        | 49', 8                     | Mag. mer. 70° 22'.                    |
|                               | u' = 39    | 07'. 5      |                           |             |                     | M           | ean         | 65° 57′. 4                 |                            |                                       |

[Date, September 30, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning, 1<sup>k</sup> 20<sup>m</sup> a. m.; time of ending, 2<sup>k</sup> 05<sup>m</sup> a. m.]

|                  |      | Ī   | oli | urity          | of   | mai      | kee | l ene        | i A | nor      | th.      |               |         |                |     |              |    |          | Pol | arity         | of      | mar          | kee | t end          | B    | nor      | th. |               |      |          |                                      |                |
|------------------|------|-----|-----|----------------|------|----------|-----|--------------|-----|----------|----------|---------------|---------|----------------|-----|--------------|----|----------|-----|---------------|---------|--------------|-----|----------------|------|----------|-----|---------------|------|----------|--------------------------------------|----------------|
| Circle<br>face e |      |     |     | lire!<br>face  |      |          |     | irel<br>face |     | est,     |          | Jirel<br>face |         | est,           |     | irel<br>face |    | rest,    |     | ircle<br>face |         | rest,<br>st. |     | Circl<br>face  |      |          |     | lirel<br>face |      |          | Circle in ma                         |                |
| 8.               | N    | ī.  |     | 8.             |      | N.       |     | 8.           |     | N.       |          | 8.            | -       | N.             | 1   | S.           |    | N.       | -   | 8.            |         | N.           |     | 8.             | 1    | N.       |     | 8.            | 1    | N.       | 1                                    |                |
| 35               | 81   | 11  | _   | 24<br>26<br>25 | _    | 02<br>04 | _   | 12<br>10     | L   | 22<br>18 | 81<br>81 | 05<br>08      |         | 28<br>26<br>27 | L   | 08<br>05     | 81 | 32<br>28 | 81  | 02            | 81      | 17<br>15     | L   | 52<br>54<br>58 | -    | 13<br>16 | į.  | 28<br>28      | 80   | 50<br>50 | Needle N. 7<br>Needle S. 7<br>Circle | 3 20'<br>2 51' |
| 810 2            | 21'. | 5   |     | 81             | 0 14 | -<br>V   |     | 810          | Ľ   |          | i        | 810           |         |                | 1_  | 810          | 1  |          |     | 819           |         |              | -   | 810            | -    |          | -   |               | 0 09 |          | Needle N. 6<br>Needle S. 6           |                |
|                  |      | 810 | 17' | . 8            | _    | -        |     |              | -   | 810      | 15       | . 5           | 100 100 |                |     |              | -  | 810      | 14  | . 1           |         |              | 1   |                |      | 810      | 21  | .4            |      |          | Mag. mer. 7                          | 1 19.          |
|                  |      |     |     | M              | Lear | 1        |     | 810          | 16' | 6        |          |               | _       |                |     |              | _  |          |     | M             | <br>081 | 1            |     | 810            | 17′. | 8.       |     | -             |      |          |                                      |                |
|                  |      |     | -   |                |      |          |     |              |     |          |          | Res           | ulti    | ing d          | ip, | 810          | 17 | '.2      |     | -             |         | -            | -   | -              |      |          |     |               |      |          |                                      |                |

[Date, September 30, 1882. Station, Uglaamie, Alaska, Göttingen time. Observer, J. E. Maxfield. Dip circle, No. 23, Needle No. 3, 4 dedecting. Time of beginning, 2<sup>h</sup> 10<sup>m</sup> a. m.; time of ending, 2<sup>h</sup> 55<sup>m</sup> a. m.]

| Circle<br>Mic<br>face | . D |          |   |    | ire<br>Mi<br>face | c. | R,   |   |     |          | e we |                   |    | Cire<br>fa |            | W @ |                |   |         |     | e ea<br>wes |          | •    |          | le ca<br>s cas |          | Circle in magne<br>prime vertical                |
|-----------------------|-----|----------|---|----|-------------------|----|------|---|-----|----------|------|-------------------|----|------------|------------|-----|----------------|---|---------|-----|-------------|----------|------|----------|----------------|----------|--|
| s.                    |     | N.       | 1 | 2  | Š.                | 1  | N.   |   | - 1 | s.       | 1    | N.                |    | s.         |            | 1   | Ň.             |   | 8       |     | 1           | N.       |      | В.       | 1              | N.       | Circle N.  |
| 0 /<br>01 01<br>03    | 60  | 05<br>07 | 1 | 42 | 26<br>24          |    | 12 1 |   | 65  | 12<br>10 |      | ,<br>5 01<br>1 59 | 6  | 6 03       |            | 63  | ./<br>43<br>41 |   | o<br>56 | 11  | 65          | 26<br>28 | 66   | 40<br>42 | -              | 54<br>52 | Needle N.<br>Needle S.<br>Circle S.<br>Needle N. |
| 1 02                  | 60  | 06       | 1 | 42 | 25                | 1  | 12 0 | ) | 65  | 11       | 65   | 00                | 6  | 6 02       |            | 65  | 42             |   | 86 :    | 12  | 65          | 27       | 66   | 41       | 65             | 53       | Needlo 8.  |
| 600                   | 34  |          | - |    | 42                | 1  | 7'   |   |     | 650      | 05'. | .5                | ı  | 6          | <u>5</u> 0 | 52' |                | 1 |         | 85° | 49'.        | 5        | !    | 66       | 0 17           | ,        | Mag. mer. 71º 1                                  |
|                       |     |          |   |    |                   |    |      |   |     |          |      | 65                | 28 | .8         | -          |     |                | 1 |         |     |             | 660      | 03'. | 2        |                |          |  |

{Date, October 14, 1882. Station, Uglaamie, Alaska. (föttingen time. Observer, J. E. Maxfield. Dip. circle No. 23. Needle No. 1. Time of beginning, 1 25 a.m.; time of ending, 2 a.m.!

|     |    |      |          | Po | la | rit      | y o | f n  | ar | kee | l en     | d J | <b>3</b> no | rth |             |    |     |          |     |    |       |     |        | Pol  | arit     | y of          | f m      | arke | ed ( | end          | A    | nor      | th.     |             |   |      | - |                         |          |          |
|-----|----|------|----------|----|----|----------|-----|------|----|-----|----------|-----|-------------|-----|-------------|----|-----|----------|-----|----|-------|-----|--------|------|----------|---------------|----------|------|------|--------------|------|----------|---------|-------------|---|------|---|-------------------------|----------|----------|
| Cir | ce |      |          | -  |    | ire      |     |      |    |     |          |     | west        | ,   | Cir<br>fac  |    |     |          |     |    |       | we  |        |      |          | le w<br>e e a |          | ,    |      | rele<br>ce v |      |          |         | Circ<br>fac |   |      |   | Circle in n<br>prime ve |          |          |
| 8.  |    |      | N.       | ١  | 1  | 3.       | Ţ   | N    |    |     | S.       | _   | N.          | _   | 8.          |    |     | N.       |     | s. |       | N   | ۲.     |      | 8.       | [             | N.       |      | 8    | . !          |      | N.       | ,<br>i_ | S.          |   | N    | 4 |                         |          |          |
| 0   |    | 0    | , ,      |    | 0  | ,        | i   | 0    | ,  |     | , ,      | ,   | 0 1         |     | 0           | ,  | 0   | ,        |     | )  |       | 5   | ı      | 0    |          | 0             |          |      | 0    | ,            | _    | ,        | 0       |             | 1 |      | , | Circle                  | N.       |          |
| 18  |    | 80   | 55<br>59 | -8 |    | 40<br>45 | 8   | 1 2  |    | 81  | 05<br>01 | 8   | 1 04<br>01  | 8   | 81 28<br>21 |    | 81  | 26<br>22 | 81  | 27 |       | 1 2 | 8<br>5 |      | 25<br>21 | 81            | 26<br>22 | - 8  | 4    |              |      | 12<br>16 | 81      | 36<br>40    |   | 1 07 |   | Needle N.<br>Needle S.  |          |          |
| 16  | 3  | 80   | 57       | 8  | 1  | 42.      | 58  | 1 2  | 5  | 81  | 03       | 8   | 1 02        | 5.8 | 31 23       | -  | 81  | 24       | .81 | 25 | . 5 8 | 1 2 | 6. !   | 81   | 23       | 81            | 24       | 8    | 1 4  | 3            | 81   | 14       | 81      | 38          | 8 | 1 0  | 9 | Circle                  | 8.       |          |
| 81  | 0  | 06′. | . 5      | -  | _  | 810      | 33  | ı. 8 |    |     | 81       | 0:  | 2'. 8       |     | 81          | n  | 23' | 5        |     | 8  | 10    | 26  | _      | -    | 810      | 23            | . 5      | - '  | 8    | 10 2         | 28'. | 5        |         | 819         | 2 | r. 5 | - | Needle N.<br>Needle S.  | 68<br>69 | 58<br>52 |
| _   | _  | _    | 81       | 2  | ο. | 2        |     |      |    | -   |          |     | 81          | 1   | 3'. 2       |    |     |          | 1   |    | -     | 81  | 0      | 24′. | 8        |               |          | 1    |      |              |      | 819      | 26      | ν           |   |      |   | Mag. mer.               | 710      | 231      |
| _   | _  |      |          |    |    | M        | BRE |      |    | 8   | 10 1     | 6.  | 7           | _   |             |    |     | _        |     |    |       |     |        |      | м        | ean           |          |      | 819  | 25           | 4.4  |          |         |             |   |      |   |                         |          |          |
| _   | _  | _    |          |    | _  |          |     | _    |    | _   |          | -   |             |     | R           | 69 | ult | ing      | dip | 8  | 0 :   | 1'  |        |      |          |               |          |      |      |              |      |          |         |             |   | _    |   |                         |          |          |

[Date, October 14, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning. 2<sup>h</sup> 10<sup>m</sup> a. m.: time of ending. 2<sup>h</sup> 50<sup>m</sup> a. m.]

| Need               | 10 240                | . 8, 3 | NO. 4 | aen                  | ectn  | ıg. |    |          |             |      | A.C      | eare         | 240.     | 4, 1 | veigl         | ateu | •        |      |          |             | _        |                                      |
|--------------------|-----------------------|--------|-------|----------------------|-------|-----|----|----------|-------------|------|----------|--------------|----------|------|---------------|------|----------|------|----------|-------------|----------|--------------------------------------|
|                    | e eas<br>. D,<br>east | .,     |       | ircle<br>Mic<br>face | . R.  |     |    |          | west,       | (    |          | e we         |          |      | Circl<br>face |      |          |      |          | eas<br>casi |          | Circle in magneti<br>prime vertical. |
| 8.                 | N                     | ī.     | 8     | 3.                   | 2     | ₹.  | 1  | 3.       | N.          |      | 8.       | 1            | N.       |      | 8.            | :    | N.       |      | 3,       | 2           | Ň.       | Circle N.                            |
| 0 /<br>80 40<br>44 | 61                    |        | 43    | 33<br>37             | 42    |     | 65 | 53<br>50 | 65 42<br>38 | 67   | 21<br>17 |              | 00<br>56 | 66   | 28<br>32      | 65   | 45<br>48 | 67   | 13<br>17 | 65          | 56<br>59 | Needle N.<br>Needle S.<br>Circle S.  |
| 50 42              | 61                    | 25     | 43    | 35                   | 42    | 16  | 65 | 51. 5    | 65 40       | 67   | 19       | 66           | 58       | 66   | 30            | 65   | 46, 5    | 67   | 15       | 65          | 57, 5    | Needle N.<br>Needle S.               |
| 61º                | 03'. 5                |        |       | 420                  | 55, 5 |     |    | 65° -    | 15'. R      |      | 670      | <b>0</b> 8′. | 5        |      | 660           | 08'. | 2        | -    | 66°      | 36'.        | 2        | Mag. emr. 71° 23                     |
|                    |                       |        |       |                      |       |     |    |          | 662         | <br> | )        |              |          |      |               |      | 66°      | 22/. | 2        |             |          |                                      |
|                    | - 44                  | =3     | 80 O  | . 5                  |       |     |    |          |             |      | м        | ean.         |          | . 66 | 0 24          | . 7  |          |      |          |             |          |                                      |

[Date, October 31, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning, 2<sup>th</sup> S<sup>(iii)</sup> in m.; time of ending, 3<sup>th</sup> 10<sup>iii</sup> a. m.]

|   |              |         | 1        | Pol | arity         | of  | ma            | ke | d en     | d Z  | l nor         | th. |          |     |          |     |            |       |               | Pο   | larit             | y oi    | ้นเส          | rke | d cı.        | d B     | no       | rth. |          |    |          |   |
|---|--------------|---------|----------|-----|---------------|-----|---------------|----|----------|------|---------------|-----|----------|-----|----------|-----|------------|-------|---------------|------|-------------------|---------|---------------|-----|--------------|---------|----------|------|----------|----|----------|---|
|   | irele<br>aco |         |          |     | lirel<br>face |     |               |    |          |      | vest,<br>ist. |     | 'ircl    |     |          | 1 . |            |       | west<br>rest. | 4    | Circ<br>fac       | le v    |               |     | Circ<br>face |         |          |      | Circ!    |    |          | Circle in magneti<br>prime vertical.        |
| 8 | ١.           |         | N.       | L   | S.            |     | N.            | !  | 8.       |      | N.            | 1   | s.       | i   | N.       | 1   | 8.         | 1     | N.            |      | S.                |         | N.            |     | s.           | 1       | N.       |      | 8.       | -  | N.       | 1   |
|   | 11<br>15     | o<br>81 | 06<br>10 |     | 50<br>54      | 81  | ,<br>11<br>14 |    | 17<br>14 |      | 1 22<br>18    | 81  | 21<br>17 |     | 28<br>21 | 8   | 1 26<br>23 |       | 1 33<br>31    | 8    | . ,<br>1 10<br>03 | O<br>NJ | ,<br>17<br>13 | 81  | 56<br>59     | o<br>81 | 18<br>21 | 81   | 30<br>34 | 81 | 01<br>03 | Virele N. Needle N. 72° 67' Needle S. 71 21 |
| 4 | 13           | 81      | 08       | 81  | 52            | 81  | 12.           | 81 | 15.      | ħυ   | £ 20          | 81  | 19       | 81  | 26       | 8   | 1 24       | . 5 8 | 1 33          | Н    | 1 08              | 81      | 15            | 81  | 57.          | 5 61    | 19.      | 5 8  | 32       | 81 | 03       | Circle S.<br>Needle N. 69 47                |
| 1 | 310          | 25'     | . 5      |     | 810           | 32' | 8             | !  | 81       | 17   | 1.8           | ĺ   | 813      | 32  | . 5      |     | 81         | 0 2   | 8'. 8         |      | 81                | 11      | 4.5           |     | 81           | 38      | . 5      |      | 810      | 17 | . 5      | Needle S. 70 07                             |
| _ |              |         | 810      | 28  | 9             |     |               | 1  |          |      | 810           | 20  | . 1      |     |          |     |            |       | 81            | 2 20 | 0'. 2             |         |               |     |              |         | 81       | 1 2  | 8'       |    |          | Mag. mer. 76° 50'.                          |
|   |              |         |          |     | M             | Ban |               |    | 910      | 24'. | .5            |     |          |     |          |     |            |       |               |      | 3                 | [ear    | a             |     | 81 `         | 24'.    | 1        |      |          |    |          |   |
| _ |              |         |          | - + |               |     | -             | •  |          | •    |               |     | Res      | ult | ing      | dip | , 81       | 24    | <br>- 3       | -    |                   |         |               |     |              |         | •        |      |          |    |          |   |

[Date, October 31, 1882. Station, Uglaumie, Alaska. Göttingen time. Observer, J. E. Maxtield. Dip circle No. 23. Time of beginning. 35 20m a. m.: time of ending, 45 a. m.]

| Mi          | e east,<br>c. D,<br>east. | Mi           | e cast,<br>c. R,<br>cast. | Circle west,<br>face west. | Circle west.              | Circle east,<br>face west. | Circle east;<br>face east. | Circle in magnetic prime vertical. |
|-------------|---------------------------|--------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|------------------------------------|
| S.          | N.                        | 8.           | N.                        | 8.   N.                    | s. N.                     | s. N.                      | s. N.                      | 1                                  |
| 60 54<br>58 | 61 15<br>19               | 42 14<br>18  | 41 34<br>86               | 66 05 65 54<br>01 50       | 66 49 66 34<br>45 30      | 65 53   65 09<br>57   66   | 67 06 65 05<br>09 09       | Circle N. Needle N. Needle S.      |
| 61°         | 61 17<br>06'. 5           | 42 16<br>41° | 41 85<br>55/, 5           | 66 03 65 52<br>65° 57′, 5  | 66 47 66 32<br>66: 39/. 5 | 65 55 65 04<br>65° 29′. 5  | 67 07.5 65 07<br>66° 07′.2 | Circle S. Noedle N. Needle S.      |
|             | -                         |              |                           | 66>                        | 18'. 5                    | 650                        | 48', 4                     | Mag. mer. 70° 50'.                 |

Date, November 16, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning. 1h 50° n. m.; time of ending, 2h 52° n. m.]

|   |                      | _              |     | )    | Pol  | ari                  | ty ( | of i | mai                  | kee  | l en                 | d I  | no                   | rth. |                        |      |                      | 1    |                      |      |                      | Pol     | arity                | of   | mai                  | rked | em                   | 1 A  | nor                  | th.  |                      |                |          |  |                  |
|---|----------------------|----------------|-----|------|------|----------------------|------|------|----------------------|------|----------------------|------|----------------------|------|------------------------|------|----------------------|------|----------------------|------|----------------------|---------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|----------------|----------|--|------------------|
|   | irel<br>face         |                |     |      |      | Tir<br>fac           |      |      | 14t,<br>8L           | (    |                      |      | rest<br>ist.         |      |                        |      | rest.                |      | 'irel                |      |                      |         |                      |      |                      |      | Circi<br>face        |      |                      |      |                      | le ea<br>o cas |          | Circle in m<br>prime ve                    | agnetical.       |
| 8 | 8.                   |                | N   | ī,   | 1    | 8,                   |      |      | N.                   | t    | 8.                   | ı    | N.                   | 1    | 8.                     |      | N.                   | 1    | s.                   | 1    | N.                   |         | S.                   |      | N.                   | -    | s.                   |      | N.                   | Ţ    | 8.                   | 1              | N.       |  |                  |
| 1 | 36<br>38<br>27<br>30 | 81<br>80<br>81 | 2 5 | 9    | ,81  | 52<br>55<br>48<br>52 |      |      | 13<br>17<br>11<br>13 |      | 06<br>02<br>59<br>55 | 8    | 10<br>05<br>13<br>11 |      | 1 24<br>21<br>17<br>13 | 81   | 28<br>24<br>35<br>31 | 0    | 06<br>02<br>05<br>02 | 81   | 22<br>18<br>27<br>23 | 。<br>81 | 12<br>08<br>14<br>10 | 81   | 21<br>17<br>23<br>10 | 81   | 40<br>44<br>46<br>50 | 81   | 13<br>17<br>10<br>14 | 81   | 40<br>41<br>40<br>41 | 80<br>81<br>81 | 59<br>02 | Circle<br>Needlo N.<br>Needlo S.<br>Circle | 48° 14′<br>51 13 |
| 1 | 32. 8                | 81             | 1   | 3. 8 | 8 81 | 51                   | . 8  | 81   | 13.                  | 5.81 | 00.                  | 58   | 09.                  | 88   | 18.                    | 8 81 | 29.                  | 5 81 | 03,                  | 8 81 | 22.                  | 5 81    | 11                   | 81   | 20                   | 81   | 45                   | 81   | 13.                  | 5 81 | 42                   | 81             | 03.8     | Needle S.                                  |                  |
|   | 810                  | 28             | .3  |      | 1    | 8                    | ı°:  | 12'  | 6                    | 1    | 81                   | o 0! | .2                   |      | 81                     | 24   | .2                   | 1    | 81                   | 13   | .2                   |         | 819                  | 15   | .5                   | -    | 810                  | 20/  | .2                   | ,    | 810                  | 22'.           | 9        | Mag. mer.                                  | 490 044          |
|   |                      |                |     | 819  | 28   | ,                    |      |      |                      | į    |                      |      | 81                   | 14   | .7                     |      |                      |      |                      |      | ٤1:                  | 14      | 4                    |      |                      |      |                      |      | 81                   | 0 26 | ,                    |                |          |  |                  |
|   |                      |                | _   |      |      |                      | Me   | an   |                      |      | 810                  | 21'  | 3                    | -    |                        |      |                      |      |                      |      |                      |         | 3                    | fear | 1                    |      | 810                  | 20'. | 2                    |      |                      |                |          |  |                  |
| - | _                    | _              | _   | _    |      |                      |      |      | _                    | _    |                      |      |                      | _    | R                      | esul | ting                 | dir  | , 81                 | 0 20 | 4.8                  |         |                      |      |                      |      |                      |      |                      |      |                      |                |          |  |                  |

H. Ex. 44----83

. Time of

magneti**o** ertical.

tle N.
72° 15'
74° 27'
rele S.
V. 68° 58
S. 69° 52'
er. 71° 23'

eedlo

[Date, November 16, 1882. Station, Ughaanie, Alaska. Göttingen time. Observer, J. E. Maxield. Dip circle No. 23, Needle No. 3, No. 4 deflecting. Time of beginning, 2\* 55\* a. m.; time of ending, 4\* a. m.]

|         | Nec                   | dle  | No.      | 3, 4 d | of  | lect                | in            |          | 1  |               |    |          |    | N           | eei | llo  | No.      | 4. w | oigt          | ited. |          |      |               |    |          |   |
|---------|-----------------------|------|----------|--------|-----|---------------------|---------------|----------|----|---------------|----|----------|----|-------------|-----|------|----------|------|---------------|-------|----------|------|---------------|----|----------|---|
|         | Airele<br>Mic<br>faco | . D  |          | 1      | 7   | elo<br>tic.<br>ce e | R,            | ,        |    | irele<br>face |    |          |    | lire<br>fac |     |      |          |      |               | e cav |          |      | Sirel<br>face |    |          | · Circle in magnetic<br>prime vertical. |
| -       | 8.                    |      | N.       |        | š.  |                     | 1             | ٧.       | 1  | S.            |    | N.       | -  | s.          |     | 1    | N.       |      | 3.            | 1     | N.       |      | 8.            |    | N.       |   |
| o<br>59 | 52<br>49              | 59   | 30<br>26 | 42     | 1/1 |                     | 0<br>41<br>42 | 58<br>02 | 66 | 27<br>23      | 66 | 11<br>07 |    | 01<br>57    | ,   |      | 10<br>06 | 66   | ,<br>02<br>06 | 65    | 24<br>27 |      | 58<br>02      | 66 | 34<br>38 | <i>Circle N.</i> Needle N. Needle S     |
| 59      | 50. 5                 | 59   | 28       | 42     | 12  | 3                   | 42            | 00       | 66 | 25            | 66 | 09       | 6: | 59          | ,   | 86   | 08       | 66   | 04            | 65    | 28. 5    | 68   | 00            | 66 | 36       | Oircle 8.                               |
| 100     | 590                   | 394. | 2        |        | 4   | 20 (                | ω,            | 5        | -  | 66            | 17 |          | -  | 66          | 0 0 | 31.2 | 5        |      | 650           | 44.   | 9        |      | 67            | 18 |          | Needle S.                               |
|         |                       |      |          | -      | _   |                     |               |          |    |               |    | 660      | 10 | 2           |     | _    |          | -    |               |       | 66º      | 81'. | 4             |    |          | Mag. mer. 49° 04'                       |
|         |                       | 16   | / == 3   | 90 07  | 7.2 | -                   | _             |          | -  |               |    |          |    | -           | Me  | an   |          | . 66 | P 20          | r.8   |          |      | -             |    |          |   |

[Date, November 30, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning, 1 10 a.m.; time of ending, 1 56 a.m.]

|    |          |      |    |     | I  | ola  | arit     | y o  | ľ m      | ark | ed e       | ıd.  | A no       | rth. |               |     |          |     |          |     |          | Pol | arity    | 7 0 | fmai     | rke | d en         | d I  | 3 n  | ort  | h.  |          |    |          |     |                                       |
|----|----------|------|----|-----|----|------|----------|------|----------|-----|------------|------|------------|------|---------------|-----|----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|--------------|------|------|------|-----|----------|----|----------|-----|---------------------------------------|
|    |          | rele |    |     |    |      |          |      | ast.     |     | Circ       |      | west,      | 1    | Circl<br>face |     |          | . 1 |          |     | est,     |     |          |     | west,    |     | Circ<br>face |      |      |      |     | Circ     |    |          | -   | Circle in magnetic<br>prime vertical. |
|    | 8.       |      |    | N.  |    |      | 8.       | Ī    | N.       |     | 8.         |      | N.         |      | S.            |     | N.       | i   | S.       | -   | N.       |     | 8.       | i   | N.       | 1.  | 8.           |      | N    |      |     | 8.       | 1  | N.       |     |                                       |
| 0  | ,        |      | 0  | ,   |    | 0    | ,        | 0    |          | . 0 |            |      | , ,        | 0    | ,             | . 0 | ,        | 0   |          | 0   | ,        | 0   | ,        | 0   |          | 0   | ,            | 0    |      |      | 0   | 1        | 0  | ,        |     | Circle N.                             |
|    | 19<br>23 |      | 81 | 5   |    |      | 04<br>07 | 81   | 42<br>46 |     | 1 33<br>29 | 8    | 1 10<br>06 | 81   | 21<br>17      | 81  | 08<br>04 | 81  | 40<br>36 | 81  | 30<br>26 | 81  | 16<br>12 | 83  | 06<br>02 | 81  | 17<br>21     | ,82  | 0    |      |     | 59<br>03 | 81 | 38<br>42 |     | Needle N. 50° 01<br>Needle S. 53 28   |
| 11 | 21       | Ξ,   | 81 | 5   | 1  | 81   | 05.      | 5 81 | 44       | 8   | 1 31       | .8   | 1 08       | 81   | . 19          | 81  | 06       | 81  | 38       | 81  | 28       | 81  | 14       | 81  | 1 04     | 81  | 19           | 82   | 0    | 2. 5 | 81  | 01       | 81 | 40       |     | Oircle 8.                             |
| -  | 81       | lo   | 37 | . 5 |    | -    | 819      | 24   | , B      | -   | 81         | 11   | y. 5       | -    | 810           | 12  | . 5      | -   | 81       | 0 3 | 3′       | -   | 81       | ۰ ( | 99'      | -   | 810          | 40   | 7. 8 | _    |     | 810      | 20 | . 5      |     | Needle N. 51 07<br>Needle S. 50 12    |
| _  |          |      |    | 8   | 10 | 31′. | 2        | -    |          | -1- |            |      | 81         | 0 10 | B'            |     |          | - 1 |          |     | 819      | 21  | ,        |     |          | -   |              |      | 8    | 0    | 30′ | 6        |    |          | ľ   | Mag. mer. 51º 12                      |
|    |          |      |    |     |    |      | М        | oar  | 1        |     | 810        | 23/. | 6          |      |               |     |          | _   |          | -   | -        |     | М        | ear | a        |     | 810          | 25′. | 8    |      |     |          |    |          | 1   |                                       |
|    | _        | _    |    |     | -  | -    |          |      |          |     |            | _    |            | R    | eault         | ins | div      |     |          | 810 | 24'.     | 7   |          | -   |          | -   |              | -    |      | -    |     |          |    | -        | - į |                                       |

[Date, November 30, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Needle No. 3, 4 deflecting. Time of beginning, 2<sup>h</sup> 05° a. m.; time of ending, 2<sup>h</sup> 40° a. m.]

|                                  |                    |                       |    |          | ted.   | eigh          | , w | No. 4      | dle | Nec           |          |          |       |               |         |          | ing     | lect        | defi   | 3, 4 | No.      | lle l   | le <b>e</b> c       | 1 |
|----------------------------------|--------------------|-----------------------|----|----------|--------|---------------|-----|------------|-----|---------------|----------|----------|-------|---------------|---------|----------|---------|-------------|--------|------|----------|---------|---------------------|---|
| Circle in magne<br>prime vertica | east.              |                       |    |          |        | Circl<br>face |     |            |     | irele<br>face |          |          |       | ircle         |         |          | R,      | ele<br>lic. |        |      | ,        | D,      | irele<br>Mic<br>ace | _ |
| 1                                | N.                 | 8.                    | -  | N.       | 1      | 8.            |     | N.         |     | 3.            | 8        | Ŋ.       | 2     |               | 8       | 7.       | 2       |             | s.     |      | N,       | 1       |                     | 8 |
| Oircle N. Needle N. Needle S.    | o /<br>66 55<br>58 | o /<br>35 59<br>36 03 |    | 05<br>09 | 66     | 22<br>26      | 65  | 5 27<br>24 | 65  |               | 65<br>64 | 29<br>25 | 65    | ,<br>14<br>11 | o<br>65 | 48<br>46 | o<br>41 |             | 2 30   | 4    | 23<br>27 | o<br>58 | ,<br>31<br>34       | 9 |
| Oirole B.                        | 66 56.5            | 36 01                 | Ī  | 07       | 66     | 24            | 65  | 25. 5      | 88  | 00            | 65       | 27       | 65    | 12. 5         | 65      | 47       | 41      | 3. 5        | 2 28   | 4    | 25       | 58      | 12. 5               | 9 |
| Needle N.<br>Needle S.           | 28'. 8             | 66°                   | 1  | 5        | 45'. 5 | 650           |     | 8          | 2′. | 850           |          | 1        | 94, 8 | 5º 1          |         | _        | 7.8     | 0 0         | 42     | ī    | 8        | 58′.    | 580                 |   |
| Mag. meт. 51° 1                  | ,                  | . 2                   | 07 | 660      |        |               |     |            |     | -             | 164. 3   | 65°      |       |               |         |          |         | -           |        |      |          |         |                     |   |
|                                  |                    |                       |    |          | 4.8    | 50 41         | 6/  |            | est | м             |          |          |       |               |         |          | -       | 7           | 16'. 1 | 90 5 | = 1      | 98"     |                     |   |

[Date December 14, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxüeld. Dip circle No. 23. Needle No. 1. Time of beginning. 15 62m a. m.; time of ending. 15 58m a. m.]

| _ | _            |     | _   |      |     | 1    | Mea  | ın. |    | 819           | 28 | ,   |      |               |      |    |    |               |     |     |      | λ       | Teau | ••••     | 8  | 110 | 21'. | 7    |     |    |      |       |                    |        |     |
|---|--------------|-----|-----|------|-----|------|------|-----|----|---------------|----|-----|------|---------------|------|----|----|---------------|-----|-----|------|---------|------|----------|----|-----|------|------|-----|----|------|-------|--------------------|--------|-----|
|   |              |     | 8   | 10 2 | 34. | 5    |      | _   |    |               |    | 810 | 12   | . 6           |      |    |    |               |     | 810 | 16   | . 4     |      |          |    |     |      | 81   | 0 2 | 7' |      |       | Mag. m             | er. I  | 6 4 |
|   | 810          | 26  | . 5 |      |     | 810  | 40   | 8   |    | 810           | 09 | . 2 |      | 81            | 0 10 | 6/ | ,  | 810           | 17  | . 8 | 1    | 81      | 0 18 | ,        | i  | 81  | 24   | r    | -   | 8  | Lº 8 | 0′    | Needle l           |        | 4 1 |
| 1 | 44           | ,81 | 0   | 9    | 81  | 56   | 81   | 25  | 81 | 10            | 81 | 08. | 5 81 | 14            | 81   | 18 | 81 | 17            | :81 | 18. | 5 81 | 18      | 81   | 12       | 81 | 39  | 81   | 69   | 81  | 45 | 81   | 15    | O                  | rcle i | 8.  |
|   | 46           | 474 | i   |      |     | 58   | C- 1 | 27  |    | 08            |    | 96  |      | 16<br>12      |      | 16 |    | 19<br>15      |     | 16  |      | 16      |      | 14<br>10 |    | 41  |      | 11   |     | 47 | -    | 17    | Needle S           |        |     |
| - | 42           | 0   | 0   | -    | 0   | 54   | 01   | 23  |    | 12            |    | 11  |      |               | 1 0  |    |    | 10            | 0   | /   | 81   | /<br>Do | 0    | 1        | 0  | 37  |      | 97   | 0   | 43 | 100  | 1 112 |                    | rcle l |     |
| ŧ | <b>5</b> ,   |     | N   |      |     | 8.   |      | N.  |    | S.            |    | N.  |      | S.            |      | N. | +  | 8.            |     | Ν.  |      | 8.      |      | N.       |    | 8.  |      | N.   |     | 8. |      | N.    |                    |        |     |
|   | irc1<br>face |     |     |      |     | irel |      |     |    | lirel<br>face |    |     |      | lirel<br>face |      |    |    | lirel<br>face |     |     |      |         | e w  | PME.     |    |     |      | ant. |     |    |      | ast,  | Circles :<br>prime |        |     |
|   |              |     |     |      |     |      |      |     |    | l en          |    |     |      |               |      |    | 1  |               |     |     | Pola | rny     | 01   | mar      |    |     |      |      |     |    |      |       | 1                  |        |     |

[Date, December 44, 1882. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4, deflecting. Time of beginning, 2<sup>h</sup> a. m.; time of ending, 3<sup>h</sup> a. m.]

io. 1. Time

ircle N.
e N. 50° 01'
e S. 53° 28
Circle S.
le N. 51° 07
le S. 50° 12

mer. 51° 12'

510 12'

| (   | irel<br>Mi | e ear | st,      |       | l defl<br>Uirel<br>Mi<br>face | e ea<br>c. R | st.      | i. |    | irele<br>face |     |                 | (    | ärel     | edle<br>e we | st,      | 3. <b>4</b> , | c   | irel     | e ea<br>wes | nt,             |      | Circle<br>face |      |    |
|-----|------------|-------|----------|-------|-------------------------------|--------------|----------|----|----|---------------|-----|-----------------|------|----------|--------------|----------|---------------|-----|----------|-------------|-----------------|------|----------------|------|----|
| - ( | 3.         | 1     | Ñ.       | ,     | 8.                            |              | N.       | ,  |    | s.            |     | N.              | -    | 8,       |              | Ň.       |               | - 8 | 4.       | - 1         | N,              |      | 8.             |      | N. |
| 0   | ,          | 0     | ,        | 0     | ,                             | 0            | ,        | 1  | 0  | 1             | 0   | ,               | 0    | 1        | 0            | ,        |               | 0   | ,        | 0           | ,               | 0    | ,              | 0    | ,  |
| 58  | 52<br>48   | 58    | 51<br>47 | 42    | 24<br>28                      | 41           | 12<br>16 | ,  | 65 | 54<br>50      | 65  | $\frac{52}{48}$ | 66   | 28<br>24 | 66           | 18<br>09 | 11            | 66  | 46<br>50 | 65          | $\frac{23}{27}$ |      | 57<br>00       | 66   | 02 |
| 58  | 50         | 58    | 49       | 42    | 26                            | 41           | 14       | -  | 65 | 52            | 65  | 50              | 66   | 26       | 66           | 11       | ,             | 80  | 48       | 65          | 25              | 66   | 58, 5          | 66   | 08 |
|     | 58°        | 49.   | 5        | -     | 41                            | 4)           |          |    |    | <b>6</b> 50   | 51′ |                 |      | 660      | 18′.         | 5        |               |     | 660      | 06'.        | 5               |      | 66°            | 314. | 8  |
|     |            |       |          |       |                               |              |          |    |    |               |     | 660             | 04'. | 8        |              |          |               |     |          |             | 660             | 19/. | 2              |      |    |
|     | •          | 14    | -38      | 9° 41 | F. 9                          | -            | -        |    |    | -             |     |                 |      |          | Mea          | n        |               | . 6 | 160 T    | 12/         |                 |      |                |      | *  |

[Date, January 1, 1883. Station, Uglaumie, Alaska. Göttingen time.. Observer, J. E. Maxifeld. Dip circle No. 23. Needle No. 1 Time of beginning, 1º 20° a. m.; time of ending, 1º 55° a. m.]

|    |    |           |    |    | 1        | 'n | ari | ity | of | ms       | rke | d er     | d.   | Æ 1   | 101 | th.  |             |      |          |     |          |      |          | Pol   | ari | ty o | ms       | rke | d ( | end  | B     | <b>n</b> 01 | th.  |          |    |          |   |                        |          |                 |
|----|----|-----------|----|----|----------|----|-----|-----|----|----------|-----|----------|------|-------|-----|------|-------------|------|----------|-----|----------|------|----------|-------|-----|------|----------|-----|-----|------|-------|-------------|------|----------|----|----------|---|------------------------|----------|-----------------|
|    |    | ele<br>co |    |    |          |    |     |     |    | ast,     | . ( | Circ     |      |       |     |      | lire<br>fac |      |          |     | 'ire     |      |          | , , ( |     | de v |          |     |     |      |       | st.         |      | Circ     |    |          |   | Circle in r<br>prime v |          |                 |
|    | s. |           | ,  | N  | ۲.       | ,  | s.  |     |    | N.       |     | S.       |      | N     |     |      | S.          |      | N.       |     | 8.       |      | N.       |       | S.  |      | N.       | _   | 8.  |      | 2     | N.          |      | 8.       |    | N.       |   |                        |          |                 |
| 0  | ,  |           | o  |    | ,        | ,  |     |     |    |          | ć   |          |      |       |     | 0    |             |      |          | 0   | ,        | 7    | ,        | 0     | ,   | d    | ,        | 0   | ,   |      | . 0   | ,           | ; 0  | ,        | 0  | 1        |   | Circle                 | Ν.       |                 |
| 81 | 4  |           | 81 | 1  | )9<br> 3 | 8  | 4   | 5   | 81 | 02<br>06 | 81  | 12<br>08 | *    | 1 1   | 17  | 81   | 08<br>04    | ۲1   | 20<br>16 | 81  | 26<br>21 | 81   | 31<br>27 | -81   | 08  |      | 12<br>08 | 81  | 55  |      | 81    | 23<br>23    | '81  | 26<br>30 | 81 | 05<br>09 |   | Needle N.<br>Needle S. |          |                 |
| 81 | 3  | )         | 81 | 1  | 1        | 8  | 4   | 3   | 81 | 04       | 81  | 10       | 9    | 1     | 4.  | 5 81 | 06          | 81   | 18       | 81  | 23.      | 5 81 | . 29     | 81    | 06  | 81   | 10       | 81  | 41  | 9. 5 | 81    | 20.         | 5 81 | 28       | 81 | 07       |   | Oircl                  | e S.     |                 |
|    | 1  | 31 >      | 2! | 5′ |          |    | 8:  | 10  | 23 | . 5      |     | 81       | - 15 | 21. 2 | 2   |      | 81          | o 15 | 2'       |     | 81       | 26   | . 2      |       | 8   | 10 0 | B'       |     | 8   | 810  | 35    | ,           |      | 810      | 17 | . 5      | 1 |                        | 80<br>77 | $\frac{02}{40}$ |
|    |    | -         |    | 8  | 10       | 24 | . 2 | -   |    |          | 1   | _        |      | - 1   | 810 | 12   | ·. 1        |      |          |     | -        |      | 81       | 0 17  | · 1 | •    |          | 1   |     | -    |       | 819         | 26   | 4.2      | -  |          |   | Mag. mer.              | 80       | 47. 6           |
|    |    |           |    | -  |          | -  |     | М   | an |          |     | 810      | 18   | . 2   |     |      |             |      |          | -   |          |      | -        |       | 3   | dear |          |     | 819 | 2    | 1′. 6 | 3           |      |          |    |          | - |                        |          |                 |
| -  |    | -         |    |    |          |    |     |     |    |          |     |          |      |       |     |      | Re          | sult | ling     | dip | p, 81    | o 19 | . 9      |       |     |      |          |     |     |      |       |             |      |          |    | -        |   |                        |          |                 |

[Date, January 1, 1883. Station, Uglasmie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning. 2a a. m. : time of ending. 2a 25a p. m.]

| Needle                | e N  | đ. a, 1  | No.  | 1  | ief           | ec   | tin | g. | 1    |         |              |    |          |          |      |     | Ne  | edi     | 0 . | No.           | 4, 1 | reig          | hted  |    | -   |    |               |     |    | _  |                         |    | •   |
|-----------------------|------|----------|------|----|---------------|------|-----|----|------|---------|--------------|----|----------|----------|------|-----|-----|---------|-----|---------------|------|---------------|-------|----|-----|----|---------------|-----|----|----|-------------------------|----|-----|
| Circle<br>Mic<br>face | c. D |          | 1    |    | rcl<br>Mi     | e. 1 | €,  | ,  |      |         | irel<br>face |    |          |          |      |     |     | w<br>ca |     |               |      | Circl<br>face |       |    |     |    | Circl<br>face |     |    | ,  | Circle in m<br>prime ve |    |     |
| 8.                    | 1    | N.       |      | 8  |               | 1    | N   |    | Ī    | 1       | 8.           | Ī  | 2        | τ.       |      | ġ,  |     |         | N   |               |      | 8.            |       | N. |     |    | ß.            |     | N. |    |                         |    |     |
| 59 08<br>02           | 58   | 58<br>54 | 42   |    | ,<br>13<br>16 | Ι,   | 1   | 20 |      | o<br>65 | 43<br>39     |    |          | 32<br>28 | 6    | 8 4 |     | 6       | 5 : | ,<br>20<br>16 | 65   | 38<br>42      | 68    | 1  |     |    | 56<br>00      | 66  | 0  | 1  | Needle N.<br>Needle B.  | N. | ,   |
| 59 04                 | 88   | 56       | 42   | 2  | 4. (          | 4    | 1 : | 22 | 1    | 65      | 41           | -  | 8.5      | 30       | 6    | 3 4 | 0   | 6       | 5 1 | 18            | 65   | 40            | 65    | 1  | 8   | 66 | 58            | 66  | 0  | 13 | Oirele<br>Needle N.     | 8. |     |
| 590                   | 00   |          | i    | 4  | 10            | 58   | . 2 | -  | 1    |         | 650          | 35 | ii<br>GB |          |      | -   | 350 | 56      | μ   | -             |      | 650           | 27'.  | 5  |     |    | 66°           | 80% | 8  |    | Needle 8.               |    |     |
|                       | -    |          | -    |    |               | -    | _   | -  |      | -       | -            |    |          | 650      | 47'. | 2   |     |         |     |               |      |               |       |    | 650 | 59 | ,             |     | _  |    | Mag. mer.               | 80 | 47. |
|                       | _,   | t'=3     | 90 3 | 0' | 9             | -    |     |    | -  - | -       |              |    | -        |          |      | _   | М   | eat     | n . |               | . 6  | 50 50         | 3'. 1 |    |     |    |               |     | _  | _  |                         |    |     |

[Date, January 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning, 1 25 = a.m.; time of ending, 2 65 = .]

|            |    |     | I   | oli | rit         | ot  | fm            | rk | d.  | eni | l B | no       | rth. |           |      |       |          |    |    |     |      | Pol  | arit        | y o | f m | arke | d  | end          | A  | nor      | th. |          | _  |     |    | i                                |     |          |
|------------|----|-----|-----|-----|-------------|-----|---------------|----|-----|-----|-----|----------|------|-----------|------|-------|----------|----|----|-----|------|------|-------------|-----|-----|------|----|--------------|----|----------|-----|----------|----|-----|----|----------------------------------|-----|----------|
| Circle     |    |     |     |     | ire<br>face |     |               |    |     |     |     | rest.    | + 1  | Cir<br>fa | cle  | W0    | eat.     |    |    |     |      |      | Circ<br>fac |     |     |      |    | irele<br>aco |    |          | 1   | Circ     |    |     |    | Circle in m<br>prime ver         |     |          |
| 8.         | T  | 1   | ₹.  |     | В.          | Ī   | N.            |    | 8   |     | 1   | Ñ.       | 1    | 8.        |      | 1     | N.       |    | S. | 1   | N.   | 1    | 8.          |     | N.  | 1    | 8  | 8.           |    | N.       |     | S.       |    | 1   | N. |                                  |     |          |
| 1 33<br>36 |    | 0 1 | 51  |     | 56<br>00    | 1 - | ,<br>11<br>15 |    | 1 0 |     | 81  | 13<br>09 |      | 24<br>11  |      |       | 37<br>33 | 81 |    | 81  |      |      | 12<br>08    | _   | 32  | 8 8  |    |              |    | 98<br>12 | 81  | 51<br>55 |    | 81  |    | Oircle<br>Needle N.<br>Needle S. | 200 |          |
| 34. 5      | 80 | 0 1 | 3   | 81  | 88          | 81  | 18            | 8  | 1 0 | 4   | 81  | 11       | 81   | 21        | . 5  | 81    | 35       | 81 | 08 | 81  | 19   | 81   | 10          | 81  | 30  | 8    | 1  | 47           | 81 | 10       | 81  | 53       |    | 81  | 11 | Circle                           | 8.  |          |
| 810        | 13 | 1,8 | -   |     | 810         | 35  | .5            |    | 8   | 10  | 07  | ,5       | -    | 8         | 0 2  | 28/.: | 2        | -  | 81 | 13  | .5   | -    | 8           | 0 2 | 0'  | i    |    | 810          | 28 | .5       | -   | 8        | 10 | 32' |    | Needle N.<br>Needle S.           |     | 38<br>16 |
|            |    |     | 810 | 24' | 6           | -   | -             |    | -   |     |     | 81       | 17   | ,8        |      |       |          |    |    |     | 81   | ° 16 | 4,8         |     |     |      |    |              |    | 810      | 30  | .2       |    |     |    | Mag. mer.                        | 20  | 02       |
|            |    |     |     |     | 3           | fes | n             |    | . 8 | 10  | 21. | 2        |      |           |      |       |          | 1  |    |     |      |      | М           | ean |     |      | 81 | lo 23        | .5 |          |     |          |    |     |    |                                  |     |          |
|            |    | _   |     | _   |             |     |               | _  |     |     |     |          | R    | -911      | ltii | ng e  | dip      | -  |    | 310 | 22'. | ١.   |             |     | -   | -    | -  |              | ** |          |     |          |    | -   |    |                                  |     |          |

[Date, January 14, 1883. Station, Uglaamie, Alasko. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning, 2<sup>b</sup> 10<sup>m</sup> a.m.; time of ending, 2<sup>b</sup> 44<sup>m</sup> a.m.]

| Ne        | edl | e N   | o. 3,    | No.  | . 4 | defi               | lect | in  | g.      |    |     |      |         |          |     | Ne            | edl | o Xo     | . 4, w | eig      | hted |          |      |               |      |          |                                       |
|-----------|-----|-------|----------|------|-----|--------------------|------|-----|---------|----|-----|------|---------|----------|-----|---------------|-----|----------|--------|----------|------|----------|------|---------------|------|----------|---------------------------------------|
|           | Mic | e eas |          |      |     | ircl<br>Mi<br>face | c. R | ٤,  | ,       | 1  |     | rele |         |          |     | lirel<br>face |     |          |        |          | e ea |          |      | lirel<br>face |      |          | Circle in magnetic<br>prime vertical. |
| 8.        |     |       | N.       |      | 8   | i.                 | -    | N   |         | j, | S.  |      | 3       | N.       |     | В.            |     | N.       | 1      | В.       |      | N.       |      | 8,            |      | N.       |                                       |
| ю 1<br>10 |     | -     | 16<br>12 | 4    | 3   | 42<br>45           | 43   | 2 2 |         | 6  | 5 4 |      | o<br>65 | 30<br>26 | 68  | 32<br>28      | 66  | 30<br>26 | 65     | 36<br>40 | 64   | 52<br>56 | 67   | 17<br>21      | 1 -  | 24<br>27 | Oircle N. Needle N. 9 '               |
| 0 1       | 7   | 60    | 14       | 4    | 3   | 43. 5              | 43   | 2   | 6       | 6  | 5 4 | 2    | 65      | 28       | 68  | 30            | 68  | 28       | 65     | 38       | 64   | 54       | 67   | 19            | 66   | 25. 5    | Circle S.                             |
| •         | 600 | 15'.  | 5        | T    | -   | 430                | 34'. | 8   |         |    |     | 65°  | 35/     |          |     | 68            | 29  | ,        |        | 65       | 0 15 |          |      | 660           | 52'. | 2        | Needle N.<br>Needle S.                |
|           |     |       |          |      |     |                    |      |     |         | 1  |     |      |         | 679      | 02' |               |     |          |        |          |      | 660      | 644. | 1             |      |          | Mag. mer. 200 02'                     |
|           |     | 11    | /=3      | 80 O | 14' | .8                 |      |     | troub r | -  |     | _    |         |          |     | 1             | Mea | n        | 66     | po 33    | ,    |          |      |               |      |          |                                       |

[Date, January 31, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 1. Time of beginning, 15 40° a. m.; time of ending, 25 25° a. m.]

|    |    |             |     |               | Pol | ari | ty | of  | mai      | kee | l en        | d Z | i noi      | th. |          |     |          |     |                |         | 1        | Pol | arity        | of | mai      | ke      | d end         | 1 B     | nor      | th. |               |    |          | -      |                                      |    |           |
|----|----|-------------|-----|---------------|-----|-----|----|-----|----------|-----|-------------|-----|------------|-----|----------|-----|----------|-----|----------------|---------|----------|-----|--------------|----|----------|---------|---------------|---------|----------|-----|---------------|----|----------|--------|--------------------------------------|----|-----------|
| •  |    | cle<br>ce e |     |               | 1   |     |    |     | at,      |     | lire<br>fac |     | rest,      |     | irele    |     |          |     | Circle<br>face |         |          |     | irel<br>face |    | ent,     |         | lirel<br>face |         |          | -   | Circl<br>face |    |          | H      | Circle in me<br>prime ver            |    |           |
|    | 8. |             |     | N.            |     | 8.  |    |     | N.       |     | 8.          | 1   | N.         | -   | 8.       | 1   | N.       | 1   | S.             |         | N.       | 1   | S.           | 1  | N.       |         | 8.            |         | N.       | 1   | 8.            |    | N.       | rl     |                                      |    |           |
| -  | 44 | . 4         | 81  | ,<br>13<br>18 | 8   | 44  | )  | 81  | 08<br>12 |     | 14<br>09    | 8   | 1 27<br>23 | 81  | 22<br>18 | 1 - | 32<br>27 |     | 32<br>28       | o<br>81 | 34<br>30 | 81  | 05<br>01     | 81 | 09<br>05 | o<br>81 | 48<br>58      | o<br>81 | 16<br>21 | 81  | 33<br>87      | 81 | 02<br>06 | li<br> | Circle<br>Needle N. 8<br>Needle S. 9 | 80 | 37'<br>29 |
| 31 | 46 |             | 81  | 15.           | 5 8 | 4:  | 1  | 81  | 10       | 81  | 11.         | 5 8 | 1 25       | 81  | 20       | 81  | 20.      | 81  | 30             | 81      | 32       | 81  | 03           | 81 | 07       | 81      | 50            | 81      | 18.      | 81  | 85            | 81 | 04       | 1      | Circle                               | 8. |           |
| -  | 81 | 0 3         | 0'. | 8             | -   | 81  | 0  | 26' | -        | -   | 810         | 18  | y. 2       | -   | 810      | 24' | . 8      | -   | 810            | 31'     |          | -   | 810          | 05 | ,        | -       | 810           | 34      | . 2      | -   | 810           | 19 | , 5      | - 1    | Needle N. 8<br>Needle S. 8           |    | 01<br>33  |
|    |    |             |     | 810           | 28  | . 4 | -  | -   |          | -   | -           |     | 810        | 21  | . 5      | _   |          | -   |                |         | 81       | 18  | y            |    |          |         |               |         | 810      | 26  | . 8           |    |          |        | Mag. mer. 8                          | 8  | 40        |
|    |    |             |     | -             |     | 2   | Me | an. |          | 8   | 110         | 25/ |            |     |          |     |          | .~  |                |         |          |     | M            | an |          | 8       | 10 2          | 2'.     | 1        |     | -             |    |          | 1      |                                      |    |           |
|    |    |             |     | -             |     |     | -  |     |          |     |             |     |            |     | Res      | ult | ing      | lip | , 810          | 23'     | 7        |     |              |    |          | -       |               |         |          |     |               |    |          | -      |                                      |    |           |

[Date, January 31, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, S. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning. 2h 30m a. m.; time of ending, 2h 57m a. m.]

1. Time

magnetio ertical.

le N. 1. 20° 00' 1. 23 19

ele S. N. 19 33 3. 17 16 er. 20 02

. 23.

| Ne        | edl | e N           | 0, 3,    | No. 4 | de       | effe | eti       | ng.      |   |    |               |      |          |      | Ne            | edle | No.      | 4, | wei          | hte        | ed. |          |      |               |      |    |                                      |
|-----------|-----|---------------|----------|-------|----------|------|-----------|----------|---|----|---------------|------|----------|------|---------------|------|----------|----|--------------|------------|-----|----------|------|---------------|------|----|--------------------------------------|
|           | Mi  | e ea<br>c. D. |          |       | A        | lic  | eas<br>R, |          | 1 |    | ircle<br>face |      |          |      | irele<br>face |      |          |    | Cir          | ele<br>e w |     |          |      | ircle<br>face |      |    | Circle in magneti<br>prime vertical. |
| 8.        |     | 1             | N.       | 1     | S.       | 1    | 1         | N.       |   | 1  | 3.            |      | N.       |      | S.            |      | N.       |    | S.           | 1          | 1   | N.       | 1    | 3.            | 1    | Ň. |                                      |
| o<br>58 4 |     | 59            | 00<br>56 | 42    | 27<br>30 |      | 0<br>41   | 10<br>14 |   | 66 |               | _    | 08<br>04 | 66   | 52<br>48      | 66   | 48<br>45 |    | 0 /<br>35 12 |            | 64  | 38<br>42 | 67   | 18<br>21      | 66   |    | Circle N. Needle N. Needle S.        |
| 58 4      | 13  | 58            | 58       | 42    | 28       | . 5  | 41        | 12       | 1 | 66 | 54. 5         | 66   | 06       | 66   | 50            | 66   | 46.      | 5  | 85 14        |            | 64  | 40       | 67   | 19. 5         | 66   | 28 | Circle S.<br>Needle N.               |
| t         | 580 | 50'.          | 5        | 1     | 41       | 0 1  | 50'.      | 2        | - |    | 660           | 30'. | 2        | -    | 660           | 48′. | 2        | l  | 64           | 0 5        | 7'  |          | -    | 660           | 53'. | 8  | Needle S.                            |
|           |     | -             |          |       |          | -    |           |          |   |    |               |      | 660      | 394. | 2             |      |          | -  |              |            | _   | 650      | 55'. | 4             |      |    | Mag. mer. 86 46                      |
|           |     | 11            | ··- 3    | 90 31 | ¥. 6     | 1    |           |          |   |    |               |      |          |      | <u> </u>      | fear | 1        |    | 660          | 17′.       | 3   |          |      |               |      |    | 1                                    |

[Date, February 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 2. Time of beginning, 1<sup>h</sup> 55<sup>m</sup> a. m.; time of ending, 2<sup>h</sup> 27<sup>m</sup> a. m.]

|     |               |    |     |     | Pe  | ılı | rity     | 0   | f n  | aaı | 'ke | d e | nc   | L    | 3 710    | rti   | . 1 |          |      |             |     |         |          |      |            | Po    | la   | rity         | of      | ma       | rke | d e        | nd  | A   | 110      | rth. |            |      |      |   |   |     |
|-----|---------------|----|-----|-----|-----|-----|----------|-----|------|-----|-----|-----|------|------|----------|-------|-----|----------|------|-------------|-----|---------|----------|------|------------|-------|------|--------------|---------|----------|-----|------------|-----|-----|----------|------|------------|------|------|---|---|-----|
|     | ircl          |    |     |     |     |     | ircl     |     |      |     |     |     |      |      |          |       |     |          |      | rest<br>est |     |         |          |      | cest.      |       |      | rele<br>ace  |         | est,     | -   |            |     |     | ast,     |      |            | cle  |      | 1 | Circle in mag<br>prime verti              |     |
| 8   | 3.            |    | N   |     |     |     | S.       |     | N    |     | 1   | 8   |      |      | N.       | ,     |     | 6.       |      | N.          | -   | 1       | š.       | Ī    | N.         | 1     | 8    |              |         | N.       | -   | 8.         |     |     | N.       | i    | 8.         | -    | N.   |   |   |     |
| 1 4 | ,<br>44<br>50 | 81 |     |     | - 6 |     | 33<br>39 | 1.  | L C  |     | 11. | 1 2 | в    | 81   | 20<br>23 |       |     | 28<br>21 | 81   | 1 30        |     | o<br>81 | 30<br>23 |      | 1 27<br>20 | 8     |      | ,<br>20<br>4 | o<br>81 | 17<br>10 | 8   | 1 46<br>50 |     |     | 20<br>27 |      | 1 28<br>35 | ,8   | 1 05 |   | Circle N<br>Needle N. 78°<br>Needle S. 81 | 28  |
| 1 ( | 47            | 81 | 1 2 | 11. | 5 8 | ı   | 36       | 8   | 1 1  | 1.  | 5 8 | 2   | 2. 8 | 81   | 26       |       | 81  | 24.      | 5 81 | 1 20        | . 5 | 81      | 26.      | 5 81 | 1 23       | 58    | 1 1  | 7            | 81      | 13.      | 5 8 | 1 52       | . 5 | 81  | 23,      | 58   | 1 31       | 5.8  | 08   |   | Circle S.<br>Needle N. 77                 |     |
| 8   | 810           | 34 | 4.1 | 5   | 1   |     | 81º      | 23  | ٧. ا | 3   | 1   | 8   | 10   | 24   | . 2      |       |     | 810      | 25   | . 5         |     |         | 81       | 2    | 51         | 1     | 8    | 310          | 15      | . 2      |     | 8          | 10  | 38  | ,        | 1    | 8          | 10 2 | 0'   | 1 | Needle S. 79                              | 41  |
| _   |               | _  | _   | 819 | 2   | 9/  | _        |     |      |     | ţ   |     | •    |      | 8        | 1 - 1 | 4.  | 8        |      |             |     |         |          |      | 8          | l° 20 | ν. : | ι -          |         |          |     |            |     | -   | 819      | 29   | Y          |      |      | - | Mag. mer. 79                              | 146 |
|     |               |    | _   |     | _   |     | M        | PA. | n.   |     |     | 819 | 21   | 81.5 | )        | -     |     |          |      |             |     |         |          |      |            |       |      | Me           | an      |          |     | 810        | 24  | 4.6 |          |      |            |      |      | - |   |     |
| _   |               |    | _   | _   | _   |     |          |     |      | -   |     |     |      |      |          |       |     | Re       | snl  | tin         | g d | ip,     | 810      | 25   | .8         |       |      |              | -       |          |     |            |     |     |          |      |            |      |      | - |   |     |

[Date, February 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip cucle No. 23. Needle Nos. 3, 4 deflecting. Time of beginning, 2° 32 a.m.: Time of ending, 3° a.m.]

|    | , | Nee               | er) | le. | N        | 0. 3 | , 4  | let      | der | tin         | g.       | 11    |     |      |     |          |     | N        | 600           | llo N               | 0. 4, | weij | gližei        | ıl.   |     |          |       |          |                           |       |
|----|---|-------------------|-----|-----|----------|------|------|----------|-----|-------------|----------|-------|-----|------|-----|----------|-----|----------|---------------|---------------------|-------|------|---------------|-------|-----|----------|-------|----------|---------------------------|-------|
|    |   | ire<br>Mi<br>face | ic. | D   | Ţ.       |      | ļ    |          | Mi  | o e<br>r. F |          | 27.20 |     | irel |     | ens.     | 1   |          | iko s<br>e ca | rent.<br>int.       | 1     |      | che e<br>e we |       |     |          | de es |          | Circle in me<br>prime ver |       |
|    | 8 | j.                | i   |     | N.       |      | -    | 16.      |     |             | N.       | 1     | B   | š.   | 1   | N.       | 1   | pi.      | 1             | N.                  | 1     | 8.   | Ī             | N.    | -   | 5.       |       | N.       |                           |       |
| 0  | , |                   | 1   | 0   |          |      | 0    | ,        |     | 1.0         | ,        | a     | . , |      | 0   | ,        | 0   |          |               |                     |       | ,    | 0             | ,     | 0   | ,        | 0     | 1        | Circle                    | ٧.    |
| 50 | 0 |                   | 1   |     | 41<br>34 |      | 42   | 36<br>28 |     | 41          | 19<br>21 | 66    | 1   |      | 65  | 47<br>43 | 66  | 06<br>06 |               | 3 <b>00</b><br>5 5H | 66    | 01   | 166           | 10    | 66  | 35<br>37 | 65    | 30<br>83 | Needle N.<br>Needle S.    | 0 1   |
| 50 | 0 | 9                 | -   | 38  | 37       | . 5  | 42   | 226      | 1   | 41          | 20       | 66    | 1   | 3. 5 | 65  | 45       | 66  | 07       | 6             | 59                  | 66    | 02   | '65           | 08, 5 | 66  | 86       | 65    | 31.5     | Circle 8                  |       |
|    |   |                   |     |     |          | _    |      | _        |     |             | _        |       |     |      |     | -        |     |          |               |                     |       |      |               |       |     | _        |       |          | Needle N.                 |       |
|    |   | 55.               | 3   | œ.  | 2        |      |      | - 4      | 13  | 541         | . 5      |       |     | 60   | 59. | 2        |     | 66       | 03            |                     |       | 452  | 35.           | 2     | 1   | 66       | 08.   |          | Needlo S.                 |       |
|    |   |                   |     |     |          |      |      |          |     |             |          |       |     |      |     | 6        | 01. | 1        | -             |                     | 1     |      |               | 65    | 49. | 5        | -     |          | Mag. mer.                 | 79 16 |
| -  |   |                   |     |     |          |      |      |          |     |             |          |       |     |      |     |          |     |          |               |                     | -     | ae r |               |       |     |          |       |          |                           |       |
|    |   |                   |     | - 6 | 6        | - 11 | 15 ; | 18',     | 2   |             |          |       |     |      |     |          |     |          | Mes           | m                   |       | 65 5 | 3, 3          |       |     |          |       |          |                           |       |

[Date, February 28, 1883. Station Ugla amie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23 Needle No. 2. Time of beginning, 11<sup>h</sup> 10<sup>o</sup> p. m., time of ending, 11<sup>h</sup> 40<sup>o</sup> p. m.]

|               |    |              | Pol | arit          | rof  | ធាន      | rke  | d er       | id z | l mui         | th. |               |     |          |      |          |      |          | Pol | arit        | y of | ma       | rke             | d en     | d B  | mar      | th. |               |    |          |   |                         |           |          |
|---------------|----|--------------|-----|---------------|------|----------|------|------------|------|---------------|-----|---------------|-----|----------|------|----------|------|----------|-----|-------------|------|----------|-----------------|----------|------|----------|-----|---------------|----|----------|---|-------------------------|-----------|----------|
| Circl<br>face |    |              |     | Sire!<br>face |      |          | (    | Hre<br>fac |      | rest.<br>ust. |     | lirel<br>face |     |          |      |          | lo w | est.     | (   | irel<br>fac |      |          |                 |          |      | ast,     |     | Circl<br>face |    |          | i | Circle in a<br>prime ve |           |          |
| 8.            | -  | N.           |     | S.            |      | N.       |      | ß.         |      | N.            | +   | 8.            |     | N.       |      | 8.       |      | N.       |     | ы.          |      | N.       |                 | s.       |      | N.       |     | 8.            |    | N.       |   |                         |           |          |
| ,             | 0  | ,            | 0   | ,             | 0    | ,        | 0    |            |      | ,             | 0   | ,             | 0   |          | 0    | ,        | 0    | ,        | 0   | 1           | 10   |          | 0               | ,        | 0    | ,        | 0   |               |    |          |   | Circle                  | N.        |          |
| 45<br>50      | 81 | 10<br>14     | 81  | 48<br>52      | 81   | 11<br>14 | 81   | 15         | Я    | 1 23<br>19    | 8,  | 24<br>20      | 81  | 29<br>24 | HI   | 18<br>14 | 81   | 24<br>20 | HI  | 26<br>22    | 81   | 32<br>28 | 81              | 38<br>42 | 81   | 04<br>08 | 81  | 37<br>41      |    | 59<br>03 | 1 |                         | 790<br>82 |          |
| 47. 8         | 81 | 12           | 81  | 50            | 81   | 12.      | 5 81 | 12.        | 5.8  | 1 21          | 81  | 10            | 81  | 26.      | 5.81 | 16       | 81   | 12       | 81  | 24          | 81   | 30       | ig <sub>1</sub> | 40       | 81   | 06       | 81  | 39            | 81 | 01       |   | Circle                  | N.        |          |
| 81°           | 29 | . 8          |     | 812           | 31   | . 2      |      | 81         | 10   | 1′. 8         |     | 81            | 24  | . 0      |      | 81       | 2 1  | 9'       |     | 81          | 27   | ,        | ,               | 81       | 0 2  | 3'       |     | 819           | 20 | r        |   | Needle N.<br>Nordle S.  | 76<br>81  | 56<br>48 |
| -             |    | 810          | 30' | . 5           |      |          |      |            |      | 810           | 20  | , 5           | -   | -        |      |          | -    | 81       | 2   | 3'          |      |          |                 |          |      | 810      | 21  | . 5           |    |          |   | Mag. mer.               | F0        | 12       |
|               | -  |              |     | M             | lear | 1        |      | 81°        | 25.  | 5             |     |               |     |          |      |          |      |          |     | M           | lear |          |                 | 810      | 22'. | 2        |     | *-            |    |          |   |                         |           |          |
|               | _  | and the same | *** |               |      |          |      |            |      |               |     | Res           | mlt | ino      | dip, | A13      | 23   | . 8      |     |             |      |          |                 |          |      |          | -   |               | -  |          |   |                         |           |          |

[Date, February 28, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4, deflecting. Time of beginning, 11<sup>h</sup> 43<sup>m</sup> p.m.: time of ending, 12<sup>hm</sup> 07 a.m., March 1.

|    | N  | lee       | dì  | le            | N  | o. 3 | 1, 4 | d  | le•f | le | cf | in  | ξ.  |               |   |    |    |     |     |             |      |     | N        | í. | edle | N        | 0. | 1, 1 | re | iдì | ite | d.            |    |      |    |            |     |         |          |     |                                     |    |
|----|----|-----------|-----|---------------|----|------|------|----|------|----|----|-----|-----|---------------|---|----|----|-----|-----|-------------|------|-----|----------|----|------|----------|----|------|----|-----|-----|---------------|----|------|----|------------|-----|---------|----------|-----|-------------------------------------|----|
|    | 3  | rel<br>Mi | c i | D,            |    |      | -    | (  | 1    | M  | ie | R   |     |               |   | (  |    |     |     | ves<br>est. |      |     |          |    | · we |          |    |      |    | rel |     |               |    | į    | (  | ire<br>fac |     |         |          |     | Circle in magne<br>prime vertical   |    |
| 1  | 3. |           |     | 1             | Ñ. |      |      |    | 8.   |    | ī  |     | N   |               |   |    | 8. | -   |     | N           |      |     | Я.       |    |      | N.       |    |      | 8. |     | i.  | ľ             | ī. | 1    | 1  | в.         |     |         | N.       |     |                                     |    |
| 59 | 21 |           |     | o<br>59<br>58 |    |      |      |    | 54   |    |    | 42  | 2 3 | ,<br>32<br>35 |   | 66 | 04 |     | €   | 5 5<br>1    | 4    | 66  | 28<br>22 |    |      | 63<br>58 |    | 66   | 4  |     |     | 5<br>35<br>Mi |    |      |    | 57<br>02   | -   | o<br>65 | 18<br>28 |     | Oircle N.<br>Needle N.<br>Needle S. |    |
| 59 | _  |           | _   |               | 5  | 7. 5 |      | 43 | _    | _  | ı  |     |     | 33.           | 5 | 66 |    |     |     | 5 5         | 1    | 69  | 25       |    |      |          | 5  | 66   |    |     |     |               |    |      | 65 | 59.        | . ! | _       |          | . 5 | Circle S.                           |    |
| -  | 5  | 590       | 0   | 8'            |    |      | !    |    | 41   | 30 | 13 | 5′. | 8   |               |   |    | 68 | \$0 | 581 |             | N) > | 05. |          | 2  | 12'. | 8        |    |      | 6  | go. | 20  |               |    | > 06 | D' |            | 0   | 40      |          | -   | Needle S.<br>Mag. mer. 30           | 12 |
|    | _  | _         |     | u             | /= | - 38 | 30   | 48 | ·. 1 | ı  |    |     |     | -             | i |    |    |     |     |             |      |     | 1        | M  | ean  | •••      | •• | . 6  | 30 | 03  | 4.1 |               |    |      |    |            |     |         |          |     |                                     |    |

[Date March 14 1825 Station Uglaumic, Alaska, Göttingen time. Observer, J. R. Maxfield Dip circle No 25 Needle No. 2 Finis of beginning, 129 45 a. m.; time of ending, 12 30 a. m.]

|   |   |             |    |          | Po] | urit;        | v of | mn       | rke | d en     | at H          | 2807     | th. |          |           |          | 1  |          |      |              | Pola  | erity    | of   | \$23 (M.S | rke  | d on     | d A  | 907           | th.  |               |      |     |                       |      |           |
|---|---|-------------|----|----------|-----|--------------|------|----------|-----|----------|---------------|----------|-----|----------|-----------|----------|----|----------|------|--------------|-------|----------|------|-----------|------|----------|------|---------------|------|---------------|------|-----|-----------------------|------|-----------|
|   |   | irel<br>ace |    | iant.    |     | Gire<br>face |      |          |     |          | lo w<br>e est | ent.     |     |          | n w<br>We | ent.     |    |          |      | rent,<br>M&. |       |          | le w | ent.      |      |          |      | HENT,<br>DOE. |      | Circi<br>face |      | ns. | Circle in prime v     |      |           |
|   | N | i.          |    | N.       |     | Я.           |      | N'.      | ĺ   | 24.      |               | N.       | 9   | ŝ.       | -         | N.       |    | 8.       | ı    | N.           |       | В.       | î    | N.        |      | 8.       | 1    | N.            |      | 8.            |      | N.  |                       |      |           |
| , |   |             |    | ,        |     |              |      |          | 0   |          |               |          | c   |          |           |          |    | ,        | 10   |              | 0     | ,        | 0    | ,         | . 0  | ,        | 10   | ,             | 10   | ,             | 1.0  | 1   | Circl                 | e N. |           |
|   | 1 | 7           | 81 | 20<br>28 | н1  | 20<br>28     |      | 56<br>62 | 81  | 24<br>17 | 81            | 17<br>11 | 181 | 14<br>08 | 81        | 24<br>18 | 81 | 29<br>22 | 81   | 27<br>20     | 81    | 25<br>18 | 81   | 27<br>20  | 81   | 38<br>45 | 81   | 28            | 81   | 29<br>29      | 81   | 96  | Needle N<br>Needle S. |      | 01'<br>08 |
| Ì | f | 2           | H  | 24       | 81  | 24           | 80   | 50       | 81  | 20.      | 5 81          | 14       | -01 | 11       | 83        | 21       | 81 | 25.      | 5.81 | 23,          | 5 81  | 21.      | 5 81 | 23.       | 5 81 | 41.      | 5 81 | 26            | 5.81 | 25,           | 5 80 | 59  | Oirei                 | e K. |           |
|   |   | 810         | 34 | ş/       |     | 810          | н    | . 5      |     | 81       | 17            | . 2      | 1   | 81       | · 16      | y -      |    | 81       | 24   | 5.8          | -   - | 810      | 22   | . 5       | 1    | 8        | 1º 3 | 4'            |      | 810           | 12   | . 2 | Needle N<br>Needle 8. |      | 04<br>59  |
|   |   | -           |    | 81       | 24  | . 8          |      |          | -   |          |               | 810      | 16  | 6        | -         |          |    |          | -    | 81           | 23    | à        | -    |           |      |          |      | 819           | 23   | .1            | -    |     | Mag. mer.             | 81   | 02        |
|   |   |             |    |          |     | M            | enn  |          |     | 81°      | 20'.          | 7        |     | -        |           |          | _  |          |      |              |       | М        | ean  |           |      | 810      | 23′. | 3             |      |               |      |     |                       |      |           |

[Date March 14, 1883. Station, Ughamile, Alaska. Göttingen time. Observer, J. E. Maxileld. Dip circle No. 23. Needle No. 3, 4, deflecting. Time of beginning, 15 25 a.m.; time of ending 25 a.m.;

No. 2. Time

in magnetie e verrical.

Firele N. 780 121 S. 82 52 Firele S. 6 N. 76 56 6 S. 81 48

mer. FO 12

No. 23.

80 12

| M       | lc east.<br>L.D.<br>Feaut |    | N        | d. R,<br>e ea |          | -  | Circle<br>face |    |          |    | Circl<br>face |    |          | -  | Circl<br>face |    |          |    | Cire<br>face     | le er |          | Circle in mag<br>prime vertic         |    |
|---------|---------------------------|----|----------|---------------|----------|----|----------------|----|----------|----|---------------|----|----------|----|---------------|----|----------|----|------------------|-------|----------|---------------------------------------|----|
| S.      | N.                        |    | 8.       | -             | N.       |    | S.             | _  | N.       |    | 8.            |    | N.       | -  | ₿.            | 1  | N.       |    | 8.               | 1     | N.       | Oirele N.                             |    |
| 9 30 22 | 59 66<br>58 52            | 42 | 18<br>20 | 41            | 40<br>42 | 65 | 42<br>38       | 65 | 30<br>26 | 66 | 32<br>28      | 66 | 19<br>16 | 66 | 30<br>33      | 65 | 46<br>50 | 66 | 52<br>5 <b>6</b> |       | 58<br>02 | Noedle N. O<br>Needle S.<br>Circle S. | ,  |
| 26      | 59 56                     | 12 | 10       | 41            | 41       | 65 | 40             | 65 | 28       | 66 | 30            | 66 | 17. 5    | 66 | 31.5          | 65 | 48       | 66 | 54               | 66    | 00       | Needle N.<br>Needle S                 |    |
| 20      | 11'                       |    |          | 420           |          |    | 650            | 34 |          | -  | <b>66</b> °   | 23 | . 8      | 1  | 66°           | 09 | , 8      |    | - 06             | p 27  | ,        | Mag. mer. 81                          | 02 |
|         |                           |    |          |               | -        |    |                |    | 650      | 58 | . 9           |    |          | !- |               |    | 660      | 18 | . 4              |       |          |                                       |    |

[Date, March 25, 1883. Station, Uglamic, Alaska. Göttingen time. Observer, J. E. Maxtield. Dip circle No. 23. Needle No. 2. Time of beginning, 98 40m p. m.: time of ending, 106 20m p. m.:]

|   |          |    | e es | ast<br>t. |      |          | rlo e<br>e we |     | •  | Sire<br>face |      |          |      |          | lo w |          |      | Circ<br>face |      | est,<br>st. |    |                 | le w | est.     |      | Circ<br>face |      |      | 1  | Circ:    |    |          | Circle in<br>prime |       |    |
|---|----------|----|------|-----------|------|----------|---------------|-----|----|--------------|------|----------|------|----------|------|----------|------|--------------|------|-------------|----|-----------------|------|----------|------|--------------|------|------|----|----------|----|----------|--------------------|-------|----|
| 2 | ś.       |    |      | N.        | 1    | S.       |               | N.  |    | S.           |      | N.       |      | 8.       |      | N.       | j    | s.           |      | N.          |    | 8.              | -    | N.       | -    | S.           |      | N.   |    | 8.       |    | N.       |                    |       |    |
| , | ,        |    | 5    | ,         | 0    | ,        | 0             | ,   | 0  |              | 0    | 1        | 0    | ,        | 0    | ,        | 0    | 1            | 5    | ,           | 10 | ,               | 0    | ,        | 0    | 1            | 0    |      | 0  |          | 0  |          | Oire               | le N  |    |
|   | 53<br>58 | 1  | 81   | 21<br>26  | 81   | 41<br>46 |               | 19  | 81 | 20<br>16     | 81   | 18<br>14 | 81   | 28<br>24 | 81   | 27<br>29 | 81   | 36           | ы    | 29          | 81 | $\frac{26}{22}$ | 81   | 25<br>20 | 81   | 37<br>42     | 81   | 13   | 81 | 45<br>49 | 81 | 17<br>22 | Needle N.          |       |    |
| 1 | 55.      | 54 | 81   | 23,       | 5 81 | 43.      | 5.81          | 14  | 81 | 18           | 81   | 16       | 8    | 26       | 81   | 24       | 5 81 | 33.          | 5 81 | 31          | 81 | 24              | 81   | 22.      | 5,81 | 39.          | 5,81 | 11   | 81 | 47       | 81 | 19. 5    | Circ               | ele N |    |
|   | 81       | 3  | 191. | 5         |      | 8:       | , 28          | . 8 | ;  | 81           | 0 1  | 7        |      | 81       | 25   | . 2      |      | 819          | 32   | 4. 2        | 1  | 81              | 23   | . 2      |      | 810          | 25   | ′. 2 |    | 810      | 33 | . 2      | Needle N.          |       |    |
|   |          |    | -    | ьi        | 34   | . 2      |               |     | 1- |              | _    | 81       | - 21 | . 1      |      |          |      | -            |      | 810         | 27 | . 7             |      |          |      |              |      | 810  | 29 | . 2      |    |          | Mag. mor.          | 76    | 11 |
|   |          |    |      |           |      | м        | eau           |     |    | 810          | 27'. | 6        |      |          |      |          |      |              |      |             |    | 2               | fear | ı        |      | 812          | 28'. | 4    |    |          |    |          | in the second      |       |    |

[Date, March 31, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer J. E. Maxfield. Dip circle No. 23. Needle No. 2. Time of beginning, 10<sup>h</sup> 10<sup>m</sup> p. m.; time of ending, 10<sup>h</sup> 40<sup>m</sup> p. m.

|   |              |     |      | Po  | lar           | ity      | of   | mi  | irk | ed | en           | d I | 9 n  | orth | 0            |     |          | 1      |       |      | F     | oia  | rity     | of   | mai         | ke       | i en          | 1 4     | 940      | rth  |          |      |          |   |
|---|--------------|-----|------|-----|---------------|----------|------|-----|-----|----|--------------|-----|------|------|--------------|-----|----------|--------|-------|------|-------|------|----------|------|-------------|----------|---------------|---------|----------|------|----------|------|----------|---|
| ( | irei<br>face | 68  | ant. |     |               | lire     |      |     |     |    | irel<br>face |     | est, |      | lire<br>face |     | rent,    | 1      | Cire: |      | rent, | (    |          | le w | ent,<br>at. |          | lirel<br>face |         |          |      | Circ     |      | ant,     | Circle in magnetic prime vertical.          |
|   | В.           |     | N.   |     |               | 84.      | T    | N.  |     | 1  | н.           | I   | N.   |      | в.           | 1   | N.       | -      | 8.    | T    | N.    |      | В.       | 1    | N.          |          | ß,            | 1       | N.       |      | 84,      |      | N.       |   |
| ı | 56<br>00     |     | 48   |     | 9<br>#1<br>#2 | 50<br>03 | 81   | 30  |     |    | 52<br>48     | 80  | 49   | 81   | 27<br>23     | H   | 25<br>20 | 0      | 11 07 | O MI | 12 07 | 81   | 25<br>20 | ×1   | 22<br>18    | 81<br>82 | 581<br>033    | o<br>81 | 29<br>34 | RI   | 48<br>53 | 0 81 | 17<br>21 | Circle N. Needle N. 80° 38' Needle S. 82 28 |
| ı | 58           | 81  | 48   | . 8 | H2            | 01       | 81   | 32  | . 5 | HU | 50           | 80  | 47   | H    | 25           | 81  | 22.      | 1 24 1 | 09    | 81   | 09.   | 5.81 | 22       | 5.81 | 20          | 82       | 00.           | 81      | 31.      | 5 81 | 50.      | 5 81 | 10       | Circle S. Needle N. 80 44                   |
|   | 810          | 51' | . 8  | -   |               | 810      | 46   | . 8 | -   |    | 800          | 48  | . ő  |      | 810          | 23  | . 8      | -      | 81    | 00   | . 2   |      | 81       | 21   | . 9         |          | 81            | 46      | y        | -    | 810      | 34   | . 8      | Needle 8, 82 14                             |
|   |              |     | 81   | 0 4 | 9',           | a        | -    |     | -   |    | -            |     | Blo  | 06   | 2            |     | WEED-1-  |        |       |      | ñ1:   | 15   | 2        |      | -           |          |               |         | 810      | 40'  | . 4      |      |          | Mag. mer. 81 31                             |
|   |              |     |      |     |               | 2        | tea  | n   |     |    | 810          | 27/ | 8    |      |              |     |          | 1      |       |      |       |      | λ        | lean |             |          | 810           | 27'     | . 8      |      | ~        |      |          | 1   |
|   |              |     |      |     |               | ******   | **** |     |     | -  | -            |     | -    |      | Res          | ult | ing e    | lip    | . 81  | 27   | 7.8   |      |          |      |             |          |               | -       |          |      |          |      |          |   |

[Date, March 31, 1883. Station, Uglaamie, Alasko. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning, 2\* 05\*\*a.m.; time of ending, 2\* 35\*\*a.m.]

| Need                | lle   | N   | ı. 3,         | Νo | . 4 | d        | eti | θť          | ti | ng       |   |    |     |             |     |          |      |     | Ne            | ed1 | 0 3 | io. i | 6, W | eigl     | itei       | l. |               |   |     |         |   |    |          |   |                                  |    |                 |
|---------------------|-------|-----|---------------|----|-----|----------|-----|-------------|----|----------|---|----|-----|-------------|-----|----------|------|-----|---------------|-----|-----|-------|------|----------|------------|----|---------------|---|-----|---------|---|----|----------|---|----------------------------------|----|-----------------|
| Circl<br>Mi<br>face | ic. l | D,  |               |    |     | λ        | die | n e<br>t. I | ł, |          | 1 | ,  |     | erle<br>ice |     |          |      |     | rele          |     |     |       |      | Sire!    |            |    |               |   |     | Circ    |   |    |          |   | Circle in n<br>prime ve          |    |                 |
| 8.                  | 1     | 2   | ۲.            | 1  | £   | š.       |     |             | 2  | ۲.       |   |    | н,  |             |     | N.       | į    | 8   |               |     | N.  |       |      | 8,       | 1          | N  | Ι.            | - |     | В.      | 1 |    | N.       |   | Circle                           | N. | **              |
| 0 /<br>81 17<br>11  | 1     | 31  | ,<br>02<br>56 | 1  | 3   | 00<br>12 |     | 4           |    | 05<br>08 |   | 6. | 2 2 |             | 65  | 17<br>13 | 01/  |     | ,<br>50<br>16 | 63  | 3:  |       | 65   | 32<br>36 | 6          | 4  | ,<br>53<br>58 |   |     | 7<br>03 |   | 66 | 02<br>06 |   | Needle N.<br>Needle S.<br>Circle | 81 | 48/<br>36       |
| BI 14               |       | 30  | 59            | 1  | 3   | 10       | 5   | 4           | 2  | 06.      | 5 | 65 | 2   | 7           | 65  | 15       | 67   | i 4 | kai           | 67  | 84  | Ü     | 65   | 34       | tle        | 4  | 56.           | 5 | 67  | 01      | - | 66 | 04       | - | Needle N.<br>Needle S.           |    | $\frac{29}{15}$ |
| 610                 | 00    | 7.5 |               | -  |     | 42       | 0   | 38          | .5 |          | - | _  | -   | 850         | 21/ |          | !    |     | 650           | 80  | ,   |       |      | 650      | 15         | .2 |               |   |     | 669     | 2 | ψ. | 5        |   | Mag. mer.                        | 80 | 02              |
|                     |       |     |               |    |     |          |     |             |    |          |   |    |     |             |     | 65       | . 30 |     |               |     |     |       |      |          |            |    | 65:           | 5 | 34, | В       |   |    |          |   |                                  |    |                 |
|                     |       | 14  | = 3           | 80 | 07  | .5       |     |             |    |          |   |    | -   |             |     | -        |      |     | 31            | lea | n   |       | . 65 | - 41     | <b>',9</b> |    |               |   |     |         |   | -  | -        |   |                                  |    |                 |

[Date, April 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxifeld. Dip circle No. 23. Needle No. 2. Time of hegmaning, 12° 36° a.m.; time of ending, 18° 05° a.m.]

|   |             |     |    | )        | Pol | arit        | y o | f m  | ark | ₽ď | ené           | A     | no       | rth. |          |     |          |     |                | -  | •        | Pol | arlt     | y of | ma            | rke | ıl or    | ad I  | i n  | orti | h.   |             | teritori, an |          |     |                                  | -         |    |
|---|-------------|-----|----|----------|-----|-------------|-----|------|-----|----|---------------|-------|----------|------|----------|-----|----------|-----|----------------|----|----------|-----|----------|------|---------------|-----|----------|-------|------|------|------|-------------|--------------|----------|-----|----------------------------------|-----------|----|
|   | Circ<br>fac |     |    |          |     | Circ<br>fac |     |      |     |    | ircle<br>face |       |          |      |          |     | vest.    |     | 'irele<br>face |    |          |     |          |      | vest,<br>ast. |     |          | ele w |      |      |      | Circ<br>fac |              |          |     | Circle in m<br>prime ver         |           |    |
|   | 8.          | -   | 1  | N.       |     | 8.          | Ĩ   | N.   | -   | 8  | 8.            |       | N.       | 1    | 8.       | ĺ   | N.       |     | ß.             | ļ  | N.       | 1   | 8.       | 1    | N.            | Ì   | 8.       | 1     | N    |      | į    | 8.          | 1            | N.       |     |                                  |           |    |
| _ | 42<br>48    | 8   | _  | 16<br>22 | 81  | 41<br>47    | 8   | 1 10 | 1   |    | 06<br>00      | 81    | 04<br>58 |      | 27<br>21 |     | 25<br>19 | 81  | 56             | 81 | 24<br>18 | 81  | 21<br>14 | _    | 28<br>22      | 81  | 35<br>40 | 8     |      | 6    | _    | 47<br>52    | 81           | 15<br>20 | H   | Circle<br>Needle N.<br>Needle S. | 760<br>81 |    |
| 1 | 45          |     | _  | 19       | 81  | 44          |     | 1 13 |     | 1  |               | 1     | 01       | 81   | 24       |     |          | 80  | 59             |    |          | 61  |          | -    | 25            | 81  |          |       | _    |      | -    | 49.         | !            | -        | . 5 | Verels N.                        | 80        |    |
|   | 81          | 0 8 | 32 |          |     | 810         | 28  | . 5  |     |    | 810           | 00    | ,        |      | 81       | 0 9 | 3'       | 1   | 819            | 1  | 94       |     | 810      | 21   | . 2           |     | 81       | 25    | V. 8 | •    |      | 810         | 33           | . 5      | ŀ   | Needle S.                        | 76        | 48 |
|   |             |     |    | 810      | 30' | 2           |     |      |     |    |               |       | 819      | 12   | . 5      |     |          | 1   |                |    | 819      | 15  | 6        |      |               |     |          |       | 8    | 10   | 29'. | 5           |              |          | Ì   | Mag. mer.                        | 78        | 53 |
|   |             |     |    |          |     | A           | 1ea | n    |     | 81 | 0 2           | l'. 4 |          |      |          |     |          | 1   |                |    |          |     | M        | dea. | n             | 8   | 110      | 22′.  | 6    |      |      |             |              |          |     |                                  |           |    |
| _ |             |     |    |          |     |             |     |      |     |    |               |       |          |      | Re       | sul | ting     | dip | 810            | 22 | . 0      |     | -        |      |               |     |          |       | -    | -    |      |             | _            |          | i   |                                  |           |    |

[Date, April 24, 1883. Ritation, Uglaamie, Alsaka. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning. 15 16= n. m.; time of ending. 15 30= n. m.]

| Needle                | (° | No      | . 3, | No | 1, 4    | defi                | ect  | ing.     |   |    |          |     |          |      | N        | Mul | le | No.   | 4.  | weig               | ti t e | ·d,       |    |      |          |                |          |                                       |
|-----------------------|----|---------|------|----|---------|---------------------|------|----------|---|----|----------|-----|----------|------|----------|-----|----|-------|-----|--------------------|--------|-----------|----|------|----------|----------------|----------|---------------------------------------|
| Circle<br>Mic<br>face | 8  | D.      |      | -  |         | irek<br>Mic<br>face | e. R | 4        |   |    | irele    |     |          |      | irel     |     |    | ê,    | 1   | Circ               |        |           |    | (    |          | rlo e<br>re ea |          | Circle in magnetic<br>prime vertical. |
| 8.                    |    | N       |      | į  | 1       | 4,                  |      | N.       | - | 1  | 4.       | i   | N.       | -    | В.       | 1   | N  |       | -   | 8.                 | 1      | N.        |    |      | В.       |                | N.       |                                       |
| 59 16<br>12           |    | n<br>58 |      | -  | 6<br>42 | 35<br>39            | 41   | 23<br>28 |   | 66 | 38<br>44 |     | 53<br>5H | 65   | 53<br>58 | 1   |    | 10    | . ( | 0 ,<br>35 12<br>06 | 1      | 04 4<br>4 |    | , 65 | 41<br>85 | 6              | 5 27     | Circle N. Nocalle N. Necedle S.       |
| 59 14                 |    | 68      | 58.  | 5  | 42      | 37                  | 41   | 25.      | 5 | 66 | 41       | 00  | 55. 5    | 65   | 55.      | 5 ( | 13 | 12. 8 | -   | 35 09              |        | 64 4      | 4  | 68   | 38       | . 6            | 35 24. 5 | Circle S.<br>Needle N.                |
| 800                   | 0  | 1. 8    |      |    |         | 42 -                | 015  | 2        |   |    | 66       | 18% | 2        |      | ชอ์      | 41  | 1  |       |     | 64                 | 54     | 1.5       |    |      | 65       | ~ 31           | 1, 12    | Needle B.                             |
|                       |    |         |      |    |         |                     |      |          |   |    |          |     | 659      | 564. | 1        |     | -  | -     | -   |                    |        | 6         | 5- | 13′. | 8        |                |          | Mug. mer. 78 N                        |
|                       |    | 11'     | - 3  | () | 25      | 0                   |      |          |   |    |          |     |          |      |          | Me  | nn |       |     | 65- 3              | Pa.    |           |    |      |          |                |          |                                       |

[Date, April 30, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Mexileld. Dip circle No. 23. Needle No. 2. Time of beginning, 125 215 a. m.; time of ending, 15 165 a. m.]

| Circle east,<br>face east. | Circle vast,<br>face west. |                        | Circle west,<br>face west. | Circle west.         | Circle west,<br>face east. | Circle east,   Circle east,   face west, | Circle in magneti<br>prime vertical. |
|----------------------------|----------------------------|------------------------|----------------------------|----------------------|----------------------------|--|--------------------------------------|
| 8.   N.                    | 8. N.                      | s. N.                  | 8. N.                      | 8. N.                | , S. N.                    | 8. N. B. N.                              |                                      |
| 1 10 1                     | 10 / 10 /                  | 01 01                  | 10 / 10 /                  | 0 / 2                | 2 / 10 /                   | 0 / 10 / 10 / 10 / 11                    | Circle A.                            |
| 1 36 81 06<br>40 11        | 81 49 81 21<br>53   27     | 81 13 81 09<br>07   03 | 81 26 81 25<br>21 19       | 81 27 81 26<br>22 20 | 81 15 81 17<br>09 11       | 81 49 81 20 81 34 81 68<br>55 25 39 13   | Needle N. 79- 4<br>Needle S. 81 5    |
| 1 8H '81 OH.               | 5 81 51 81 24              | 81 10 .81 08           | 81 23. 5 81 22             | 81 24.5 81 23        | 81 12 81 14                | 81 52 81 22, 5 81 36, 5 81 10, 5         | Circle 8.                            |
| 81° 23′. 2                 | 810 37'. 5                 | 810 08                 | 811 221.8                  | B1° 23', 8           | 81° 13'                    | 81 - 87/. 2 81 - 20/. 5 .                | Needle N. 80 5<br>Needle S. 80 0     |
| 810                        | 30', 4                     | 810                    | 15'. 4                     | 810                  | 18'. 4                     | 81° 30'. 4                               | Mag. mer. 80 3                       |
| -                          | Mcan                       | 810 227.9.             |                            |                      | Mean                       | 81: 24'. 4.                              |                                      |

¡Date, April 30, 1885. Station, Ugbiamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of begit ning. 15 20m a. m. : time of ending. 15 40m a. m. ]

|         |          |     | ens<br>ens |          | 1  | Circle<br>face |     |          | -  |    | ircte<br>face |       |          |     | Cir<br>fa          |     | we. |          | ì |    | rel<br>ace |    |      |      | (    | 'ir      |     | cas  |          |   | Circle in magneti<br>prime vertical. |
|---------|----------|-----|------------|----------|----|----------------|-----|----------|----|----|---------------|-------|----------|-----|--------------------|-----|-----|----------|---|----|------------|----|------|------|------|----------|-----|------|----------|---|--------------------------------------|
| 1       | S.       |     | 1          | N.       |    | s.             | 2   | N.       |    | 1  | 4.            |       | N.       | 1   | S.                 |     | 2   | Ň.       |   | 8  |            |    | N.   |      |      | S.       | 1   |      | N.       |   |                                      |
| o<br>59 | 37<br>33 |     | 5Đ         | 16<br>10 | 42 | 15<br>18       | 41  | 14<br>17 | -  | 66 | 20<br>14      |       | 03<br>58 |     | 0 /<br>18 19<br>12 |     | 66  | 13<br>07 |   | 66 | 23<br>29   | 0  | 547  |      | 66   | 40<br>45 |     | 65   | 51<br>57 | - | Circle N.<br>Needle N.<br>Needle S.  |
| 59      | 35       |     | 59         | 13       | 42 | 16, 5          | 41  | 15       | .5 | 66 | 17            | 66    | 00,      | 5 € | 16 16              | 3   | 66  | 10       | ( | 66 | .6         | 6  | 5 50 | 0    | 66   | 42       | . 5 | 65   | 51       | 1 | Circle S.                            |
|         | 5        | 300 | 24         |          | 1  | 410            | 46′ |          | Ŀ  | -  | 36° (1        | 81. 8 |          | 1   | - (                | 360 | 13′ |          |   |    | 660        | 08 | ,    |      |      | 66       | 0   | 18'. | 2        |   | Needle N.<br>Needle S.               |
|         | -        |     |            |          |    |                |     |          | 13 |    |               |       | 660      | 10  | . 9                |     | -   |          | - | -  |            |    | 61   | ge : | 13'. | 1        |     |      |          |   | Mag.mer. 80                          |

H. Ex. 44——84

Time of

edle

tic

29 15

No. 2. Time of

e in magnetic me vertical.

Circle N.
le N. 769 41'
le S. 81 17
Circle S.
lle N. 80 46
lle S. 76 48
z. mer. 78 53

{Date, May 14, 1883. Statiou, Uglaamic, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needla No. 2. Time of beginning, 12.2 him a. m. time of ending, 12.3 him a. m.]

|                  |     | )        | Pol | ari       | ty       | of      | mai      | ke  | d er        | id z | 1 21 | 77t  | ĥ.      |               |     |     |     |         |               |     |          | P     | ola | rit;          | y o | f m      | arle | e!  | en            | d A | B 1         | 107  | ta. |     |     | _  |             | 1   |                        |     |   |
|------------------|-----|----------|-----|-----------|----------|---------|----------|-----|-------------|------|------|------|---------|---------------|-----|-----|-----|---------|---------------|-----|----------|-------|-----|---------------|-----|----------|------|-----|---------------|-----|-------------|------|-----|-----|-----|----|-------------|-----|------------------------|-----|---|
| Circle<br>face e |     |          |     | it<br>fac |          |         | ist.     | 1   | Tire<br>fac |      |      |      |         | 'irel<br>face |     |     |     |         | Hrele<br>face |     |          |       | Ci  | rel           | e v | vest     | 7    |     |               |     | 688<br>(80) |      |     | Cir |     |    | met,<br>et. |     | Circle in a<br>prime v |     |   |
| S.               | 1   | v.       |     | 8.        | -        | -       | N.       |     | S.          | Ī    | N    |      |         | 8.            | 1   | N.  |     |         | 8.            |     | N.       |       | 8   | š.            |     | N.       |      | 8   | ١,            | 1   | N           | ١.   | L   | 8.  |     |    | N.          | -   |                        |     |   |
| 0 29 8           |     | 51<br>53 | 81  | 51        |          | o<br>81 | 19<br>22 | 80  | 52 48       |      | 1 01 |      | o<br>F1 | 36<br>32      | 1 - | 43  | b   | o<br>81 |               | 81  | 26<br>22 | - 1 ' | 1 : | /<br>24<br>21 | 81  | 35<br>31 | 81   | l 8 | ,<br>51<br>54 |     | 1 1         | 4.7  | 81  | 41  |     | 81 | 02<br>04    |     | Necdle N.<br>Necdle S. | 740 |   |
| 1 30.58          | nU  | 52       | 81  | 52        | . 5.     | 81      | 20.      | 186 | 50          | - 8  | 1 0  | 1. 8 | 81      | 34            | 81  | 41  | . Б | 81      | 13            | 81  | 24       | К     | 1 : | 10. /         | 81  | 33       | 8    | 1 5 | 2             | 5 H | 1 1         | 5, 1 | 581 | 42  | . 5 | 81 | 63          |     | Orrel                  | B.  |   |
| 810 11           | 1'. | 2        |     | 81        | 0 ;      | 367     | . 5      | 1   | 803         | .1.  | 7. 8 | -    | -       | 810           | 37  | . 8 | +   | _       | 810           | 18  | , 5      | -     | 8   | 10            | 27  | . 8      |      | 8   | 10            | 34  | ۷. 0        |      | 1   | 81  | 0 0 |    | 8           | - 1 | Needle N.<br>Needle S. |     |   |
|                  |     | 810      | 23  | . 8       | en sen n |         |          | ĺ   |             |      | F)   | ر    | 181     | . 3           |     |     | 1   |         | -             |     | 81       | 2:    | ۷.: | 3             |     |          |      |     |               |     | 8           | 10   | 28  | . 4 |     |    |             | ļ   | Mag. mer.              | 77  | 4 |
|                  |     |          |     |           | м        | ea      | n        |     | 810         | 21   |      |      |         |               |     |     | 1   |         |               | _   |          |       |     | M             | eat | n        |      | 819 | 5             | 5'. | ê           | -    |     |     |     |    |             | 1   |                        |     |   |
|                  | -   |          |     |           |          |         |          |     |             |      |      |      |         | Res           | ult | ing | di  | <br>D.  | 81º 2         | 3'. | 4        |       | -   |               |     |          |      | -   |               |     |             | -    |     |     |     |    |             |     |                        |     |   |

[Date, May 14, 1883. Station, Uglasmie, Alaska Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning, 18 35 sen. m.; time of ending, 18 56 sen. m.]

| Needle No. 3,                         | No. 4 de                | decting.                      |             |                  | Fiet           | odlo No. 4  | l, weigh    | ted.           |             |             |                                       |
|---------------------------------------|-------------------------|-------------------------------|-------------|------------------|----------------|-------------|-------------|----------------|-------------|-------------|---------------------------------------|
| Circle east,<br>Mic. D.<br>face east. | 31                      | le cast,<br>or, R,<br>s ear L |             | e west,<br>west. | Circle<br>face |             |             | osst,<br>west. |             | e east.     | Circle in magnetic<br>prime vertical. |
| 8. N.                                 | S.                      | N.                            | 8.          | N.               | 8.             | N.          | S.          | N.             | 8.          | N.          |                                       |
| 6 / 6 /<br>59 22   58 58<br>54        | i o 7<br>i 42 28<br>i.u | 41 36                         | 65 44<br>41 | 63 33<br>29      | 66 23<br>20    | 66 13<br>10 | 65 46<br>49 | 65 10<br>13    | 66 49<br>53 | 65 54<br>67 | Circle N.<br>Needle N.<br>Needle S.   |
| 9 20   58 56                          | 12 79                   | : 11-37                       | 65 42.5     | 65 31            | 66 21, 5       | 66 11.5     | 65 47.5     | 65 11.5        | 66 51       | 66 55, 5    | Circle 8.                             |
| 59° 08′                               | 1 4                     | 0.7                           | 65°         | 36'. 8           | 660 1          | 6'. "       | 650         | 29', 5         | 660         | 23'. 2      | Needle N.<br>Needle S.                |
|                                       |                         |                               |             | 650              | 56', 6         | i           |             | 650            | 56'. 4      | 1           | Mag. mer. 77 47                       |
| 12 30                                 | 90 245.5                |                               |             |                  | М              | ean         | .650 564    | 5              |             |             |                                       |

[Date, May 23, 1685. Station, Uglaarde, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 2 Time of heginning, 12 47 a.m.; time of ending, 15 18 a.m.]

| Polarity of mark                              | sed end $B$ nort     | h.                         |                            | Polarity of marked en            | d A north.           |                      |                                       |
|---|----------------------|----------------------------|----------------------------|----------------------------------|----------------------|----------------------|---------------------------------------|
| Circle cast Circle east, face east face west. | Circle vest,         | Circle west,<br>Lace West, | Circle west,<br>face west. |                                  |                      | le east,<br>east.    | Circle in magnetic<br>prime vertical. |
| S N S N.                                      | 8 5                  | S S.                       | 8. N.                      | 8, N. S,                         | N. S.                | N.                   |                                       |
| 0 . 0   |                      | 1 1 1                      | 0101                       | 010101                           | 0 1 0 1              | 0 /                  | Circle N.                             |
| 1 59 31 05 81 40 81 04 3<br>41 1 08 43 07     | 81 69 81 15<br>05 .1 | 81 12 81 20<br>08 , 17     | F1 38 81 48<br>34 44       | 81 02 81 10 82 00<br>80 58 05 03 | 81 71 81 32<br>25 86 | 81 (1                | Needle N. 839 48<br>Needle S. 80 02   |
| 1 40 81 06, 5 81 41, 5 81 05, 5               | 81 07 (31 1)         | ** 10 - 81 48.             | 5 81 36  81 46             | 81 00 81 07.5 82 01.             | 5 81 23 81 33.       | 5 <sub>80</sub> 22.3 | Circle S.                             |
| 81 × 23/12 ( 81 × 23/ 5                       | 819-16               | 819 14.72                  | 819 41                     | 810 03/.8 810                    | 42'.2 810            | 16.45                | Needle N. 83 59<br>Needle S. 83 42    |
| 819 23 .4                                     | 819                  | 12.41                      | 810                        | 22 .4                            | 81° 29′.4            |                      | Mag. mer. 62 53                       |
| Mean  | .819 17/8            |                            |                            | Mean 81º 2                       | 25'.9                |                      |                                       |
|   |                      | Resulting                  | dip, 81° 21./8             |                                  |                      |                      |                                       |

[Date, May 31, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 2. Time of beginning, 12 58 m.n.; time of ending, 12 50 m.a. m.]

. Time of

magnetic certicle.

ole N.
N. 74° 08′
8. 77° 39
ole S.
N. 77° 16
8. 81° 04
or. 77° 47

ecdlo

etie 11.

No. 2. Time of

le in magnetic me vertical.

Circle N.

10 N. 83° 48'
10 S. 80 02

Circle S.

10 N. 83 59
10 S. 83 42

mor. 82 53

|                  | Poli        | rnty        | nt   | man | keć  | l en         | d A  | nor  | th.        |              |      |       |      |               |    | 1     | ol  | arity          | of   | mar   | kec | i end         | B   | nor        | h. |     |              |      |                         |          |   |
|------------------|-------------|-------------|------|-----|------|--------------|------|------|------------|--------------|------|-------|------|---------------|----|-------|-----|----------------|------|-------|-----|---------------|-----|------------|----|-----|--------------|------|-------------------------|----------|---|
| Circl cas        |             | nos<br>lace |      |     |      | irel<br>face |      | est, |            | irel<br>face |      |       |      | lirek<br>Iace |    |       | . ( | Circle<br>face |      | ont,  |     | Circl<br>face |     |            | 1  |     | le e<br>e ea | nst, | Circle in m<br>prime ve |          |   |
| 8. N             |             | s.          |      | N.  | 1    | 8.           |      | N.   |            | 8.           |      | N.    |      | ß.            | 1  | N.    |     | 8.             |      | N.    |     | 8.            |     | N.         | i  | 8.  |              | N.   |                         |          |   |
| /   o<br>42 81 0 | , o<br>3 81 | 47          | 0 81 | 09  | 0 81 | 19           |      | 28   | 0          | 23           |      | 31    | 0    | 14            |    | 25    | 81  | 15             | 0 81 | 28    | 82  | 08            | 0   | 25         | 81 | 55  |              | 12   | Oirele                  | N.       |   |
| 45 (             | 7           | 51          |      | 13  |      | 15           | _    | 24   | L          | 20           | L    | 27    | 61   | 10            |    | 22    |     | 11             | _    | 25    |     | 11            |     | 29         | 01 | 56  |              | 15   | Needle N.<br>Needle S.  | 76°      |   |
| 43. 5 81 6       | 2 81        | 49          | 61   | 11  | 81   | 17           | 81   | 26   | 81         | 21. 5        | 5 83 | 29    | 81   | 12            | 81 | 23. 5 | 81  | 13             | 81   | 26. 5 | 82  | 69. 5         | 81  | 27         | 81 | 56. | 5.81         | 13.5 | Ulrote                  | 8.       |   |
| 810 247.3        |             | 810         | 30   | ŧ   |      | 810          | 21   | .15  | T          | 810          | 25   | .2    | -    | 810           | 17 | .8    | -   | 810            | 19   | r.8   |     | 810           | 48  | <b>7.2</b> |    | 81  | 0 3          | 5'   | Needle N.<br>Needle S.  | 76<br>80 |   |
|                  | 10 27/      | . i         |      |     |      |              |      | 810  | 23.        | /4           |      |       |      |               |    | 810   | 18  | .8             |      |       |     |               |     | 810        | 41 | .6  |              | į    | Mag. mer.               | 78       | 4 |
|                  |             | 31          | ean  |     | 8    | 10 2         | 5./2 | ì.   |            |              | ^ 1  |       | ĺ    | 2.0           |    |       |     | M              | ea   | n     | 8   | 31° 3         | 0'. | 2          |    |     |              |      |                         |          |   |
|                  |             |             |      |     |      |              | -    |      | - Calmania | Rea          | ult  | ing é | lip, | 810           | 27 | . 7   | _   |                | -    | -     |     |               |     |            |    |     |              |      |                         |          |   |

[Date, May 31, 1883. Station, Uglaamie, Alaska. Güttingen time. Observer, J. B. Maxfield. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning, 1<sup>h</sup> 32<sup>m</sup> a. m.; time of ending, 1<sup>h</sup> 49<sup>m</sup> a. m.]

|                                    |             |                 |        |          | ted.    | eigl     | 1, w    | No.      | dle         | Ne            |     |               |         |               |             |          | ing     | effec                | 4 d     | No. 3    | dlo l                  | Nee |
|------------------------------------|-------------|-----------------|--------|----------|---------|----------|---------|----------|-------------|---------------|-----|---------------|---------|---------------|-------------|----------|---------|----------------------|---------|----------|------------------------|-----|
| Circle in magnetic prime vertical. |             | ircle<br>face e |        |          | n eas   |          |         |          |             | ircle<br>face |     |               |         | ircle<br>face |             | .        | . R,    | ircle<br>Mic<br>face |         |          | e eas<br>e. D,<br>east |     |
| ,                                  | N.          | 5.              | 8      | ĩ.       | 2       | 3.       | -       | τ.       | 1           | 3.            | -   | v             | 1       | 5.            | -           | Ñ.       | 2       |                      | 5       | ξ.       | 2                      | 8.  |
| Circle N. Needle N. Needle S.      | 67 02<br>08 | 31 34           | 67     | 32<br>35 | o<br>65 | 26<br>30 | o<br>66 | 58<br>55 | 6<br>6<br>6 | 07<br>04      | 66  | ,<br>18<br>14 | o<br>05 | 28<br>24      | 6<br>6<br>6 | 38<br>41 | °<br>41 | 42<br>45             | o<br>42 | 11<br>08 | 59                     | 32  |
| Circle S.                          | 67 04       | 32. 5           | 67     | 33. 5    | 65      | 28       | 66      | 56. 5    | 65          | 05. 5         | 66  | 16            | 65      | 26            | 65          | 39. 5    | 41      | 43. 5                | 42      | 00.5     | 59                     | 31  |
| Needle N.<br>Needle S.             | 8'. 2       | 67º 1           |        | 3        | 00%     | 660      |         |          | 01'         | 66º           |     |               | 21'     | 650           | -           | 5        | 1'. !   | 42°                  |         |          | 20'. 5                 | 590 |
| Mag. mer. 780 4                    |             | 5               | 394. ! | 66°      |         |          |         |          |             |               | 41' | 650           |         |               | -           | -        |         |                      |         |          |                        |     |
|                                    |             |                 |        |          | . 2     | o 10     | . 66    |          | lear        | M             |     |               |         |               | -           |          |         | . 2                  | 14      | =39      | 14                     |     |

[Date, June 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 2. Time of beginning. 12% 57m a. ; m. time of ending, 18 26m a.m.]

|                                 | Polarity of mar               | ked end B nor              | th.                        | P                               | clarity of mark      | ked end A north.           |   |
|---------------------------------|-------------------------------|----------------------------|----------------------------|---------------------------------|----------------------|----------------------------|---|
| Circle east,                    | Circle east,<br>face west.    | Circle west,<br>face east. | Circle west,<br>face west. | Circle west,<br>face west.      | Circle west,         | Circle cast, face cast,    | Circle in magnetic<br>prime vertical.       |
| S. N.                           | S <sub>i</sub> N <sub>i</sub> | 8. N.                      | 8. N.                      | 8. N.                           | S. N.                | 8. N. S. N.                | 1   |
| 0 r 'c r<br>1 40 81 14<br>45 19 | 81 44 81 <b>18</b><br>48 23   | 81 20<br>15 81 16<br>11    | 81 21 81 23<br>16 18       | 0 / 0 /<br>81 21 81 18<br>16 13 | 61 17 81 21<br>12 15 | 81 53 81 22 81 31 81 05 09 | Circle N. Nuodlo N. 8 5 55 Nuodlo S. 8 5 55 |
| 1 42 5 81 16                    | 1 1                           |                            | 5 81 18. 5 81 20. 5        | 81 18, 5 81 15, 7               | 1                    | 81 55 81 24 81 33 81 07    | Circle .<br>Needle N. 81 "                  |
|                                 | 815, 835, 9                   | 810 15/, 5                 | 81° 19′. 5                 | 810 17                          | 810 107.2            | 810 397, 5 R10 207         | Mag. mer. 83 06                             |
| - 01                            |                               | 89, 247.4                  | 11.5                       |                                 |                      | 810 23/.2                  |   |
|                                 |                               |                            | Resulting                  | dip, 81° 23′, 8                 |                      |                            |   |

[Date, June 14, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No.23, Needle No.3, No.4 deficting. Time of beginning, 15 28 a.m.; time of ending, 15 48 a.m.]

|                                      |          |      |     |              |      |     | ed  | ght | wei          | 4, | No       | He   | lee       | N   |    |          |      |          | . ' | ting     | lec  | 4 de         | Ñο.           | 3, 2     | No   | dle                 | í e |
|--------------------------------------|----------|------|-----|--------------|------|-----|-----|-----|--------------|----|----------|------|-----------|-----|----|----------|------|----------|-----|----------|------|--------------|---------------|----------|------|---------------------|-----|
| Circle in magneti<br>prime vertical. |          |      |     | lire<br>face |      |     |     |     | Circ<br>face |    |          |      | cle<br>ce |     |    |          |      | ircle    |     |          | . R  | 'ircl<br>Mic |               |          | D,   | rele<br>Hie<br>ee e |     |
| Circle N.                            | N.       | 1    |     | s.           |      |     | N   |     | s.           |    | N.       |      |           | 8.  | [  | ٧.       | 1    | S.       | -   | N.       | :    | s.           | ,             |          | N    |                     | 8   |
| Needle N<br>Needle S.<br>Circle S.   | 10<br>16 |      |     | 52<br>57     |      |     | 5 4 | 68  | 43<br>40     | 66 | 50<br>45 |      |           | 16  | 60 | 31<br>20 | 66   | 50<br>44 |     | 50<br>54 | 41   |              | o<br>42<br>43 |          | 59 3 | 8                   | 9 4 |
| Needle N.<br>Needle S.               | 13       | 66   | . 5 | 54.          | 66   | 4 . | 5 4 | 65  | 46           | 66 | 47.      | 65   | 7. 5      | 07  | 60 | 28. 3    | 66   | 47       | 66  | 52       | 41   | 59           | 42            | 1.5      | 50   | 4. 5                | ) 4 |
| Mag. mer. 83° 06                     | . 8      | 33′. | 0   | 660          |      |     | . 2 | 15  | 66°          |    | 5        | 57′. | 50 [      | 6.  |    | 8        | 37′. | 660      |     | 5        | 25'. | 420          | _             | -        | 38   | 590                 |     |
|                                      |          |      |     | 5            | 24′. | во  | 6   |     |              | -  |          |      | 3         | . 6 | 17 | 660      |      |          | 1   |          |      |              |               | and rate |      |                     | -   |
|                                      |          |      |     |              |      |     | ,   | 21  | 660          |    | n        | loa  | M         |     |    |          |      |          | -   | _        |      | 58/, 2       | 20 5          | - 35     | 41   |                     |     |

[Date, June 30, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxileld. Dip circle No. 23. Needle No. 2. Time of beginning, 126 50m a.m.; time of ending, 12 27m a.m.]

|   |     |     |     |     |               | P   | ılı | ait;     | y o | fn   | n r | kei | l en          | ıd. | A 1 | or  | th. |             |            |              |      |    |               |     |           | P    | ola  | rity     | of    | n         | arl  | red | en         | d F | n    | rth |     |          |     |             |    |  |   |
|---|-----|-----|-----|-----|---------------|-----|-----|----------|-----|------|-----|-----|---------------|-----|-----|-----|-----|-------------|------------|--------------|------|----|---------------|-----|-----------|------|------|----------|-------|-----------|------|-----|------------|-----|------|-----|-----|----------|-----|-------------|----|--|---|
|   |     |     |     |     | st.           |     |     |          |     | est. |     |     |               |     |     |     |     | Circ<br>fac | :le<br>e v | wes          | t, . | C  | lirel<br>face | e v | vest      | ŧ,   | (    | ire      | le t  | we<br>nut | st,  | (   | ire<br>fac |     |      |     |     |          |     | ast,<br>st. |    | Circle in magnet<br>prime vertical.        |   |
|   | S   |     |     | 3   | N.            | 1   |     | s.       | 1   | N.   | -   |     | 8.            | 1   | N   |     |     | s.          | -          | N            | -    | -  | s.            | 1   | N         |      |      | s.       |       | 2         | Γ.   |     | 8.         |     | N    |     | 1   | 3.       |     | N.          |    |  |   |
|   | 222 |     | 80  | U   | 7<br>54<br>58 |     |     | 41<br>45 | 8   | 1 06 | 3   |     | ,<br>09<br>05 | 8   | 1.0 |     |     | 26<br>22    |            | 0 1<br>81 2: |      |    | 21<br>16      | 8   |           |      | 81   | 19<br>14 | - 1 - | 1 1       |      | 81  | 42<br>46   | 81  | 1 1  | 1 8 |     | 49<br>53 | 81  | 16<br>21    |    | Circle N. Needle N. 79° 11 Needle S. 82 22 |   |
| 1 | 2   | 11) | 80  | 0 : | 56            | į   | 1   | 43       | .8  | 1 08 | 3   | ×1  | 07            | ,8  | 1 0 | 5 . | 81  | 24          | 1          | 1 23         |      | 81 | 18.           | 58  | 1 18      | 8. 5 | 81   | 16.      | 58    | 1 1       | 3. 5 | 81  | 44         | 81  | 1 10 | 3 8 | 1   | 51       | 81  | 18.         | .5 | Circle S.                                  | _ |
|   |     | 81  | 0 0 | 9   | _             | - - |     | 810      | 25  | 4.5  |     |     | 81            | 0 ( | 61  |     | +   | 81          | 0 0        | 3'. 5        |      | _  | 810           | 18  | , 5       |      | ; -  | 81       | 0 1   | 5/        |      | _   | 81         | 0 3 | 0'   |     |     | 810      | 34' | 8           |    | Needle N. 77 29<br>Needle S. 82 09         |   |
|   |     |     |     |     | 810           | 1.  | 7'. | 2        | -   |      | -   | _   |               |     | 8   | i°  | 14' | 8           |            |              |      |    |               |     | 8!        | 0 1  | 16'. | 8        |       |           |      | ,   |            |     | 8    | 0 3 | 2/. | ,        |     |             | i  | Mag. mer. 80 18                            | 8 |
| - | _   |     |     |     |               |     |     |          | Me  | an.  |     |     | 310           | 16' |     |     |     |             |            |              |      |    |               |     |           |      |      | 1        | des   | n.        |      | 8   | 1- 5       | 4'. | 6    | -   |     | -        |     |             | ı  |  |   |
| - | _   | -   | _   | -   | _             | _   | _   |          |     |      |     |     |               |     |     |     |     | R           | est        | ltîn         | g d  | ip | .8E           | 21  | ٠<br>۲. 3 |      |      |          |       | -         |      |     |            |     |      |     |     |          |     | -           |    |  |   |

{Date, June 30, 1883, Station. Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxileld. Dip circle No. 23. Needle No. 3, 4 deflecting. Time of beginning, 1<sup>h</sup> 29<sup>m</sup> a.m.; time of ending, 1<sup>h</sup> 53<sup>m</sup> a.m.]

| Circle cast, prime vert<br>face east.   |                | le cast,<br>west. |                     | st,      | ens  |          |       |          |     | 'ircle<br>face ' |      | i.                 | Mic. R.<br>face east. |        | ., | 1).     | irele<br>Mic<br>ace |     |
|---|----------------|-------------------|---------------------|----------|------|----------|-------|----------|-----|------------------|------|--------------------|-----------------------|--------|----|---------|---------------------|-----|
| S. N. Circle A                          | . , S.         | N.                | s.                  | N.       | , ;  | s.       |       | N.       |     | s.               |      | X.                 | 1                     | S      | ١. | 1       |                     | s   |
| 49 65 59 Needle S.<br>54 66 64 Circle & | 59 66 49<br>51 | 64 59<br>65 0     | 65 <b>4</b> 3<br>47 | 43<br>38 |      | 04<br>00 |       | 29<br>24 | 65  | 50<br>45         |      | 1 09<br>12         |                       | 0 42 2 |    | o<br>59 | ,<br>28<br>24       | 0 : |
| 51, 5 66 01, 5 Needle N.<br>Needle S.   | 66 51          | 65 0              | 65 45               | 40. 5    | 65   | 02       | 66    | 26. 5    | 65  | 47.5             | 5 65 | 1 10, 7            | . 5 4                 | 42 5   | 10 | 59      | 26                  | 9   |
| 66° 26′, 5 Mag. mer. 80                 | 66             | o 23'             | 65                  | 2        | 51.1 | 65-      |       |          | 37' | 65               |      | 590 18' 410 46', 5 |                       | 590    |    |         |                     |     |
| ١.                                      | 35° 54′. 8.    | 6                 |                     |          |      | ١.       | 141.  | 651.4    |     |                  |      |                    |                       |        |    |         | -                   | _   |
|   | 3              | . 6               | . 65° 49            |          |      | ١.       | H4. 1 | 651.4    |     | (),)             |      | , 5                |                       | 27'.   | 36 |         | 590                 | _   |

[Date, July 14, 1883. Station, Ugluamic, Alaska, Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 2. Time of beginning, 12h 50m a.m.; time of ending, 1h 30m a.m.]

|     |       |      |          | Po  | laı | ity           | of  | mai         | ke  | d en         | d E | nor      | th. |              |      |      | l    |               |     |            | Pola | rity         | of  | mar         | ked | lend          | l A | nor      | th. |          |     |          |   |   |
|-----|-------|------|----------|-----|-----|---------------|-----|-------------|-----|--------------|-----|----------|-----|--------------|------|------|------|---------------|-----|------------|------|--------------|-----|-------------|-----|---------------|-----|----------|-----|----------|-----|----------|---|---|
|     | re le |      |          | Ī   |     | irc<br>ace    |     | nat,<br>st. | •   | lirel<br>fae |     | est.     |     | irel<br>face |      |      |      | 'ircl<br>face |     |            |      | irel<br>face |     | est,<br>st. |     | lire!<br>face |     |          |     | Circ     |     |          |   | rcle in magnetic<br>orime vertical.             |
| 8   |       |      | N        |     |     | s.            |     | N.          |     | S.           | Ī   | N.       |     | S.           | 1    | N.   | 1    | S.            | Ī   | N.         |      | 8.           |     | N.          |     | 8.            | -   | N.       |     | 8.       |     | N.       |   |   |
| 1 3 | 1     | 81   | 03<br>08 |     |     | ,<br>18<br>22 |     | 55<br>59    |     | 87<br>33     |     | 32<br>28 | 81  | 33<br>28     | 81   | 32   | 81   | 08<br>03      | 1 " | 1 04<br>00 |      | 15<br>10     | 8   | 16<br>12    |     | 53<br>57      | -   | 21<br>25 | 81  | 86<br>40 | 81  | 09<br>18 |   | Circle N.<br>eedle N. 832 05'<br>eedle S. 80 24 |
| 1 3 | 3     | 81   | 05.      | 5 8 | 1   | 20            | 80  | 57          | [8] | 35           | 8   | 30       | 81  | 30,          | 5;81 | 29.  | 5 81 | 05.           | 58  | 1 02       | 81   | 12.          | 5'8 | 1 14        | 81  | 55            | 81  | 23       | 181 | 38       | 81  | 11       | 1 | Circle 8.                                       |
| 8   | 1º 1  | 194. | 2        |     | -   | 810           | 08  | 5           | -   | 810          | 32  | , 5      | -   | 810          | 301  |      | -    | 810           | 03  | 7. 8       | i    | 810          | 13  | 1, 2        |     | 81º           | 39  |          | -   | 810      | 24' | . ō      |   | pedle N. 84 17<br>redle S 82 13                 |
|     |       |      | 81       | 1   | 34, | 8             |     |             |     |              |     | 819      | 31  | . 2          |      |      |      |               |     | 81         | U8/  | . 5          |     |             |     |               |     | 810      | 31  | . 8      |     |          | M | ag, mer. 82 - 33, l                             |
|     |       |      |          |     |     | M             | eat | 1           | 1   | 810          | 22/ | 5        |     |              |      |      | i    |               |     |            |      | λ            | des | n           | 6   | 40.           | 01. | 0        |     |          |     |          |   |   |
|     |       |      |          |     | -   |               |     | -           |     | -            | -   |          |     |              | Res  | ulti | ng   | dip,          | 819 | 21'.       | 4    |              |     |             |     | -             |     |          |     |          |     | -        |   |   |

[Date, July 14, 1883. Station, Uglaamie, Alaska, Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Needle No. 3, No. 4 deflecting. Time of beginning. 1<sup>h</sup> 35m a.m.; time of ending. 1<sup>h</sup> 55m.]

2. Time of

n magnetic vertical.

Firele N.
5 N. 79° 11'
6 S. 82° 22'
Circle S.
6 N. 77° 29
6 S. 82° 09
mer. 80° 18

Needle

18'

| Circle 6<br>Mic. I<br>face ea | D,                 | Mic                | east,<br>R,<br>east. | Circle<br>face v |                          |             | west,<br>enst. | Circle east,<br>face west. | Circle cast,<br>face cast. | Circle in magnetic<br>prime vertical, |
|-------------------------------|--------------------|--------------------|----------------------|------------------|--------------------------|-------------|----------------|----------------------------|----------------------------|---------------------------------------|
| S.                            | N.                 | 8,                 | N.                   | 8.               | N.                       | 8,          | N.             | 8. N.                      | S. N.                      |                                       |
|                               | 0 /<br>59 17<br>14 | 9 /<br>42 22<br>26 | 0 /<br>41 12<br>16   | 65 08<br>05      | 64 5 <sup>st</sup><br>55 | 65 53<br>49 | 65 40<br>87    | 65 28   64 35<br>31   38*  | 06 37   65 34<br>41   37   | Circle N.<br>Needle N.<br>Needle S.   |
| 9 34.5                        | 59 15. 5           | 42 24              | 41 14                | 65 06, 5         | 64 56, 5                 | 65 51       | 65 38.5        | 65 29, 5 64 36, 8          | 5 86 39 65 35.5            | Circle S.<br>Needle N.                |
| 590 2                         | 257                | 410                | 49'                  | 650 (            | 14.5                     | 65°         | 44'. 8         | 650 037                    | 660 077. 2                 | Needle S.                             |

[Date, July 31, 1883. Station, Uglaamie, Alaska, Göttingen time. Observer, J. E. Maxifeld. Dip circle No. 23. Needle No. 2. Time of beginning, 15 57 ma.m.; time of ending, 25 17 ma.m.]

|                            | Polarity | of mar      | ked en | 1 A no      | rth. |         |      |       |                      | Pola                 | rity of            | fmar       | ked      | €Ink  | B nor              | th.  |                            |                                    |
|----------------------------|----------|-------------|--------|-------------|------|---------|------|-------|----------------------|----------------------|--------------------|------------|----------|-------|--------------------|------|----------------------------|------------------------------------|
| Circle east,<br>face east. |          |             |        |             |      | arcle v |      |       | rle west<br>re west. |                      | ircle v<br>face es |            |          |       | east,<br>vest.     |      | ircle cast.<br>face cast.  | Circle in magnetic prime vertical. |
| 8. N.                      | 8.       | N.          | S.     | N.          |      | S.      | N.   | S.    | N.                   |                      | 8.                 | N.         |          | S,    | N.                 | ż    | 8. N.                      |                                    |
| 0 56 80 29<br>1 01   34    | 81 10    | 80 41<br>46 | 80.54  | 80 52<br>47 |      |         | 1 10 | 81 00 | 51 11<br>08          |                      |                    | 1 10<br>05 |          |       | 0 /<br>81 02<br>07 |      | 7 0 7<br>17 80 50<br>22 55 | Circle N.<br>Needle N. 80° 50      |
| 0 58, 5 80 31.             |          |             |        | -           |      |         |      |       |                      |                      |                    | _          |          |       |                    |      |                            | Needle S. 82 2:<br>Circle S.       |
| 800 45/                    | 800      | 57′,8       | 800    | 594.5       |      | 81 05   | 91.8 | - 8   | 15 0755              |                      | 810 0              | 6'         | 4600-00- | 81° 1 | 81.5               |      | 810 (iii)                  | Needle N. 77 2<br>Needle S. 78 2   |
| 86                         | 0 51',4  |             |        | 8           |      | .2      |      |       | >                    | - () <sup>m</sup> ', | 8                  |            |          |       | 813                | 1200 | 2                          | Ma., mer. 79 4.                    |
|                            | M        | lean        | 800 5  | 51.8        |      |         |      |       |                      |                      | Mea                | n          | ۸        | 10    | , θ                |      |                            |                                    |

| Date, July 31, 1883. Station, Uglaamie, Alaska. Göttingen time. Observer, J. E. Maxfield. Dip circle No. 23. Time of beginning, 2<sup>b</sup> 19<sup>m</sup> a. m., time of ending, 2<sup>b</sup> 33<sup>m</sup> a. m.}

| Needle No. 3,                         | No. 4 defl  | ecting.                   |             |             | Needle              | No. 4,  | weighted.        |                     |                                       |
|---------------------------------------|-------------|---------------------------|-------------|-------------|---------------------|---------|------------------|---------------------|---------------------------------------|
| Circle cast,<br>Mic. D,<br>face cast. | Mi          | c cast,<br>c. R,<br>cast. |             | e west,     | Circle we           |         | Circle east      |                     | Circle in magnetic<br>prime vertical. |
| 8. N.                                 | 8,          | N.                        | 8.          | N.          | 8.                  | N.      | 8. N             | . 8. N.             |                                       |
| 59 47 59 33<br>48 29                  | 42 22<br>20 | 41 24<br>28               | 64 13<br>09 | 63 54<br>50 | 65 27 65            |         | 35 21 64 8<br>25 |                     | Oirole N. Nordle N. Nordle S.         |
| 59 45 59 31                           | 42 24       | 41 26                     | 64 11       | 63 52       | 65 24. 5 <b>6</b> 5 | 03. 5 6 | 35 28   64 3     | 7 65 56, 5 65 09, 5 | Gircle 8.                             |
| 500 38/                               | 410         | 55'                       | 640         | 01'.5       | 650 14              |         | 65° 00′          | 65° 38'             | Needle N.<br>Needle S.                |
|                                       |             |                           |             | 640         | 371.8               |         |                  | 35° 16'.5           | Mag. mer. 70° 4                       |

[Date, August 14, 1883. Station, Uglaamie, Alasan. Obsorver, J. E. Maxfield. Dipeircle No. 23. Needle No. 2. Time of heginning, 18 35% a. m. ; time of ending. 18 50% p. m. Magnetic meridian reads, 78° 29°.]

|                     |     | Pol  | arit        | of  | ma       | rke  | d en     | d B   | noi          | rth. |               |      |          |      |       |      | _             | 1.0  | aı'it       | y 0: | fma           | LKG  | t enc        | ı A | nor      | ın. |          |      |          |   |   |
|---------------------|-----|------|-------------|-----|----------|------|----------|-------|--------------|------|---------------|------|----------|------|-------|------|---------------|------|-------------|------|---------------|------|--------------|-----|----------|-----|----------|------|----------|---|---|
| Circle e<br>face ea |     |      | Circ<br>fac |     |          |      | fac      |       | vest<br>ist. |      |               | de w | rest,    | 1    |       |      | rest,<br>est. | 1    | Circ<br>fac |      | vest,<br>ist. |      | ircl<br>face |     |          |     |          | le e | ast.     | , | Circle in magneti<br>prime vertical.    |
| S.                  | N.  | 1    | 8.          |     | N.       | -    | S.       |       | N.           | -    | S.            |      | N.       |      | S.    | 1    | N.            |      | 8.          |      | N.            |      | S.           | i   | N.       | i   | 8.       | ı    | N.       |   |   |
| 40 81<br>45         | 09  | 81   | 40<br>44    | 81  | 15<br>20 |      | 31<br>26 |       | 23<br>18     | 81   | ,<br>32<br>28 | 81   | 36<br>31 | 81   | 37 32 | 0    | 87<br>32      | 81   | 20<br>15    | 0    | 21<br>16      |      | 59<br>03     | 81  | 28<br>32 | 81  | 45<br>50 | 81   | 20<br>24 |   | Oircle N. Needle N. 78° 33 Needle S. 09 |
| 42, 5 81            | 11. | 5 81 | 42          | 81  | 17.      | 5 81 | 28.      | 5 81  | 20.          | 5 81 | 30            | 81   | 33.      | 5.81 | 34.   | 5,81 | 34.           | 5 81 | 17.         | 5,81 | 18.           | 5 82 | 01           | 81  | 30       | 81  | 47.      | 5 81 | 22       | - | Orrele N.                               |
| 819 27              | ,   |      | 810         | 29: | 8        | -    | 81       | 24    | . 5          |      | 819           | 31   | . 8      |      | 810   | 34   | 4.5           | -    | 819         | 18   | . 0           | -    | 810          | 45  | . 5      |     | 81       | 34   | . 8      | 1 | Needle S. 33                            |
|                     | 81  | 28   | 4           |     |          |      |          |       | 810          | 28'. | 2             |      |          | 1    |       | _    | 810           | 26   | . 2         |      |               | 1    |              | _   | 810      | 40  | . 2      |      |          |   | Mag. mer. 78 20                         |
|                     |     |      | - M         | еап |          | 8    | 102      | 8'. 3 |              |      |               |      |          |      |       |      |               |      |             |      | 810           | 33   | . 2          |     |          |     |          |      | _        |   |   |

[Date, August 14, 1883. Station, Uglaamie, Alas ka. Observer, J. E. Maxfield. Dip circle No. 23. Time of beginning, 2b 18m a. m.]

| Needle                   |      | 17, |     |     | uen         | erc t | mg             | ١.   |          |               |     |          |     |   | 746      | our       | 0 410    |   | veigl             | iveu |                   |      |                |      | -        |   |
|--------------------------|------|-----|-----|-----|-------------|-------|----------------|------|----------|---------------|-----|----------|-----|---|----------|-----------|----------|---|-------------------|------|-------------------|------|----------------|------|----------|---|
| Circle<br>Mic.<br>face o | . D, |     |     |     | rcle<br>Mie | . R   | ,              |      |          | ircle<br>face |     |          |     |   |          | ea.       |          |   | Circ<br>face      |      |                   |      | Circi<br>face  |      |          | Circle in magneti<br>prime vertical.              |
| S.                       | N    | ί.  | i   | 8   |             | -     | N.             |      | 1        | 3.            |     | N.       | 1   | 8 | ļ        |           | N.       | 1 | 8.                | 1    | N.                | -    | s.             | T    | N.       |   |
| 9 33<br>29<br>9 31       | 59 1 | 13  | 4   | 2 2 | 12          |       | 33<br>37<br>35 | _  . | 67<br>67 | 18            |     | 26<br>30 | . 6 |   | 41<br>45 |           | 00 04 02 | - | 05<br>00<br>02. 5 | _    | 47<br>42<br>44. 5 | -    | 38<br>34<br>36 | _    | 23<br>18 | Oirols N. Needle N. Needle S. Oirols S. Needle N. |
| 59> 2                    |      |     |     | -   | 42° (       | 7', 1 | к              |      |          | 662           | 52' |          |     |   | 65°      | 1<br>22 . | 5        |   | 650               | 534. | 5                 |      | 650            | 28'. | 2        | Needle S.<br>Mag. mer. 78° 2                      |
|                          |      |     |     |     |             |       |                |      |          |               |     | 66       | 07  | - |          |           |          |   |                   |      | 650               | 10'. | Н              |      |          |   |
|                          | 111  | :   | (1) | 1.1 | 7           |       |                |      |          |               |     |          |     |   |          | Me        | an       |   | 350 5             | 4/   |                   |      |                |      |          |   |

Recapitulation of results for dip.

| Date.                                  | Needle.          | Dip.  | Date.                      | Needle.     | Đip.  | Date.                 | Needle. | Dip.                                  | Date.                            | Needle.          | Dip.                                     |
|--|------------------|---|----------------------------|-------------|---|-----------------------|---------|---------------------------------------|----------------------------------|------------------|--|
| 1881<br>Nov. 30<br>Dec. 17<br>18<br>19 | 1<br>2<br>1<br>2 | 81 22.3<br>28.9<br>21.7<br>25.6               | 1882<br>May 17<br>18<br>19 | 1 2 1       | 81 18 3<br>22. 1<br>26. 2                     | 1883<br>Oct. 14<br>31 | 1       | 81 21.0<br>24.3                       | 1883<br>Mar. 31<br>Apr. 14<br>30 | 2<br>2<br>2      | 81 27. 8<br>22. 0<br>23. 6               |
| 1882<br>Jan. 18<br>19<br>20            | 1<br>2<br>1      | 81 24.6<br>81 25.8<br>18.2<br>23.2            | June 16<br>18<br>19        | 1 2 1       | 81 22.2<br>81 25.1<br>22.7<br>24.1            | 30                    | 1       | 81 20.8<br>24.7<br>81 22.8            | May 14 23                        | 2 2              |  |
| Feb. 16<br>17<br>18                    | 1<br>2<br>1      | 81 22.4<br>81 29.8<br>25.3<br>26.2<br>81 27.1 | July 17<br>18<br>19        | 2 1 2       | 81 24.0<br>81 16.9<br>21.7<br>26.0<br>81 21.5 | 1,000                 | 1 1 1 1 | 81 22.4<br>81 19 9<br>22.4<br>23.7    | May 31<br>June 14<br>80          | 2<br>2<br>2      |  |
| Mar. 17<br>18<br>19                    | 1 2 1            | 81 26. 3<br>29. 1<br>27. 5<br>81 27. 6        | Aug. 17<br>18<br>19        | 1<br>2<br>1 | 81 :2.7                                       | Feb. 14<br>28         | 2 2     | 81 22.0<br>81 25.8<br>23.8<br>81 24.8 |                                  | 2<br>2<br>2<br>2 | 81 23.9<br>81 21.4<br>02.9 w=<br>30.8 w= |
| Apr. 17<br>18<br>19                    | 1<br>2<br>1      | 81 12.6<br>27.9<br>32.3                       | Aug. 31<br>Sept. 14<br>30  | 1<br>1<br>1 | 81 26.0<br>23.4<br>17.2                       | Mar. 14<br>25         | 2 2     | 81 22.0                               |                                  | İ                | 81 19.2                                  |

N. 78° 33′ 09

r. 78 20

|                       | June | 16, 18 | 482.                             |                       | Jul | y 17.                   | 1882.                | 4                     | lug  | us <b>t</b> 17,         | 1882.                                     | 4                     | Augi | rst 31,                 | 1882  | ļ.                              |                | otol  | er 14,                  | 1882.  |
|-----------------------|------|--------|----------------------------------|-----------------------|-----|-------------------------|----------------------|-----------------------|------|-------------------------|---|-----------------------|------|-------------------------|-------|---------------------------------|----------------|-------|-------------------------|--|
| Cos<br>Cosec<br>Cosec |      | 0, 98  | 9, 60281<br>0, 19511<br>0, 58587 | Сов<br>Совес<br>Совес | 39  | 17'.3<br>26 .0<br>59 .6 | 0.19710              | Cosec                 | 39   | 21.4                    | 9. 61 <b>79</b> 2<br>0. 19781<br>0. 56258 | Cos<br>Cosec<br>Cosec | 39   | 22'.6<br>29 .7<br>03 .4 | 0     | 61977<br>19654<br>55817         | Cosec<br>Cosec | 38    | 24'.7 $00.5$ $56.3$     | 9, 6022 <b>4</b><br>0, 21058<br>0, 55875         |
|                       |      |        | 2.0, 08379                       | 1                     |     |                         | 2)0. 38866           |                       |      |                         | 2)0.37831                                 |                       |      |                         | 2)0   | 37448                           | :              |       |                         | 2(0, 40157                                       |
| А                     |      |        | 0. 19190<br>0. 92055             | 4                     |     |                         | 0. 19433<br>0. 92055 | A                     |      |                         | 0. 18916<br>0. 92055                      | i A                   |      |                         | 0     | . 18724<br>. 92055              | A              |       |                         | 0, 20078<br>0, 91759                             |
| F<br>Cos              | 81   | 24 .0  | 1, 11245<br>9, 17474             | F<br>Cos              | 81  | 21 .5                   | 1. 11488<br>9. 17683 | F<br>Cos              | 81   | 22 .8                   | 1. 10971<br>9. 17575                      | $F_{\mathrm{Coa}}$    | 81   | 22 .8                   | 1     | . 10779<br>17575                | F<br>Cos       | 81    | 22 .6                   | 1, 11837<br>9, 17591                             |
| H                     | 1. 9 | 37     | 0. 28719                         | H                     | 1.  | 958                     | 0. 29171             | H                     | 1.   | 930                     | 0. 28546                                  | П                     | 1.   | 921                     |       | . 28554                         | H              | 1.    | 969                     | 0. 29428   |
|                       | June | 18, 1  | 382.                             |                       | Jul | y 18,                   | 1882.                | 4                     | Lug  | wet 18,                 | 1882.                                     | Se                    | pter | uber 1                  | 1, 18 | 82.                             | (              | octo  | ber 31,                 | 1882.  |
| Cos<br>Cosec<br>Cosec | 39   | 35 .7  | 9, 58955<br>0, 19562<br>0, 60884 | Cosec<br>Cosec        | 38  | 56'.0<br>45 .4<br>25 .7 | 0. 20342             | Cosec<br>Cosec        | 39   | 39'.5<br>25 .1<br>44 .0 | 9. 61508<br>0. 19724<br>0. 56677          | Cosec<br>Cosec        | 30   | 57'.4<br>07'.5<br>26'.0 | 0     | 61005<br>19996<br>157493        | Coseo<br>Coseo | 38    | 03'.4<br>29 .0<br>20 .9 | 9, 60835<br>0, 20001<br>0, 57727                 |
|                       |      |        | 2)0. 39401                       | -                     |     |                         | 2)0. 38893           |                       |      |                         | 2)0. 37909                                | l<br>F                |      |                         | 2)0   | 08494                           |                |       |                         | 2)0.39163  |
| 4                     |      |        | 0. 19700<br>0. 92055             | 4                     |     |                         | 0. 19446<br>0. 92055 | 4                     |      |                         | 0. 18654<br>0. 92055                      | 4                     |      |                         |       | 1924 <b>7</b><br>19 <b>1759</b> | A              |       |                         | 0. 19582<br>0. 917 <i>8</i> 9                    |
| F<br>Cos              | 81   | 24.0   | 1. 11755<br>9. 17474             | F<br>Cos              | 81  | 21 .5                   | 1. 11501<br>9. 17683 | F<br>Cos              | 81   | 22 .8                   | 1. 11009<br>9. 17575                      | F<br>Cos              | 81   | 22 .2                   |       | . 11006<br>. 17624              | F Cos          | 81    | 22 .6                   | 1. 11341<br>9. 17591                             |
| H                     | 1. 9 | 60     | 0. 29229                         | H                     | 1.  | 958                     | 0. 29184             | H                     | 1.   | 931                     | 0. 28584                                  | H                     | 1.   | 933                     |       | . 28030<br>T. T                 | П              | 1.    | 947                     | 0. 28932   |
|                       | June | 19, 18 | 882.                             | İ                     | Jul | y 19,                   | 1882.                | . 4                   | l ug | ust 19,                 | 1882.                                     | Se                    | pter | nber 8                  | 0, 18 | 82.                             | N              | 21:61 | nber 10                 | 3, 1882.   |
| Cos<br>Cosec<br>Cosec |      | 41.6   | 9, 60250<br>0, 10472<br>0, 58686 | Cosec<br>Cosec        | 38  | 55'.2<br>35 .7<br>30 .8 | 0. 20495             | Cos<br>Coseo<br>Cuseo | 39   | 32'.2<br>27 .2<br>50 .1 | 9. 61712<br>0. 19692<br>0. 56405          | Cosec<br>Cosec        | 38   | 46'.0<br>34 .5<br>31 .2 | - 0   | . 61326<br>. 20514<br>. 57255   | Cosec<br>Cosec | 39    | 20'.8<br>07 .2<br>00 .0 | 9, 6033 <b>6</b><br>0, 2000 <b>1</b><br>0, 58700 |
|                       |      |        | 2)0. 38408                       |                       |     |                         | 2)0. 38836           |                       |      |                         | 2)0.37809                                 | 1                     |      |                         | 2)0   | . 39095                         |                |       |                         | 2)0. 39037                                       |
| А                     |      |        | 0. 19204<br>0. 92055             | A                     |     |                         | 0. 19418<br>0. 92055 | A                     |      |                         | 0. 18904<br>0. 92055                      | A                     |      |                         |       | . 19548<br>. 91759              | A              |       |                         | 0. 1951><br>0. 9175t                             |
| F<br>Cos              | 81   | 24 .0  | 1. 11259<br>9. 17474             | F<br>Cos              | 81  | 21 .8                   | 1. 11473<br>9. 17683 | F Cos                 | 81   | 22 .8                   | 1. 10959<br>9. 17575                      | F<br>Cos              | 81   | 22 .2                   |       | . 11307<br>. 17624              | F<br>Cos       | 81    | 22.8                    | 1. 11277<br>9. 1757                              |
| H                     | 1. 9 | 38     | 0. 28733                         | H                     | 1.  | 957                     | 0. 29156             | H                     | 1    | 929                     | 0. 28534                                  | H                     | 1.   | 947                     | 0     | 28931                           | H              | 1.    | 943                     | 0. 28852   |

| N                     | ovemi                 | er 30                   | , 1882.                           | J                    | anı           | ary 14  | , 1883.                          | F                     | ebr | ary 28                  | 1, 1883.                         |                         | Api | ril 14, 18              | 83.                              |                         | Me | ny 31, 1                | 183.                    |                   |
|-----------------------|-----------------------|-------------------------|-----------------------------------|----------------------|---------------|---------|----------------------------------|-----------------------|-----|-------------------------|----------------------------------|-------------------------|-----|-------------------------|----------------------------------|-------------------------|----|-------------------------|-------------------------|-------------------|
| Cos<br>Cosec<br>Cosec |                       | 11'.8<br>26 .7<br>12 .9 | 9, 61444<br>0, 11 100<br>0, 56727 | Сов Совес            | 38            | 04.8    | 9, 59983<br>0, 20099<br>0, 59203 | Cos<br>Cosec<br>Cosec | 38  | 03'.1<br>48 .1<br>20 .7 | 9, 60843<br>0 20299<br>0, 57736  | Cosec<br>Cosec          | 39  |                         | 9. 61634<br>0. 19695<br>0. 56543 | Cosec<br>Cosec          | 89 | 10'.2<br>14 .2<br>17 .5 | 9. 60<br>0. 19<br>0. 55 | m-0:              |
|                       |                       |                         | 2)0. 37871                        |                      |               |         | 2)0.40185                        |                       |     |                         | 2)0. 38878                       |                         |     |                         | 2)0.37872                        |                         |    |                         | 2)0.38                  | 8417              |
| A                     |                       |                         | 0. 18936<br>0. 91759              | A                    |               |         | 0, 20092<br>0, 91759             | A                     |     |                         | 0, 19439<br>0, 91759             | А                       |     |                         | 0. 18936<br>0. 91759             | A                       |    |                         | 0. 19                   | $\frac{020}{175}$ |
| F<br>Cos              | 81 2                  | 22 .8                   | 1. 10095<br>9. 17575              | F<br>Cos             | 81            | 22 .0   | 1. 11851<br>9. 17641             | F Cos                 | 81  | 24.8                    | 1, 11198<br>9, 17408             | F                       | 81  | 24.5                    | 1. 10695<br>9. 17433             |                         | 81 | 22.6                    | 1. 16<br>9. 17          | (H)6'             |
| Н                     | 1. 9                  | 17                      | 0. 28270                          | H                    | 1.            | 972     | 0. 20492                         | H                     | ì.  | (6)2                    | 0.28666                          | II                      | 1.  | 911                     | 0.28128                          | И                       | 1. | 0::0                    | 0. 28                   |                   |
| D                     | ecemb                 | er 14                   | , 1862.                           | J                    | anu           | ary 31  | , 1883.                          |                       | Mai | rch 14,                 | 1883.                            |                         | Apn | ril 30, 18              | 83.                              |                         | Ju | не 14, 1                | 883.                    |                   |
| Соя<br>Сояес<br>Совес | 66° 1                 |                         | 9, 60589<br>0, 19493<br>0, 58213  | Cose<br>Cose<br>Cose | 39            | 39.6    | 9, 60437<br>0, 19502<br>0, 58400 | Cos<br>Cosec<br>Cosec | 39  | 08'.6<br>24 .5<br>13 .4 | 9, 60686<br>6, 19733<br>0, 58073 | Cosec<br>Cosec          | 39  | 12'.0<br>25 .0<br>11 .6 | 0.58157                          | Cosec<br>Cosec<br>Cosec | 38 |                         | 9, 60<br>0, 20<br>0, 58 | 014               |
|                       |                       |                         | 2)0, 38295                        |                      |               |         | 2)0, 38339                       |                       |     |                         | 2)0.38492                        |                         |     |                         | 210.38172                        |                         |    |                         | 2)0, 3                  | 1104              |
| A                     |                       |                         | 0. 19148<br>0. 91759              | А                    |               |         | 0, 19170<br>0, 91759             | A                     |     |                         | 0. 19216<br>0. 91759             | A                       |     |                         | 0. 19256<br>0. 91759             | à                       |    |                         | 0. 19<br>0. 91          | 175               |
| F<br>Cos              | 81 2                  | 12 .4                   | 1. 10007<br>9. 17608              |                      | 81            | 22 .0   | 1. 1c929<br>9. 17641             | $_{\rm Cos}^F$        | 81  | 25 .0                   | 1, 11005<br>9, 17391             | F<br>Cos                | 81  | 24.5                    | 1, 10995                         | $F_{\mathrm{Cos}}$      | 81 | 23.9                    | 1. 11<br>9. 15          | 1279<br>7483      |
| Н                     | 1. 92                 | 28                      |                                   | E                    | 1.            | 931     | 0. 28570                         | II                    | 1.  | 923                     | 0. 28396                         | H                       | 1.  | 924                     | 0.28428  <br>= =:                | H                       | 1. | . 039                   | 0.28                    |                   |
| J                     | anuai                 | ry 1,                   | 1883.                             | Fe                   | eb <b>r</b> u | ary 14, | 1883.                            |                       | Mar | ch 31, 3                | 1863.                            |                         | Лa  | y <b>14, 1</b> 8)       | 43.                              |                         | Ju | ne 30, 1                | H83.                    |                   |
| Cosec                 | 65° 5<br>30 3<br>15 2 | 0.9                     | 9, 61127<br>0, 19635<br>0, 57456  | Cosee<br>Cosee       | 39            |         | 0. 19554<br>0. 57087             | Cosec                 | 38  |                         | 9, 61441<br>0, 20045<br>0, 50592 | Cosec<br>Cosec<br>Cusco | 39  | 56′,5<br>24 ,5<br>26 ,9 | 9, 61630<br>0, 19733<br>0, 57452 | Cosee<br>Cosee<br>Cosee | 39 |                         | 9, 61<br>0, 19<br>0, 55 | 968:<br>7261      |
|                       |                       |                         | 2)0.08 %                          |                      |               |         | 2)0, 37905                       |                       |     |                         | 2)0, 38978                       |                         |     |                         | 210, 38215                       |                         |    |                         | 2,0.3                   |                   |
| A                     |                       |                         | 0. 19109<br>0. 91773              | .1                   |               |         | 0, 1×952<br>0, 95759             | .1                    |     |                         | 0, 19480<br>0, 91759             | A                       |     |                         | 0. 101 o8  <br>0. 91750          | A                       |    |                         | 0. 11                   | 175               |
| F<br>Cos              | 81 2                  | 2.0                     | 1. 108: 8<br>9. 17641             | $F_{\mathrm{Cos}}$   | 81            | 24 .8   |                                  | $_{\mathbb{C}on}^{F}$ | 81  | 25.0                    | 1 11248<br>9, 17591              | $F_{\mathrm{Cos}}$      | 81  | 22.6                    | 1. 10867<br>9. 17591             | F<br>Cos                | 81 | 23 .0                   | 1. 10<br>9. 17          | 085<br>748        |
| II.                   | 1.92                  | 8                       | 0.28509                           | $\mathcal{H}$        | 1.1           | 911     | 0, 28119                         | H                     | 1.  | 934                     | 0. 28630                         | II                      | 1.  | 926                     | 0.28458                          | II                      | 1. | 920                     | 0.28                    |                   |

|   |  |  | <br> |
|---|--|--|------|
| July 14, 1883.  | July 31, 1883.   | August 14, 1883.   | 1    |
| Cose 65 29/.2 9.61795<br>Cosec 39 23 .0 0.19756<br>Cosec 15 52 .2 0.56311 | Cos 64° 57′.2 9, 62674<br>Cosec 29 13 .5 0, 19993<br>Cosec 16 05 .7 0, 55716 | Cos 65° 51′.0 9.61101<br>Cosec 39 14 .7 0.1984  <br>Cosec 15 36 .8 0.57002 |      |
| 2)0.37862   | 2)0, 38290   | 2)0. "7987   |      |
| 0. 18931<br>0. 91759  | A 0, 19145<br>0, 91759   |  |      |
| Cos 81 19.2 9.17873   | F 1, 10904<br>Cos 81 ,9 ,2 9, 17873  | P 1, 10773<br>Cos 81 19.2 9, 17873   |      |
| T 1.930 0.28563   | H = -1.940 = 0.28777   | H = -1.993 = -0.28626  |      |

Recapitulation of results for horizontal component of force H by Dr. Lloyd's method.

| 1832.               | II.                          | 1882.         | 11.                        | 1883.         | 11.                        | 1883.         | H.                         |
|---------------------|------------------------------|---------------|----------------------------|---------------|----------------------------|---------------|----------------------------|
| June 16<br>18<br>19 | 1, 937  <br>1, 960<br>1, 938 |               | 1. 921<br>1. 933<br>1. 947 |               | 1, 928<br>1, 972<br>1, 931 | Арт. 30       | 1, 92                      |
|                     | 1.945                        |               | 1. 934                     |               | 1, 944                     | May 14        | 1, 9, 6<br>1, 936          |
| July 17<br>18<br>19 | 1, 958<br>4, 958<br>1, 957   | Oct. 14   31  |                            | Feb. 11<br>28 | 1, 911<br>1, 932           | June 14       | 1, 900<br>1, 939<br>1, 900 |
|                     | 1.958                        |               | 1.958                      |               | 1. 922                     | 50            | 1, 923                     |
| Aug. 17<br>18       | 1, 230<br>1, 931             | Nov. 16<br>30 | 1.943<br>1.917             | Mar. 14       | 1, 923                     | July 14<br>31 | 1 920<br>1 540             |
| 19                  | 1, 929                       | Dec. 14       | 1, 930                     |               | 1 928                      | Aug. 11       | 1 1 37                     |

#### APPENDIX No. 6.

MEMORANDUM RESPECTING MAGNETICALLY DISTURBED AND UNDISTURBED DAYS AT UGLA-AMIE, ALASKA, 1882-183.

COMPUTING DIVISION, COAST AND GEODETIC SURVEY, December 6, 1884.

A complete examination was made of the tabulated observations at Uglaamie of variations in declination and in the horizontal and vertical components of the earth's magnetism—for all those days on which disturbances were observed at other polar stations and for those days which were selected as normal or quiet days—according to circular No. 39, issued by Dr. Wild, president of the International Polar Commission.

Our series with the Brooke differential instruments commences with September 12, 1882, and for these instruments it was found that for every one of the 21 days, designated as disturbed at other stations, disturbances occurred at Ughamie in the declination and in the horizontal force and generally also in the vertical force, as may be seen in the accompanying list. Certain times, extending over several days, present themselves very prominently, and these may aptly be designated as times of stormy magnetic weather, suggesting their collective study.

Respecting the so-called quiet days (steady condition of magnetism) it is not so easy to make any positive statement, for the reason that the normal or undisturbed observations have not yet been reported and treated by themselves, hence only an indistinct idea as to the limits of variability can at present be had. In general the days mentioned as quiet were also found to be so at Uglamie, yet there are exceptions, and in particular the horizontal force appears to have been rather restless. The Uglamie record would exclude the following days from the table of quiet days and place them among those of ordinary ones, viz: 1882, September 30, declination and horizontal force agitated; 1883, February 8, ditto; March 15, declination, horizontal and vertical force agitated; May 15, horizontal and vertica force excited; June 11, ditto.

Respectfully submitted by

CHAS. A. SCHOTT,

Assistant

J. E. HILGARD,

Superintendent United States Coast and Geodetic Survey.

#### UGLAAMIE MAGNETIC RECORD, 1882-'83.

Examination of days of disturbance mentioned in Circular No. 39, issued by President Wild, November 8, 1884.

August 5, 1882 (Observation with inferior instrument).—Declination disturbance commenced August 4, and was dying out in the forenoon of August 5.

October 6, 1882.—Declination greatly disturbed. Horizontal force heavily disturbed. Vertical force slightly affected.

October 28, 1882.—Declination slightly disturbed, extending to the 29th. Horizontal force greatly disturbed on the 28th and 29th. Vertical force slightly affected.

November 12 and 13, 1882.—Declination greatly disturbed; continued to 14th. Strong auroral display on both days. Great disturbance of horizontal force on the 12th, 13th, 14th, and 15th. Vertical force disturbance excessive on 12th, 13th, and 14th.

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0, 19692 0, 91759 1, 10851 9, 17483 0, 38334 November 17 to 20, 1882.—Declination greatly disturbed on these days; brilliant auroral display on the 20th. Great disturbance in horizontal force on the 17th, 18th, 19th, 20th, and 21st. Vertical force but little affected.

The magnetic equilibrium was disturbed during the entire period, November 12 to November 21, inclusive, with daily displays of auroras.

December 20, 21, 1882.—Declination disturbance commenced on the 19th and continued to the 24th, inclusive. Bright auroras every day. Horizontal force greatly disturbed on the 20th and 21st. Vertical force slightly, if at all, affected.

February 24, 25, 27, 28, 1883.—Declination disturbances commence February 22, and extend at least to March 3; daily auroras, very brilliant February 23, 25, 26, 28, March 2 and 3. Horizontal force on the 24th and 25th greatly disturbed (already on preceding days, 22d and 23d), and continues in a state of unrest to March 3, inclusive. The vertical force appears undisturbed on the 24th and 25th, and is but slightly affected on the 28th.

March 27, 1883.—Declination greatly disturbed on the 27th and 28th. Bright auroras on the 26th, 27th, and 28th. Days of disturbance of the horizontal force 26th, 27th, 28th, 29th, and 30th. Vertical force very little affected.

April 3, 1883.—Declination greatly disturbed April 2 and 3; auroras. Great disturbance in horizontal force on the 1st, 2d, 3d, 4th, and 5th. Vertical force slightly affected.

May 21, 22, 1883.—Declination disturbed on the 20th, 21st, and 22d; horizontal force likewise Vertical force disturbed on the 21st but not on the 22d.

June 18, 1883.—Declination greatly disturbed on the 17th, 18th, 19th; horizontal force disturbed on the 17th, 18th, 19th, and 20th. Vertical force apparently normal.

June 27, 1883.—Large disturbance in declination. Horizontal force disturbed on the 25th, 26th, 27th, 28th, 29th, and 30th, and very heavily on July 1. Vertical force apparently normal.

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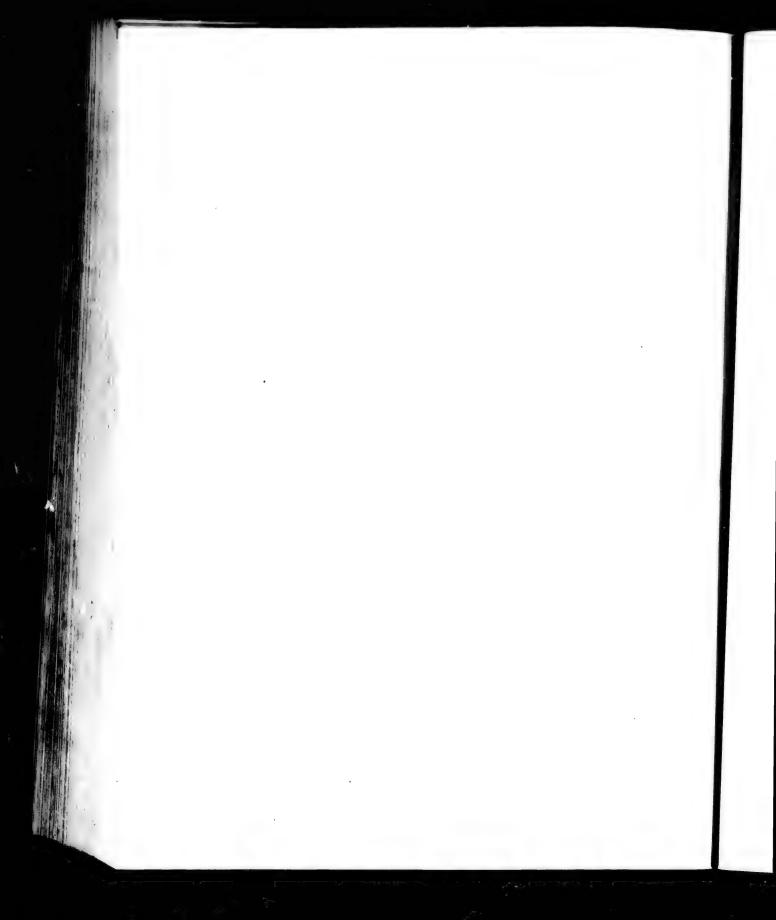
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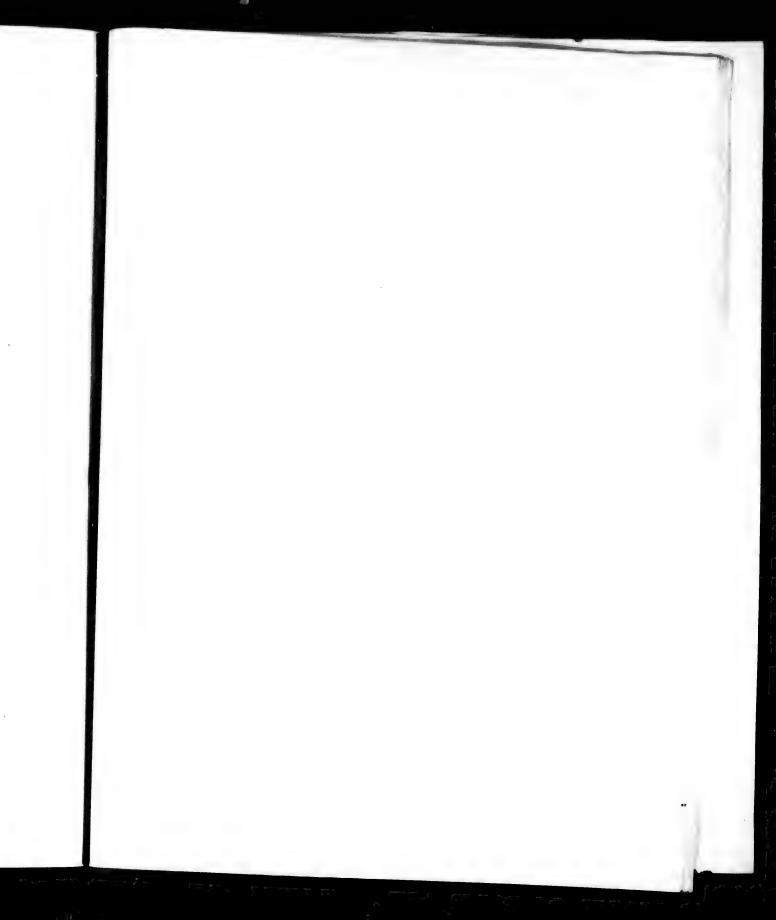
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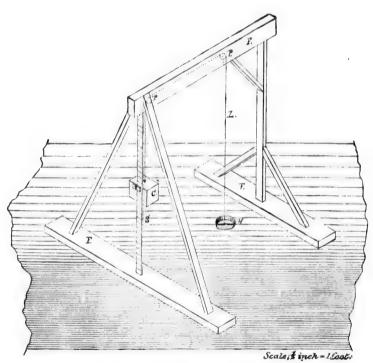
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PART VII.

TIDES.







Tide Gauge at Uylaumie, Alaska,

F, F, F, frame. H, hele in ice. L, line. P. P. pulleys. C. counterpoise. S, scale. V, vernier.

## TIDES.

Observations of tides at the United States Itnernational Polar Station, Uglaamie, Alaska, were made half-hourly and uninterruptedly for a period of 112 days, beginning at midnight February 26, and ending with midnight June 17, 1883. This series, consisting of 5,376 observations, is complete, not a single reading being missed. These observations form a part of the general series of records secured at this station, and were made by the same observers as were the meteorological and magnetic observations.

Six observers were on duty daily, each making all the observations for four hours. These observers were Charles Ancor, A. C. Dark, J. A. Guzman, J. E. Maxfield, John Murdoch, and Middleton Smith. How faithfully these observers did their duty may be interred from the fact that not a single observation was missed. To make a tidal observation, the observer walked out over the level ice to the gauge, about 100 yards from the shore, broke through the ice in the hole formed since the last observation, a half-hour before, scooped out the slush so as to clear the line, and then read the scale to the nearest hundredth of a foot. Returning to the house, he wrote down this reading, together with the hour, the direction of the wind, and the initial of his name. He further noted whether the tide had turned since the last observation, and if so, the highest or lowest reading reached. This was done by means of a maximum and minimum index, to be described in connection with the gauge. When a maximum or minimum reading occurred between the half-hourly readings, this fact is noted in the record, but is not here reproduced, as it does not appear to much increase the knowledge afforded by the record as here printed. The record was kept in duplicate, the second or duplicate copy being made daily, and thus kept up with the original.

Although wind observations were made half-hourly in connection with these tidal observations, nevertheless it is believed that the regular hourly observations of wind and atmospheric pressure will afford all the necessary data for determining the fluctuations of sea-level due to meteorological causes; for these reasons the half-hourly observations are not here printed.

Gauge.—The gauge was constructed at the station in February, 1883, and put in position so that observations began on the 26th, as before mentioned. No photograph of the gauge was made, but a drawing to scale appears on the plate opposite, from which its method of operation will be readily understood.

FFF is a wooden frame-work standing on the ice over the hole II. A line, L, passes from the 200 pound anchor through the hole H over pulleys PP, and terminates at the counterpoise C; this counterpoise weighing about 20 pounds. A fixed wooden scale, S, attached to the frame of the gauge, was subdivided to feet and tenths and hundredths, and to the line was attached an index which, moving along the scale, gave readings showing the stage of the tide.

The zero of the scale was placed low down, and the numbers increased upward and downward from this zero. The numbers above zero were considered positive (+) and those below it negative (-). When the tide rose, the ice, the gauge, and all its appurtenances were litted up, and in such manner that the difference between any two index readings would indicate the change of level between the readings.

From the construction, as well as from observation, therefore, we see that *increasing* numbers indicate *rising* tide and *diminishing* numbers *falling* tide.

In order to record automatically the heights of high and low water, a self-registering index was adjusted as follows:

A piece of cod line was stretched along the face of the scale and led through an ivory stud attached to the counterpoise. This ivory stud coincided with the zero of the vernier or reading index. On either side of this stud cork slides were attached to the cod line and were pushed one up, the other down, with rising and falling tide, respectively. Attached to these corks were brass verniers moving along the scale and enabling close readings to be made. The highest and lowest readings of the scalevel falling between the regular half hourly observations were thus automatically recorded.

Location of gauge.—The gauge was placed on the shore ice due west from the station and at a distance of about 100 yards from the beach. The water at the hole was 17 feet deep at mean low water. The ice was level, and at the beginning of observations in February was  $4_6^{\circ}$  feet thick

and at the close of observations in June was 5 feet thick.

About one mile and a half from the beach and parallel with it is a bar having about 3 fathoms water upon it. On this bar the heavy pack-ice grounds and thus leaves the inshore ice comparatively andisturbed. During this entire series of observations the ice remained undisturbed except in elevation. The anchor remained unmoved and the line hung free in the middle of the hole. The accumulations of ice on the side of the hole were chopped away each day. That the ice, however, rose and fell was obvious, independent of the gauge readings, for along the "ice foot" at the beach the rise and fall was clearly seen, though there was never open water between the beach and the gauge, except for a few moments when the general level of ice would break off from the "ice feet" with falling or rising tide and make a narrow seam, which was soon after solidly frozen over.

In this location the gauge was practically free from local peculiarities and so disposed as to

give the fluctuations of level in the open ocean.

Fime.—The observations were made on local mean time. At intervals of one, two, or three weeks, as the weather permitted, time observations were made with transit or sextant, for the regulation of the standard chronometer upon which all other time-pieces depended.

Flood tides came from the southward and westward and there was a prevailing current setting to the northeast. The ebb current slackened but did not reverse this current.

The daily rise and fall of tide is quite small, being about 6 or 7 inches, but during the series of observations the level of the sea varied more than 3 feet.

he duplicate record has been placed in the hands of the superintendent of the Coast and Geodetic Survey for reduction, discussion, and publication. A preliminary discussion has been made, from which enough of the peculiarities of these Arctic tides have been brought out to show that a more complete analysis, study, and comparison with other Arctic tides is desirable. It has been deemed desirable to substitute here the original record of observations for this preliminary discussion and to give the full discussion hereafter. This discussion will be made and published by the Coast and Geodetic Survey.

Tidal observations at the United States International Polar Station, Uglaamie, Alasla, 1883.

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| Hour.  | Apr. 15   | Apr. 16   | Apr. 17   | Apr. 18   | Apr. 19   | Apr 20   | Apr. 21   |   |   | Apr. 24   |  |  |   | 7 Apr. 28  |   |  |
| C 5  | 1, 02<br>1, 00<br>1, 02<br>1, 04<br>1, 10<br>1, 11<br>1, 13<br>1, 16<br>1, 19<br>1, 20<br>1, 21<br>1, 23<br>1, 23<br>1, 18  | 1. 05 1. 04 1. 02 1. 00 0. 58 1. 00 0. 97 0. 59 1. 02 1. 04 1. 06 1. 49 1. 12 1. 12 1. 13 1. 14   | 1.04<br>1.02<br>1.01<br>1.03<br>1.03<br>1.03<br>1.03<br>1.10<br>1.11<br>1.13<br>1.22<br>1.23<br>1.23<br>1.23<br>1.33<br>1.30<br>1.30<br>1.30<br>1.30<br>1.30<br>1.30<br>1.3   | 1 16 1 17 1 16 1 17 1 17 1 17 1 17 1 17   | 1, 34<br>1, 37<br>1, 40<br>1, 43<br>1, 48<br>1, 57<br>1, 60   | 1 60 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5   | 1.73 1.61 1.67 1.61 1.67 1.63 1.63 1.63 1.63 1.63 1.63 1.63 1.63  | 1 63 1 1.50 1 1.50 1 1.50 1 1.50 1 1.50 1 1 1 1.50 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 1. 20<br>1. 12<br>1. 13<br>1. 13<br>1. 17<br>1. 21<br>1. 27<br>1. 36<br>1. 39<br>1. 44<br>1. 46<br>1. 48  | 1.53 1.49 1.55 1.49 1.41 1.41 1.41 1.42 1.42 1.42 1.42 1.43 1.43 1.43 1.43 1.43 1.43 1.43 1.43  | 1. 67<br>1. 73<br>1. 73<br>1. 73<br>1. 72<br>1. 68<br>1. 65<br>1. 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Tidal observations at the United States International Polar Station, Uglaamie, Alaska, 1883-Cont'd.

|  |  | May 2.   | May 3.   | May 4.   | May 5.   | May 6.   | May 7.   | Мау 8.   | May 9.   | May 10.   | May 11.  | May 12.   | May 13.  | May 14.  | May 15.  | May 1     |
|--|--|--|--|--|--|--|--|--|--|---|--|---|--|--|--|-----------|
| 5<br>5<br>5  | 0, 61<br>0, 65<br>0, 68<br>0, 70   | 0. 40<br>0. 39<br>0. 38<br>0. 38   | 0. 64<br>0. 60<br>0. 58<br>0. 56   | 0. 99<br>0. 95<br>0. 93<br>0. 92   | 1. 21<br>1. 17<br>1. 15<br>1. 12   | 2. 67<br>2. 00<br>1. 98<br>1. 90   | 1. 61<br>1. 60<br>1. 57<br>1. 53   | 1. 87<br>1. 86<br>1. 83<br>1. 80   | 1, 51<br>1, 52<br>1, 52<br>1, 53   | 1, 56<br>1, 65<br>1, 73<br>1, 79<br>1, 78   | 1. 49<br>1. 52<br>1. 52<br>1. 52   | 1. 14<br>1. 20<br>1. 23<br>1. 27  | 1. 16<br>1. 20<br>1. 24<br>1. 32   | 1. 22<br>1. 28<br>1. 32<br>1. 35   | 1. 42<br>1. 43<br>1. 43<br>1. 49   | 1.4       |
| 5<br>D   | 0. 70<br>0. 72<br>0. 73  | 0.41   | 0.58   | 0.97   | 1. 10<br>1. 17   | 1.79   | 1.48   | 1. 76<br>1. 70   | 1. 49<br>1. 42   | 1. 78<br>1. 75  | 1.59   | 1, 32   | 1.31   | 1. 43  | 1. 57<br>1. 57   | 1         |
| 5<br>D   | 0. 78<br>0. 77<br>0. 81  | 0, 50<br>0, 54   | 0, 59<br>0, 68   | 0. 94<br>0. 98<br>1. 01  | 1. 15<br>1. 18   | 1. 69<br>1. 66   | 1.38   | 1.64   | 1.34   | 1.74  | 1. 52<br>1. 52<br>1. 48  | 1, 35   | 1.37   | 1.56<br>1.58   | 1. 59  | 1.        |
| 0  | 0.84   | 0. 58<br>0. 61   | 0.71   | 1.00   | 1. 26<br>1. 33   | 1.60<br>1.60   | 1. 33<br>1. 32   | 1, 56  | 1. 20<br>1. 15   | 1. 70<br>1. 65  | 1. 42<br>1. 39<br>1. 33  | 1. 37   | 1. 38<br>1. 38   | 1. 61<br>1. 62<br>1. 62  | 1.66   | 1.        |
|  | 0, 84<br>0, 86   | 0. 63  | 0. 82<br>0. 88   | 1, 09<br>1, 14<br>1, 24<br>1, 27   | 1.39   | 1.60   | 1. 34<br>1. 39   | 1. 50<br>1. 40   | 1. 12<br>1. 08   | 1.62  | 1.28   | 1.36  | 1.38<br>1.37   | 1.62   | 1. 72<br>1. 72<br>1. 73  | 1.        |
|  | 0.86   | 0. 66<br>0. 68   | 0. 94<br>0. 98<br>0. 99  | 1. 24<br>1. 27   | 1. 44<br>1. 54<br>1. 63  | 1. 62<br>1. 68   | 1. 45<br>1. 50   | 1.48<br>1.50   | 1.04<br>1.04   | 1. 53<br>1. 52  | 1. 22<br>1. 10   | 1, 24   | 1, 35  | 1, 63<br>1, 63   | 1. 75  | 1.        |
|  | 0, 83<br>0, 83   | 0. 70<br>0. 72<br>0. 73  | 1.00   | 1. 35  | 1.68   | 1. 69<br>1. 73   | 1.54   | 1, 52  | 1, 05<br>1, 06   | 1, 53   | 1. 14  | 1. 21   | 1.29   | 1.63   | 1.78   | 1         |
|  | 0. 81<br>0. 79<br>0. 75  | 0. 72  | 1. 02<br>1. 00   | 1, 36<br>1, 37   | 1.96<br>2.05   | 1.80<br>1.82   | 1. 73<br>1. 61   | 1, 63  | 1, 08<br>1, 19   | 1. 56<br>1. 60  | 1.11   | 1. 13<br>1. 12  | 1, 22<br>1, 22   | 1.60<br>1.58   | 1. 75<br>1. 73<br>1. 70  | 1 1       |
|  | 0. 73  | 0. 68<br>0. 63   | 1. 01<br>0. 96   | 1.37<br>1.39<br>1.38   | 2. 13<br>2. 25   | 1.99<br>2.01   | 1.88<br>1.92   | 1.78<br>1.83<br>1.88   | 1, 23<br>1, 32   | 1. 62<br>1. 66<br>1. 77   | 1. 11<br>1. 12<br>1. 14  | 1. 12<br>1. 11  | 1.20<br>1.19   | 1. 56<br>1. 50   | 1.65   | 1 1       |
|  | 0. 70<br>0. 66   | 0. 59<br>0. 53   | 0.98   | 1, 20  | 2. 27<br>2. 31   | 2. 02<br>2. 03   | 1. 97<br>2. 04   | 1.96   | 1, 37<br>1, 42   | 1.80  | 1. 19  | 1. 13<br>1. 16  | 1. 14<br>1. 16   | 1.49<br>1.44   | 1. 63<br>1. 59   | 1         |
| n  | 0.61   | 0.42   | 0. 90<br>0. 77   | 1. 21<br>1. 16   | 2, 33<br>2, 33   | 2. 04<br>2. 03   | 2.06<br>2.05   | 1, 98<br>2, 00   | 1, 47<br>1, 53   | 1, 82<br>1, 84  | 1. 24<br>1. 28   | 1, 19   | 1.18   | 1.45<br>1.46   | 1, 57<br>1, 56   | 1         |
|  | 0, 55<br>0, 55<br>0, 54  | 0.41   | 0.74   | 1. 08<br>1. 02   | 2. 31<br>2. 27   | 1.98<br>1.91   | 2. 08  | 2.00   | 1, 60<br>1, 62   | 1. 92<br>1. 98  | 1. 30<br>1. 33   | 1. 24<br>1. 31  | 1. 19<br>1. 20   | 1.44   | 1, 57<br>1, 56   | 1         |
|  | 0.54   | 0.38   | 0. 62<br>0. 58   | 0. 98<br>0. 97<br>0. 85  | 2. 24<br>2. 17   | 1.84   | 2. 05<br>1. 08   | 1.97<br>1.97   | 1, 65<br>1, 65   | 2. 04<br>2. 04  | 1. 37<br>1. 40   | 1, 34<br>1, 37  | 1, 25<br>1, 28   | 1. 45<br>1. 48<br>1. 50  | 1. 54<br>1. 57   | 1 1       |
|  | 0.55<br>0.56   | 0.35<br>0.35   | 0 61<br>0.62   | 0.80   | 2. 14<br>2. 05   | 1. 70  | 1. 92<br>1. 82<br>1. 77  | 1.88<br>1.80<br>1.72   | 1, 65<br>1, 63   | 2.04  | 1.37   | 1, 39<br>1, 42  | 1.30<br>1.30   | 1, 51  | 1.57<br>1.58   | : 1       |
|  | 0.60   | 0.36   | 0.61   | 0.79<br>0.76   | 2. 03<br>2. 02<br>2. 00  | 1.49   | 1.69   | 1.63   | 1. 63<br>1. 69   | 1.98<br>1.89  | 1. 37<br>1. 34   | 1.44  | 1, 30<br>1, 31   | 1.51<br>1.53   | 1.59<br>1.6.   | 1 1       |
|  | 0.64   | 0.43   | 0. 64<br>0. 72   | 0.84   | 1.98   | 1.36<br>1.28   | 1. 62<br>1. 57   | 1, 55<br>1, 47<br>1, 39  | 1.51   | 1.84<br>1.71<br>1.68  | 1, 30<br>1, 21   | 1.43<br>1.40  | 1.33   | 1.58<br>1.59   | 1. 61<br>1. 64   | 1         |
|  | 0.68<br>0.67   | 0. 47<br>0. 50   | 0. 72<br>0. 72<br>0. 78<br>0. 78<br>0. 82  | 0. 81<br>9. 86<br>0. 90  | 1. 97<br>1. 98   | 1. 23<br>1. 24<br>1. 24  | 1. 55<br>1. 51   | 1.31   | 1.36   | 1.62  | 1. 18  | 1, 35<br>1, 33  | 1.32<br>1.32   | 1. 62<br>1. 62   | 1.66<br>1.68   | 1         |
|  | 0.64   | 0.56<br>0.65   | 0.87   | 0.94   | 1.98   | 1, 29  | 1.50<br>1.49   | 1, 29<br>1, 27<br>1, 25  | 1. 23<br>1. 23   | 1. 50<br>1. 54  | 1. 07<br>1. 03   | 1, 31<br>1, 25  | 1. 30<br>1. 28<br>1. 27  | 1. 62<br>1. 60   | 1. 69<br>1. 69   |           |
|  | 0, 65<br>0, 64<br>0, 61  | 0.66<br>0.70   | 0, 94<br>0, 95<br>1, 02  | 1. 03<br>1. 05   | 2.00<br>2.04   | 1. 32<br>1. 34   | 1.51<br>1.54   | 1, 25<br>1, 24   | 1, 24  | 1.51  | 1, 00  | 1, 22   | 1. 24  | 1.60<br>1.59   | 1.70<br>1.69   |           |
|  | 0.58   | 0. 70<br>0. 71<br>0. 71<br>0. 71   | 1.04   | 1. 06<br>1. 12   | 2. 06<br>2. 14   | 1.40<br>1.44   | 1. 58<br>1. 62   | 1, 24<br>1, 27<br>1, 28  | 1. 29<br>1. 30   | 1. 44<br>1. 42  | 1.91   | 1. 15<br>1. 12  | 1. 24<br>1. 22   | 1. 54<br>1. 54<br>1. 53  | 1. 68<br>1. 63   |           |
|  | 0, 52<br>0, 46<br>0, 50  | 0. 63  | 1. 08<br>1. 09   | 1. 18<br>1. 20   | 2. 19<br>2. 20   | 1.50<br>1.53   | 1. 67<br>1. 73   | 1, 31  | 1. 32<br>1. 35   | 1.39  | 1. 93<br>1. 96   | 1. 12   | 1. 21<br>1. 19   | 1. 52  | 1.62<br>1.58   | 1         |
|  | 0, 50<br>0, 44<br>0, 43  | 0. 63<br>0. 65<br>0. 66  | 1. 10<br>1. 04<br>1. 05  | 1, 23<br>1, 25<br>1, 24  | 2. 21<br>2. 20<br>2. 19  | 1.55<br>1.58<br>1.60   | 1. 82<br>1. 84<br>1. 86  | 1, 42<br>1, 46<br>1, 49  | 1. 44<br>1. 48   | 1, 40<br>1, 41  | 1.96<br>1.98   | 1. 00<br>1. 07  | 1. 18<br>1. 19   | 1.48<br>1.47<br>1.45   | 1. 54<br>1. 46<br>1. 43  | 1         |
|  | 0.43   | 0.67   | 1.02   | 1.28   | 2.12   | 1.60   | 1.87   | 1, 50  | 1. 52<br>1. 53   | 1.43  | 1. 01<br>1. 06   | 1.09<br>1.12  | 1. 20<br>1. 20   | 1.42   | 1.41   |           |
| ur.  | May 17.  |  |  | 1. 28<br>May 20.   | May 21.  | May 22.  | May 23.  | May 24.  | May 25.  | May 26  | May 27   | . May 28  | . May 29   | . May 30   |  | 1<br>June |
|  | May 17.  | May 18.<br>1,57<br>1,53<br>1,48  | May 10.  | 1. 28<br>May 20.   | May 21.  1. 50 1. 47 1. 44   | May 22.  | May 23.  1. 69 1. 68 1. 64   | May 24.  | May 25.  | May 26  | May 27   | . May 28<br>  | 0, 98<br>1, 00<br>1, 02  | 1. 02<br>1. 09<br>1. 15  | . May 31<br>1, 33<br>1, 38<br>1, 40  | . Jun     |
|  | May 17.  1. 49 1. 48 1. 46 1. 46 1. 46   | May 18.<br>1,57<br>1,53<br>1,48<br>1,41<br>1,41  | May 10.  1, 40 1, 36 1, 32 1, 29 1, 25   | 1. 28<br>May 20.   | 1, 50<br>1, 47<br>1, 44<br>1, 40<br>1, 35  | May 22.  | May 23.  1. 69 1. 68 1. 64 1. 59   | May 24. 1, 98 1, 98 2, 01 2, 06 9, 02  | May 25.  1. 93 1. 98 1. 95 1. 94   | 1. 84<br>1. 82<br>1. 82<br>1. 81  | 1, 64<br>1, 68<br>1, 70<br>1, 75<br>1, 76  | 1, 59<br>1, 63<br>1, 66<br>1, 68  | 0, 98<br>1, 00<br>1, 02<br>1, 01<br>1, 02  | 1, 02<br>1, 09<br>1, 15<br>1, 21<br>1, 30  | 1, 33<br>1, 38<br>1, 40<br>1, 44<br>1, 45  | . Jun     |
|  | May 17.  1. 49 1. 48 1. 46 1. 46 1. 46 1. 46   | May 18. 1, 57 1, 53 1, 48 1, 41 1, 41 1, 39 1, 37  | May 19.  1, 40 1, 36 1, 32 1, 29 1, 25 1, 23 1, 21   | 1, 28<br>May 20<br>1, 39<br>1, 34<br>1, 28<br>1, 27<br>1, 24<br>1, 22<br>1, 20   | 1. 50<br>1. 47<br>1. 44<br>1. 40<br>1. 35<br>1. 31<br>1. 29  | 1, 33<br>1, 31<br>1, 28<br>1, 24<br>1, 20<br>1, 17<br>1, 11  | May 23.  1, 69 1, 68 1, 64 1, 59 1, 57 1, 53 1, 50   | May 24.  1. 98 1. 98 2. 01 2. 06 2. 02 1. 97 1. 90   | May 25.  1. 93 1. 98 1. 95 1. 94 1. 92 1. 91   | . May 26<br>1, 84<br>1, 82<br>1, 82<br>1, 81<br>1, 82<br>1, 82  | 1, 64<br>1, 68<br>1, 70<br>1, 75<br>1, 76  | 1. 59<br>1. 63<br>1. 66<br>1. 68<br>1. 72<br>1. 74  | 0, 98<br>1, 00<br>1, 02<br>1, 01<br>1, 02<br>1, 02   | 1. 02<br>1. 09<br>1. 15<br>1. 21<br>1. 30<br>1. 36<br>1. 14  | 1, 33<br>1, 38<br>1, 46<br>1, 44<br>1, 15<br>1, 50<br>1, 54  | . ժա      |
|  | May 17.  1, 49 1, 48 1, 46 1, 46 1, 46 1, 59 1, 59 1, 53   | May 18. 1, 57 1, 53 1, 48 1, 41 1, 40 1, 37 1, 38 1, 40  | May 10.  1, 40 1, 36 1, 32 1, 29 1, 25 1, 23 1, 21 1, 20 1, 20   | 1. 28<br>May 20.<br>1. 39<br>1. 34<br>1. 28<br>1. 27<br>1. 24<br>1. 22<br>1. 20<br>1. 18   | 1.50<br>1.47<br>1.44<br>1.40<br>1.35<br>1.31<br>1.29   | 1, 33<br>1, 31<br>1, 28<br>1, 24<br>1, 20<br>1, 17<br>1, 11<br>1, 10<br>1, 06  | May 23.  1, 69 1, 68 1, 64 1, 59 1, 57 1, 53 1, 50 1, 48 1, 43   | May 24.  1. 98 1. 98 2. 01 2. 06 2. 02 1. 97 1. 90 1. 91 1. 82   | May 25.  1, 93 1, 98 1, 95 1, 94 1, 92 1, 91 1, 87 1, 76   | . May 26<br>1, 84<br>1, 82<br>1, 82<br>1, 81<br>1, 82<br>1, 82<br>1, 80<br>1, 70<br>1, 70   | 1, 64<br>1, 68<br>1, 70<br>1, 75<br>1, 76<br>1, 74<br>1, 74<br>1, 73<br>1, 71  | 1. 59<br>1. 63<br>1. 66<br>1. 68<br>1. 72<br>1. 74<br>1. 75<br>1. 73<br>1. 74   | 0, 98<br>1, 00<br>1, 02<br>1, 04<br>1, 02<br>1, 04<br>1, 00<br>0, 99<br>0, 95  | 1, 02<br>1, 09<br>1, 15<br>1, 21<br>1, 30<br>1, 36<br>1, 14<br>1, 48<br>1, 50  | 1, 33<br>1, 38<br>1, 40<br>1, 44<br>1, 45<br>1, 50<br>1, 54<br>1, 76   | . Jun     |
|  | May 17.  1, 49 1, 48 1, 46 1, 46 1, 46 1, 59 1, 53 1, 55 1, 62 1, 63   | May 18. 1, 57 1, 53 1, 48 1, 41 1, 39 1, 37 1, 38 1, 40 1, 43  | May 19.  1, 40 1, 36 1, 32 1, 29 1, 25 1, 23 1, 21 1, 20 1, 20 1, 22 1, 22 1, 25   | 1. 28<br>May 20.<br>1. 39<br>1. 34<br>1. 28<br>1. 27<br>1. 24<br>1. 22<br>1. 20<br>1. 18<br>1. 20<br>1. 20<br>1. 20<br>1. 23   | 1. 50<br>1. 47<br>1. 44<br>1. 40<br>1. 35<br>1. 31<br>1. 29<br>1. 25<br>1. 22<br>1. 23<br>1. 24  | 1, 33<br>1, 31<br>1, 28<br>1, 24<br>1, 20<br>1, 17<br>1, 11<br>1, 10<br>1, 06<br>1, 05<br>1, 05  | May 23.  1. 69 1. 68 1. 64 1. 59 1. 57 1. 53 1. 50 1. 48 1. 43 1. 40 1. 41   | May 24.  1. 98 1. 98 2. 01 2. 06 2. 02 1. 97 1. 90 1. 91 1. 82 1. 82   | May 25.  1. 93 1. 98 1. 95 1. 94 1. 92 1. 91 1. 87 1. 76 1. 76 1. 70   | . May 26<br>1. 84<br>1. 82<br>1. 82<br>1. 81<br>1. 82<br>1. 82<br>1. 80<br>1. 77<br>1. 70<br>1. 66  | 1, 64<br>1, 68<br>1, 70<br>1, 75<br>1, 76<br>1, 74<br>1, 74<br>1, 73<br>1, 71<br>1, 68<br>1, 63  | 1. 59<br>1. 63<br>1. 66<br>1. 68<br>1. 72<br>1. 74<br>1. 75<br>1. 73<br>1. 74   | 0, 98<br>1, 00<br>1, 02<br>1, 02<br>1, 01<br>1, 02<br>1, 00<br>0/99<br>0, 95<br>0, 90<br>0, 86   | 1, 02<br>1, 09<br>1, 15<br>1, 21<br>1, 30<br>1, 36<br>1, 14<br>1, 48<br>1, 50<br>1, 52<br>1, 58  | 1, 33<br>1, 38<br>1, 40<br>1, 44<br>1, 45<br>1, 50<br>1, 54<br>1, 66<br>1, 66  | . Jun     |
|  | May 17.  1, 49 1, 48 1, 46 1, 46 1, 46 1, 50 1, 50 1, 55 1, 62 1, 63 1, 69   | May 18.  1, 57 1, 53 1, 48 1, 41 1, 39 1, 37 1, 38 1, 49 1, 43 1, 53 1, 58   | May 19.  1, 40 1, 36 1, 32 1, 29 1, 25 1, 20 1, 20 1, 20 1, 20 1, 20 1, 20 1, 21 1, 31 1, 31   | 1, 28  May 20,  1, 39 1, 34 1, 28 1, 27 1, 27 1, 20 1, 10 1, | May 21.  1. 50 1. 47 1. 44 1. 40 1. 35 1. 31 1. 29 1. 22 1. 23 1. 24 1. 27 1. 30   | May 22.  1. 33 1. 31 1. 28 1. 24 1. 20 1. 17 1. 11 1. 10 1. 06 1. 05 1. 05 1. 04 1. 08   | May 23.  1. 69 1. 68 1. 64 1. 59 1. 57 1. 53 1. 50 1. 44 1. 43 1. 40 1. 41 1. 41 1. 42   | May 24.  1. 98 1. 98 2. 01 2. 06 2. 02 1. 97 1. 90 1. 91 1. 82 1. 82 1. 80 1. 82 1. 82   | May 25.  1, 93 1, 98 1, 95 1, 94 1, 92 1, 91 1, 87 1, 76 1, 70 1, 65 1, 61 1, 60   | . May 26<br>1. 84<br>1. 82<br>1. 82<br>1. 81<br>1. 82<br>1. 80<br>1. 77<br>1. 70<br>1. 66<br>1. 64<br>1. 60<br>1. 54  | 1, 64<br>1, 68<br>1, 70<br>1, 75<br>1, 76<br>1, 74<br>1, 74<br>1, 73<br>1, 71<br>1, 68<br>1, 63<br>1, 62   | . May 28<br>1, 59<br>1, 63<br>1, 66<br>1, 68<br>1, 72<br>1, 74<br>1, 75<br>1, 73<br>1, 74<br>1, 70<br>1, 72<br>1, 71<br>1, 66   | . May 29<br>0, 98<br>1, 00<br>1, 02<br>1, 01<br>1, 02<br>1, 02<br>1, 00<br>0/90<br>0, 95<br>0, 90<br>0, 86<br>0, 84<br>0, 80   | 1, 02<br>1, 02<br>1, 09<br>1, 15<br>1, 21<br>1, 30<br>1, 36<br>1, 14<br>1, 48<br>1, 59<br>1, 58<br>1, 58   | 1, 33<br>1, 38<br>1, 46<br>1, 44<br>1, 45<br>1, 50<br>1, 54<br>1, 76<br>1, 66<br>1, 68   | . Jun     |
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| 5  | May 17.  1. 49 1. 48 1. 46 1. 46 1. 46 1. 46 1. 47 1. 49 1. 47 1.  | May 18.   1.57   1.53   1.441   1.411  | 1,49 1,30 1,30 1,30 1,32 1,12 1,12 1,12 1,12 1,12 1,12 1,12  | 1.28  May 20.  1.30 1.34 1.34 1.39 1.28 1.29 1.120 1.1 | May 21.  1.50 1.47 1.44 1.45 1.47 1.44 1.55 1.22 1.23 1.24 1.23 1.24 1.25 1.23 1.24 1.34 1.43 1.44 1.45 1.45 1.45 1.45 1.45 1.45 1.45  | May 22.  1.33 1.24 1.19 1.19 1.19 1.10 1.10 1.10 1.10 1.10   | May 23, 169 1, 69 1, 69 1, 68 1, 64 1, 68  | May 24.  1. 98 1. 198 2.006 2.006 2.006 1. 97 1. 90 1. 182 1. 82 1. 82 1. 82 2.00 2. 03 2. | 1.93 1.98 1.95 1.97 1.98 1.98 1.95 1.99 1.99 1.99 1.99 1.99 1.99 1.99  | . May 26   1.84   1.82   1.83   | May 27 1, 64 1, 100 1,  | . May 28 1.69 1.69 1.69 1.69 1.69 1.69 1.74 1.73 1.74 1.73 1.74 1.70 1.72 1.71 1.60 1.60 1.59 1.51 1.18 1.59 1.51 1.19 1.51 1.54 1.55 1.55 1.55 1.55 1.55 1.55  | May 299 0, 988 1, 907 1, 102 1, 1, 103 1, 1, 104 1, 1, 105 1, 1, 106 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1, 107 1, 1 | . May 300 1.02 1.02 1.09 1.15 1.09 1.15 1.19 1.19 1.19 1.19 1.19 1.19 1.1  | . May 31 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2   | Jun       |
| 5  | May 17.  1.49 1.48 1.49 1.48 1.49 1.48 1.49 1.49 1.49 1.49 1.49 1.49 1.49 1.59 1.63 1.63 1.69 1.75 1.62 1.63 1.75 1.63 1.63 1.63 1.63 1.63 1.63 1.63 1.63  | May 18.  1.57  1.153  1.154  1.157  1.158  1.41  1.19  1.40  1.43  1.49  1.40  | 1,40 May 10. 1,40 May 10. 1,30 May 10. 1,30 May 10. 1,30 May 10. 1,20  | 1.28  1.39  1.39  1.39  1.39  1.34  1.28  1.28  1.28  1.29  1.20   | May 21. 50 1 | May 22.  1.33 1.34 1.35 1.29 1.19 1.19 1.19 1.19 1.19 1.19 1.19  | May 23. 1.69 (1.69 | May 24.  1. 98 1. 198 2.006 2.006 2.006 1. 97 1. 90 1. 182 1. 82 1. 82 1. 82 2.00 2. 03 2. | May 25.5 1.93 1.98 1.98 1.98 1.99 1.1.98 1.99 1.1.97 1.76 1.66 1.66 1.67 1.66 1.67 1.76 1.76   | May 26  1. 184 3  | . May 27  1.68 1.68 1.70 1.75 1.74 1.74 1.73 1.71 1.68 1.63 1.62 1.57 1.51 1.50 1.49 1.48 1.48 1.49 1.50 1.65 1.79 1.79 1.79 1.79 1.79 1.85 1.84 1.82  | . May 29 1.69 1.63 1.63 1.63 1.63 1.63 1.63 1.63 1.63   | May 299 1. (20) 1. (20 | . May 30 1.02 1.09 1.151 1.151 1.151 1.151 1.151 1.151 1.152 1.158   | . May 31 1.38 4.18 1.48 4.18 1.48 4.18 1.48 4.18 1.48 4.18 1.18 1  | Jun       |
| 5.00 5.00 5.00 6.00 6.00 6.00 6.00 6.00  | May 17.  1.49 1.48 1.49 1.48 1.49 1.48 1.49 1.49 1.49 1.49 1.49 1.49 1.49 1.49   | May 18.  1.57  1.58  1.49  1.41  1.42  1.43  1.4 | May 19.  1.40 1.20 1.20 1.20 1.20 1.20 1.20 1.20 1.2   | 1.28  1.39  1.39  1.39  1.39  1.28  1.34  1.28  1.29  1.27  1.20   | May 21.  1.47  1.44  1.47  1.44  1.49  1.49  1.22  1.33  1.33  1.43  1.43  1.53  1.43  | May 22.  1.33 1.24 1.28 1.28 1.29 1.28 1.29 1.29 1.29 1.29 1.29 1.29 1.29 1.29   | May 23. 1.69 (1.68) (1. | May 24.  1. 98 1. 198 2.006 2.006 2.006 1. 97 1. 90 1. 182 1. 82 1. 82 1. 82 2.00 2. 03 2. | May 25. 1. 93  | May 25 1, 84 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,   | May 27 1.68 1.75 1.75 1.75 1.75 1.75 1.75 1.75 1.75  | . May 29 1. 69 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)  | May 299 0.88 0.88 0.89 0.80 0.80 0.80 0.80 0.  | . May 300 1.02 1.02 1.09 1.15 1.09 1.15 1.19 1.19 1.19 1.19 1.19 1.19 1.1  | . May 31 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2   | Jun       |
| 55 | May 17.  1.49 1.48 1.49 1.48 1.49 1.48 1.49 1.49 1.49 1.49 1.49 1.49 1.49 1.59 1.63 1.63 1.69 1.75 1.62 1.63 1.75 1.63 1.63 1.63 1.63 1.63 1.63 1.63 1.63  | May 18.  1.57 1.158 1.491 1.592 1.159 1.15 | May 19, 1, 400 1, 130 1 | 1.28  1.39  1.39  1.39  1.39  1.34  1.28  1.34  1.28  1.27  1.27  1.20   | May 21. 50 May 21. 1. 50 May 2 | May 22  1,33 1,13 1,28 1,128 1,129 1,129 1,147 1,100 1,160 1 | May 23.  1.69 (4) (1.69 (4) (1.69 (4) (4) (4) (4) (4) (4) (4) (4) (4) (4)  | May 24.  1. 98 1. 198 2.006 2.006 2.006 1. 97 1. 90 1. 182 1. 82 1. 82 1. 82 2.00 2. 03 2. | May 25. 1. 93. 1. 93. 1. 94. 1. 95. 1. 95. 1. 97. 1. 98. 1 | May 20  | May 27 - 1, 44 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,   | . May 22 1. 59 64 1. 69 64 1.   | May 29 11.00 | . May 300  1.020 1.020 1.020 1.020 1.020 1.030 1   | . May 31 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | Jun       |
| 5  | May 17.  1.49 1.484 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.466 1.467 1.46 | May 18.    1.57   1.58   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.59   1.50  | May 19, 1, 40 1, 130 1, | 1.28  May 20.0  1.39  1.39  1.34  1.28  1.34  1.28  1.27  1.20   | May 21. 50 May 21. 1. 50 May 2 | May 22.  1.33 1.33 1.28 1.29 1.19 1.19 1.10 1.10 1.10 1.10 1.10 1.1  | May 23. 1.69 91. 1.69 1.69 1.69 1.69 1.69 1.69 1.69 1.69   | May 24.  1.98 (1.08 )  2.06 (2.06 )  2.06 (2.06 )  2.07 (2.07 )  1.90 (1 | May 25. 1.931 1.984 1.985 1.991 1.991 1.991 1.911 1.977 1.971 1.977 1.971 1.972 1.971 1.972 1.971 1.972 1.971 1.972 1.973 1.97 | May 22  | May 27 - 1, 44 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,   | . May 22 1.59 6 1.69 6 1  | May 29 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | . May 300  1. 000  1.  | . May 31 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | Jun       |
| 55 | May 17.  1.49 1.48 1.49 1.48 1.49 1.48 1.49 1.49 1.49 1.49 1.49 1.49 1.49 1.49   | May 18.  1.57 1.158 1.491 1.592 1.159 1.15 | May 19, 1, 40   1, 40   1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1   | 1.28  May 20.  1.39  1.34  1.28  1.34  1.28  1.28  1.29  1.29  1.20  | May 21.  1. 60 | May 22  1,33 1,13 1,28 1,128 1,129 1,129 1,147 1,100 1,160 1 | May 23. 1.69 1.1.69 1.1.69 1.1.69 1.1.69 1.1.61 1.1 | May 24.  1. 98 1. 198 2.006 2.006 2.006 1. 97 1. 90 1. 182 1. 82 1. 82 1. 82 2.00 2. 03 2. | May 23, 1.98 1.98 1.99 1.99 1.99 1.99 1.99 1.99  | May 25  | May 27  1.68  1.89  1.18 | . May 22 1.99 1.10 1.10 1.10 1.10 1.10 1.10 1.10  | May 29 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | . May 300 1.020 1.020 1.020 1.020 1.030 1.   | . May 31 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | Jun       |

H. Ex. 44----86

83—Cont'd. e.]

Apr. 17 Apr. 14

 $\begin{array}{c} 2.11\\ 2.22\\ 2.22\\ 2.23\\ 0.00\\ 0.004\\$ 

28 Apr 29 Apr. 30

Tidal observations at the United States International Polar Station, Uglaamie, Alaska, 1883-Cont'd.

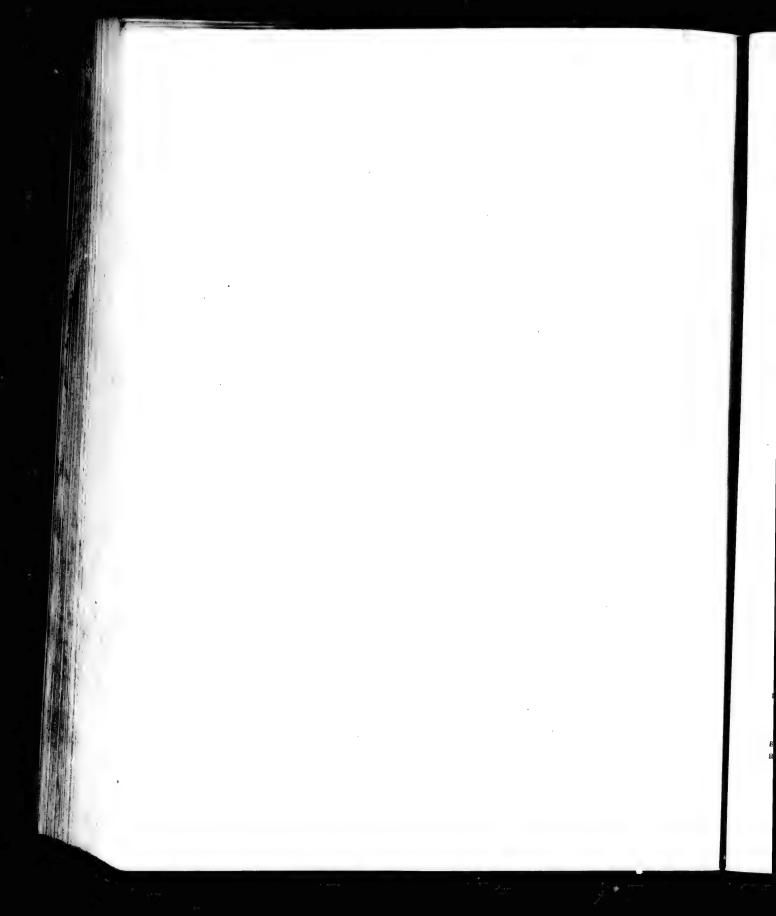
[Half-hourly readings made on local mean time. Helghts expressed in feet. Increasing numbers denote rising tide.]

|                                  |                         |         |                |         |         |                |                |              |           |                |           |                |                |         | -            |                         |
|----------------------------------|-------------------------|---------|----------------|---------|---------|----------------|----------------|--------------|-----------|----------------|-----------|----------------|----------------|---------|--------------|-------------------------|
| T1                               | F 0                     |         |                |         |         |                |                | Y            | Taxan 144 | Toron 11       | June 19   | June 12        | June 14        | Luno 15 | Trans tot    |                         |
| mour.                            | June 2.                 | June 3. | June 4.        | June 5. | June 6, | June 7.        | Jame 8.        | - dune u     | June 10.  | o une 11       | o ane iza | o une to.      | 0 ttno 14.     | THE 10. | #une 16, a   | une 17,                 |
|                                  |                         |         |                |         |         |                | -              |              |           |                |           |                | -              |         |              | -                       |
| 0.5                              | 1 94                    | 1. 60   | 1. 51          | 1 44    | 1.51    | 1.56           | 1. 47          | 1.38         | 1,46      | 1.00           | 1. 62     | 1.17           | 0,84           | 1.60    | 1.50         | 1 10                    |
| 1. 0                             | 1. 26<br>1. 24<br>1. 23 | 1. 55   | 1, 50          | 1.44    | 1, 54   | 1. 59          | 1, 50          | 1. 47        | 1.50      | 1.05           | 1.06      | 1.19           | 0, 84          | 1, 60   | 1. 46        | 1. 17<br>1. 12          |
| 1.5                              | 1 00                    | 1. 59   |                | 1. 37   | 1. 49   | 1. 57          | 1, 50          | 1.50         | 1, 53     | 1, 09          | 1.11      | 1. 19<br>1. 22 | 0.87           | 1, 60   | 1. 45        | 1.12                    |
| 2. 0                             | 1. 21                   | 1. 53   | 1. 45          | 1. 32   | 1. 45   | 1. 52          | 1. 52          | 1, 54        | 1, 57     | 1, 12          | 1.18      | 1. 26          | 0, 91          | 1, 59   | 1. 44        | 1. 10                   |
| 2.5                              | 1. 20                   | 1. 30   | 1, 32          | 1, 25   | 1. 38   | 1.47           | 1. 49          | 1. 57        | 1. 61     | 1. 14          | 1. 21     | 1. 29          | 0. 97          | 1. 61   | 1. 44        | 1. 10<br>1. 07<br>1. 07 |
| 3.0                              | 1. 18                   | 1.46    | 1.30           | 1, 20   | 1. 35   | 1.43           | 1. 46          | 1.55         |           | 1.17           | 1. 22     | 1. 34          | 1.00           | 1. 64   | 1. 45        | 1.08                    |
| 3. 5                             | 1. 22                   | 1.47    | 1. 26          | 1. 13   | 1. 30   | 1. 36          | 1. 41          | 1, 52        | 1.64      | 1.17           | 1, 27     | 1. 35          | 1, 05          | 1.68    | 1. 48        | 1.10                    |
| 3. 5<br>4. 0                     | 1. 29                   | 1. 46   | 1. 27          | 1, 06   | 1. 24   | 1, 30          | 1.34           | 1.47         | 1.63      | 1.16           | 1.34      | 1.37           | 1. 10          | 1.69    | 1, 50        | 1. 10<br>1. 14          |
| 4.5                              | 1, 29                   | 1.50    | 1. 27          | 1.06    | 1. 20   | 1. 25          | 1. 31          | 1.42         | 1.60      | 1. 10          | 1.84      | 1. 37          | 1.18           | 1. 74   | 1.56         | 1 10                    |
| 5. 0                             | 1, 39                   | 1. 56   | 1. 26          | 1.08    | 1. 19   | 1. 24          | 1. 25          | 1.40         |           | 1.08           | 1.35      | 1. 38          | 1. 21 .        | 1. 77   | 1.59         | 1. 19<br>1. 20          |
| 5. 5<br>6. 0                     | 1.41                    | 1. 58   | 1. 32          | 1.09    | 1.18    | 1.18           | 1. 20          | 1.38         | 1.53      | 1.05           | 1. 35     | 1. 39          | 1, 28          | 1. 79   | 1. 64        | 1. 25                   |
| 6.0                              | 1. 51                   | 1.67    | 1. 34          | 1.14    | 1.18    | 1.15           | 1.15           | 1.34         | 1.49      | 1.02           | 1. 35     | 1.39           | 1. 31          | 1.81    | 1. 67        | 1.30                    |
| 6. 5                             | 1. 55                   | 1. 72   | 1.48           | 1. 20   | 1, 20   | 1.14           | 1.13           | 1.27         | 1.47      | 0.99           | 1. 34     | 1.38           | 1. 37          | 1.83    | 1. 70        | 1. 33                   |
| 7. 0                             | 1.66                    | 1.76    | 1, 50          | 1. 24   | 1. 24   | 1.14           | 1.11           | 1. 27        | 1.38      | 0, 94          | 1. 33     | 1.36           | 1.41           | 1.83    | 1.73         | 1, 37                   |
| 7. 5                             | 1.68                    | 1.82    | 1, 57          | 1.33    | 1. 30   | 1, 14          | 1.10           | 1.25         | 1.34      | 0.87           | 1. 31     | 1.32           | 1.45           | 1. 85   | 1.74         | 1, 40                   |
| 8. 0<br>8. 5                     | 1.71                    | 1.86    | 1. 63          | 1.36    | 1. 31   | 1.18           | 1.10           | 1.26         | 1.31      | 0, 84          | 1.30      | 1.30           | 1.48           | 1. 86   | 1.76         | 1. 40<br>1. 48          |
| 8.5                              | 1.75                    | 1.88    | 1.70           | 1.48    | 1.50    | 1. 22          | 1. 12          | 1. 27        | 1. 28     | 0.84           | 1. 25     | 1. 22          | 1.48           | 1.86    | 1. 77        | 1.48                    |
| 9. 0                             | 1.96                    | 1.93    | 1.74           | 1.56    | 1, 55   | 1.28           | 1.19           | 1, 27        | 1. 27     | 0.80           | 1. 22     | 1. 18          | 1.49           | 1.87    | 1. 76        | 1.49                    |
| 9.5                              | 1. 82                   | 1. 97   | 1, 81          | 1. 65   | 1. 66   | 1.36           | 1, 20          | 1.36         | 1. 22     | 0.80           | 1. 21     | 1. 14          | 1.50           | 1, 85 } | 1. 77        | 1.50                    |
| 10. 0                            | 1.80                    | 1.98    | 1.87           | 1.70    | 1, 73   | 1.42           | 1. 27          | 1.39         | 1.23      | 0.77           | 1.21      | 1. 12          | 1, 52          | 1.83    | 1.78         | 1.50                    |
| 10.5                             | 1.79                    | 1.98    | 1.86           | 1.78    | 1, 80   | 1, 51          | 1. 72          | 1.43         | 1. 24     | 0.78           | 1.21      | 1.08           | 1, 52          | 1.80    | 1. 75        | 1. 50                   |
| 11. 0                            | 1.77                    | 1. 92   | 1.95           | 1.81    | 1.85    | 1.57           | 1.35           | 1.47         | 1, 29     | 0.78           | 1. 21     | 1.04           | 1. 55          | 1.75    | 1.72         | 1.49                    |
| 11.5                             | 1.70                    | 1. 91   | 1.90           | 1.83    | 1. №6   | 1, 63          | 1. 44          | 1.51         | 1.30      | 0.80           | 1. 20     | 1. 04          | 1.55           | 1.71    | 1.64         | 1, 42                   |
| Noon                             | 1. 65                   | 1. 82   | 1.83           | 1.86    | 1.91    | 1.68           | 1. 49          | 1. 57        | 1. 28     | 0. 80          | 1. 23     | 1.02           | 1, 56          | 1.68    | 1. 59        | 1.36                    |
| 12. 5<br>13. 0<br>13. 5<br>14. 0 | 1.65                    | 1.81    | 1.80           | 1.82    | 1.93    | 1. 71          | 1. 51          | 1. 63        | 1.34      | 0.82           | 1.23      | 1.00           | 1.56           | 1.65    | 1.52         | 1. 32<br>1. 25          |
| 13. 0                            | 1.64                    | 1.72    | 1. 73          | 1. 81   | 1.44    | 1. 73          | 1, 53          | 1. 67        | 1. 35     | 1. 15          | 1. 24     | 1.00           | 1. 56          | 1.64    | 1.48         | 1, 25                   |
| 18. 5                            | 1, 48                   | 1. 64   | 1. 63          | 1.78    | 1, 90   | 1.74           | 1.58           | 1.68         | 1. 39     | 1. 18          | 1. 30     | 1. 02          | 1.58           | 1. 60 : | 1.42         | 1. 20                   |
| 14.0                             | 1.45                    | 1.59    | 1.58           | 1. 73   | 1.87    | 1. 74          | 1, 58<br>1, 54 | 1.70<br>1.73 | 1. 39     | 1. 22<br>1. 24 | 1.31      | 1. 02          | 1.60           | 1.58    | 1.37         | 1. 13                   |
| 14. 5                            | 1. 40  <br>1. 36        | 1. 54   | 1.49           | 1.68    | 1. 82   | 1, 71          | 1. 52          | 1. 73        | 1. 40     | 1. 27          | 1.40      | 1.02           | 1. 64<br>1. 65 | 1.57    | 1. 35        | 1. 08                   |
| 15. 0<br>15. 5<br>16. 0          | 1. 30                   | 1. 50   | 1.41           | 1.60    | 1.72    |                | 1. 49          | 1. 70        | 1.40      | 1. 27          | 1.42      | 1. 05          |                |         | 1. 34        | 1.05                    |
| 16.0                             | 1, 35<br>1, 35          | 1.44    | 1.34           | 1. 55   | 1.68    | 1. 63<br>1. 56 | 1. 45          | 1. 67        | 1, 38     | 1. 27          | 1. 43     | 1. 07          | 1.69 :<br>1.72 | 1, 57   | 1.31<br>1.29 | 1.00                    |
| 16. 5                            | 1. 34                   | 1.39    | 1. 26<br>1. 22 | 1, 49   | 1.60    | 1.46           | 1.36           | 1. 65        | 1. 34     | 1. 27          | 1. 46     | 1. 08          |                | 1.59    | 1. 29        | 0. 98                   |
| 17 0                             | 1. 44                   | 1. 37   | 1. 19          | 1. 36   | 1.48    | 1.31           | 1. 31          | 1. 59        | 1.31      | 1. 27          | 1. 48     | 1. 09          | 1, 75<br>1, 77 | 1. 59   | 1. 28        | 0. 97<br>0. 95          |
| 17.5                             | 1. 47                   | 1. 34   | 1. 15          | 1. 33   | 1.43    | 1, 36          | 1. 26          | 1. 53        | 1. 24     | 1. 25          | 1.46      | 1. 10          | 1. 77          | 1. 59   | 1. 28        |                         |
| 18 0                             | 1.49                    | 1. 35   | 1. 17          | 1. 30   | 1.37    | 1. 31          | 1. 21          | 1.50         | 1, 20     | 1. 20          | 1. 44     | 1. 10          | 1.80           | 1, 60   | 1. 28        | 0, 96                   |
| 17. 0<br>17. 5<br>18. 0<br>18. 5 | 1. 53                   | 1.41    | 1. 15          | 1. 30   | 1. 34   | 1. 27          | 1. 15          | 1. 45        | 1. 13     | 1. 16          | 1.43      | 1.10           | 1.82           | 1. 61   | 1. 29        | 0. 99                   |
| 19.0.                            | 1.55                    | 1.38    | 1. 17          | 1, 29   | 1.32    | 1. 23          | 1.10           | 1.40         | 1, 10     | 1. 10          | 1.40      | 1. 10          | 1.82           | 1. 62   | 1. 31        | 1. 00                   |
| 19. 0<br>19. 5                   | 1.59                    | 1.42    | 1. 20          | 1. 31   | 1. 31   | 1. 21          | 1.09           | 1. 37        | 1.06      | 1. 10          | 1.37      | 1, 10          | 1.82           | 1. 64   | 1. 32        | 1. 01                   |
| 20. 0                            | 1, 68                   | 1. 51   | 1. 23          | 1, 33   | 1.30    | 1. 20          | 1.07           | 1.34         | 1.02      | 1.05           | 1. 34     | 1.06           | 1.82           | 1. 65   | 1. 33        | 1. 02                   |
| 20.5                             | 1.68                    | 1, 54   | 1. 29          | 1. 37   | 1.33    | 1.20           | 1.06           | 1.31         | 1.00      | 0.99           | 1.30      | 1. 03          | 1. 80          | 1. 65   | 1. 35        | 1.02                    |
| 21. 0                            | 1.70                    | 1.55    | 1. 35          | 1.43    | 1.35    | 1. 22          | 1.09           | 1. 31        | 0.95      | 0. 95          | 1. 25     | 1.00           | 1.77           | 1.65    | 1. 34        | 1.05                    |
| 21. 0<br>21. 5                   | 1, 73                   | 1.61    | 1.39           | 1. 46   | 1, 37   | 1. 26          | 1. 11          | 1.31         | 0.92      | 0.95           | 1, 22     | 0.95           | 1.75           | 1.64    | 1. 32        | 1. 07                   |
| 22. 0                            | 1.72                    | 1. 59   | 1.42           | 1.49    | 1. 43   | 1. 30          | 1. 15          | 1.30         | 0.92      | 0.95           | 1. 19     | 0.92           | 1. 71          | 1.53    | 1, 30        | 1. 08                   |
| 22, 5                            | 1.74                    | 1. 63   | 1.44           | 1, 52   | 1.47    | 1. 35          | 1. 21          | 1.32         | 0.92      | 0.95           | 1.16      | 0. 90          | 1.68           | 1. 59   | 1. 29        | 1.08                    |
| 23. 0                            | 1.70                    | 1, 60   | 1.46           | 1, 56   | 1.50    | 1.40           | 1. 25          | 1.35         | 0.92      | 0.95           | 1.16      | 0.88           | 1, 65          | 1.58    | 1. 27        | 1. 05                   |
| 22. 5                            | 1.68                    | 1.59    | 1.46           | 1. 57   | 1.53    | 1.44           | 1. 28          | 1. 37        | 0. 93     | 0.95           | 1. 15     | 0.86           | 1.64           | 1.55    | 1. 24        | 1. 03                   |
| Midn't.                          | 1.64                    | 1.53    | 1.48           | 1.57    | 1.55    | 1.45           | 1. 30          | 1.41         | 0.96      | 0.98           | 1.16      | 0.85           | 1.62           | 1, 53   | 1. 20        | 0, 99                   |
|                                  |                         |         |                |         |         | 1              |                |              |           |                |           |                |                |         |              |                         |

1. 50 1. 46 1. 44 1. 44 1. 45 1. 44 1. 45 1. 46 1. 46 1. 46 1. 47 1. 70 1. 70 1. 70 1. 77 1. 78 1. 79 1. 1. 17 1. 10

## PART VIII.

MISCELLANEOUS OBSERVATIONS.



## MISCELLANEOUS OBSERVATIONS.

# I. A REPORT ON THE GROUND CURRENT OBSERVATIONS MADE AT UGLAAMIE, ALASKA.

By A. L. MCRAE, Private Signal Corps, U. S. Army.

The observations were commenced August 11, 1882, and were continued at hourly intervals until November 14, 1882.

The lines were insulated wires one thousand yards in length. One was in the magnetic meridian, and the other at right angles to it.

The terminals were copper plates 2 (1?) feet square. The N., S. and W. terminals were in water; the E. in land.

Compass galvanoscopes were used to measure the strength of the current.

As the observations possess especial interest because they were made in such a high latitude, several deflections of the galvanoscope have been reduced to something like absolute measure by comparison with a galvanometer in the laboratory.

Unfortunately the electromotive force due to the terminals and the resistance of the complete circuit were not determined, so that their effects cannot be accurately estimated.

But from an experiment with copper plates one square foot in area it was found that the electromotive force under the most favorable circumstances, when both plates were in sea is less than .05 volt, and when one plate was in sea and the other in land is less than .2 volt.

Mr. Wild has found that the electromotive force due to copper plates buried in the earth may reach .05 volt. We can therefore safely assume that the electromotive force between the plates used in the observations was not greater than .2 volts.

Mr. Wild has already found that the resistance of the ground between copper plates one square meter in area buried two meters below the surface and one kilometer apart was between thirty and sixty ohms. By comparison the resistance of the ground at Uglaamie would be between eighty and one hundred and sixty ohms. But since all the plates except one were in water it is probable the resistance was much less.

If we assume that the resistance of the line and the ground was so small compared to the resistance of the galvanoscope as to be inappreciable, we find that at times there was an electromotive force of .8 volt acting. Deducting the .2 due to the terminals we have .6 volt remaining, which must be due to a ground current.

The difficulties mentioned above of eliminating everything from the true ground current prevent a careful study of the observations; but by plotting the total current it appears that:

1. The current is generally steady in strength and direction for several days at a time. There are periods when there is no current. There are also rare moments when the intensity of the current changes rapidly. The direction of the current usually changes slowly.

2. The north and south component is the stronger.

3. The general direction of the current is from the first (NW.) to the third (SE.) quadrant, and not from the second (NE.) to the fourth (SW.) as in Europe.

The general direction varied from due west to a little east of north.

In connection with auroras it is noticed that:

On September 4 a weak variable current suddenly changed to a strong north by east current six or seven hours before an aurora was observed. This strong current continued for several days and auroras on the 6th, 12th, and 15th did not seem to affect its intensity or direction.

On September 25 there was quite a disturbance of the needle five hours in advance of the aurora. Just after the appearance of the aurora the current began to weaken and shifted from north to northwest.

On September 26 there was an increased current one hour in advance of the aurora.

On October 8 a westerly current changed to a little south of west one hour in advance of the aurora.

At other times auroras occurred when there was a strong or moderately strong current without apparently having the slightest effect.

#### NOTE ON AN IMPROVED METHOD FOR OBSERVING GROUND CURRENTS.

Heretofore the best method for observing ground currents has been that of two lines, one in the magnetic meridan and one at right angles to it. By this method the difference of potential between N, and S, and between E, and W, giving the components of the current in these two directions can be obtained. This, however, is not sufficient to enable us to determine the exact direction and strength of the current.

Now, if the difference of potential between N. and W. is taken at the same time as that of N. and S. and of E. and N., there will be all the necessary data to plat the equipotential surfaces, from which the direction of the current can be obtained.

Then, knowing distance between the equipotential surfaces, we can get the variation of the potential with respect to the distance and hence the strength of the current.

The lines need not be at right angles, nor is it necessary that one should be in the magnetic meridian.

#### II. THICKNESS OF THE ICE.

The thickness of the ice in the lagoon close to the station, and in the still water of the sea near shore, was measured at intervals of about a month during the winter.

The following table presents the results of these observations:

| LA  | GOON                       | ICE.               | A1                                   |
|---|----------------------------|--------------------|--------------------------------------|
| Date.   | Thic                       | kness.             | Remarks.                             |
| November 1  | Fret                       | Inches.            |                                      |
| January 1   | 3<br>5<br>6                | 9<br>14<br>24      |                                      |
| :   | SEA 10                     | E.                 |                                      |
| December 1  |                            | . 29               | Sea ice.                             |
| January 3 February 2 March 7 April 2 May 2 July 1 | 3<br>4<br>5<br>4<br>5<br>5 | 8<br>2<br>11<br>04 | Measured about 200 yards from shore. |

Note.—In the meteorological observations, the readings of the barometer are not reduced to the sea-level.

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| Δ.                              | _          |                                    | 147 |
|---------------------------------|------------|------------------------------------|-----|
|                                 | Page.      | Amphithos compressa                | 143 |
| Acanthostepheia malmgreni       | 146        | Edwardsii                          | 140 |
| Acam tozone polyacantha, n. sp. | 146        | panopla                            | 14  |
| Acephala                        | 183        | swammerdamii                       | 14  |
| Actinaria                       | 169        | Amphithonotus aculeatus            |     |
| Actinia carneola                | 162        | cataphractus                       | 14  |
| crassicornis                    | 162        | Edwardsii                          |     |
| elegantissima                   | 162        | malmgreni                          | 14  |
| holsatica                       | 165        | Anomoura                           | 13  |
| Laurentii                       | 162        | Anonyx litoralis                   | 14  |
| obtruncata                      | 162        | Anser albifrons gambeli            | 11  |
| spectabilis                     | 162        | Anthomyia sp                       | 13  |
| (Urticina) crassicornis         | 162        | Anthozoa                           | 16  |
| Actinidae                       | 162        | summary of                         | 16  |
| Actodromas bairdi               | 112, 200   | Anthus sp                          | 20  |
| fuscicollis                     | 112        | Antinoe sarsi                      | 15  |
| maculata111, 113                | , 114, 200 | Apetalæ                            | 19  |
| Admete middendorffiana          | 179        | Aphanacapsa castagnei              | 19  |
| viridula                        | 179        | Aphanothece stagnina               | 19  |
| Ægina canatiensis               | 164        | Aphrodita scabra                   | 15  |
| citrea                          | 164        | . Appendicularia sp                | 16  |
| Eschscholtzii                   | 164        | Apus glacialis                     | 14  |
| pachyderma                      | 164        | Aquila chrysætus canadensis        | 10  |
| rhodina                         | 164        | Arctagrostis (Colpodium) latifolia | 19  |
| rosea                           | 164        | Arctian                            | 13  |
| Ægiothus canescens exilipes     | 105        | Arcturus hystrix                   | 14  |
| linaria                         |            | Arenicola glacialis, n. sp.        | 1.0 |
| Æolidia papillosa               |            | maring                             | 10  |
| Agaricus                        |            | Argis lar                          | 13  |
| Aglantha camtschatica           |            | Aricia arctica                     | 15  |
| Air, tables showing moisture of |            | Ariciida                           | 15  |
| pressure of                     |            | Ascidia aurantium                  | 10  |
| temperature of                  |            | pyriformis                         | 1   |
| Aleyonaria                      |            | squamata                           | 1   |
| Alcyonidæ                       |            | rillosu                            | 1   |
| Alcyonium rubiforme             |            | Ascidiacea                         | 1   |
| Alectoria divergens             |            | Ascidiæ simplices                  |     |
| Alga-                           |            | Astarte fabula                     | 1   |
|                                 |            | Ryctocyma) Esquimalti              | -   |
| Alibrotus litoralis             |            | Asteracanthion riolaceus           |     |
| Alopecurus alpinus              |            | Asterias acervata                  | _   |
| Alphabet                        |            |                                    | 1   |
| Alpheus spinus                  |            | aculcata                           |     |
| Amara obtusa                    |            | a finis                            |     |
| Amauropsis helicoides           |            | alborerrucosa                      | -   |
| purpurea                        |            | arctica var. a                     |     |
| Amicula vestita                 |            | endeca                             |     |
| Amphictenide                    |            | rar, decemradiata                  | 1   |
| Amphipoda                       | . 143      | oplaira                            | -   |
|                                 |            | 687                                |     |

| Asterias papposa                  | 159            |   | Buccinum plectrum                     | 180        |
|-----------------------------------|----------------|---|---------------------------------------|------------|
| rubens                            | 158            |   | polare                                | 180        |
| sanguinolenta                     | 159            |   | var. percrassum                       | 180        |
| spongiosu                         | 159            |   | tenue                                 | 179, 186   |
| 8])                               | 159            |   | undatum                               | 186        |
| violacea                          | 158            |   | Bumble-bee                            | 137        |
| Astragalus alpinus                | 191            |   | Burgomaster                           | 12:        |
| frigidus                          | 191            |   | Butterfly and poppy, belief regarding | 2:         |
| Astrophyton sp.                   | 162            |   | C.                                    |            |
| Atylus compressus                 | 147            |   |                                       |            |
| swammerdamii                      | 1.17           |   | Caltha palustris                      | 19         |
| Aurelia labiata                   |                |   | Campanella                            |            |
| Aurora                            | 23             | 1 | Cancellaria                           | 179        |
| record of                         |                |   | arctica                               | 18         |
| table of frequency of             | 532            |   | Cancer ampulla                        | 14         |
| Autolytus sp                      | 154            |   | boreas                                | 139        |
| В.                                |                |   | Gemmarus) galba                       | 1.4:       |
|                                   | 4.00           |   | homaroides                            | 139<br>143 |
| Baliena mysticetus                | 100            |   | locusta                               | 143        |
| Balanus sp                        | 150            |   | medisarum                             | 13         |
| Bear, barren-ground               | 94             | 1 | opiliophalangium                      | 13         |
| polar                             | 94             |   | pules                                 | 14         |
| Beetles                           | 106<br>175     | , | spinus                                | 14         |
| Bela arctica                      | 17=            |   | stagnulis                             | 1.43       |
| exarata                           | 173            |   | Cams occidentalis grisco-albus        | 9          |
| gigas                             | 178            |   | Carabida                              | 13         |
| harpa<br>lævigata                 | 175            |   | Cardium islandicum                    | 18         |
| murdochiana                       | 179            | 1 | (Serripes) grænlandienm               | 183        |
| scalaris                          | 17=            |   | Carex                                 | 19         |
| simplex                           | 174            | , | Cary ophyllacese                      | 19         |
| tenuilirata                       | 178            |   | Cassione tetragona                    | 19         |
| Bellis scolopendrica              | 161            |   | Castalia multipapillata               | 15         |
| Beluga sp.                        | 99             | 1 | Census of Cape Smythe village         | 4          |
| Berniela nigricans                | 117            |   | Centrophanes lapponicus               | 10         |
| Beroe roseola                     | 163, 165       |   | Cephalopoda                           | 17         |
| Bighorn                           | 98             |   | Ceraphilus boreas                     | 133        |
| Birds                             | 104            |   | Cerastium alpinum                     | 19         |
| list of, at Plover Bay            | 500            | 1 | Cetraria arctica                      | 19         |
| Bird fauna                        | 104            | į | islandica, var. Delisei               | 19         |
| Boltenia bolteni                  | 166            |   | Chaetognatha                          | 150        |
| 8[1                               | * 166          | 1 | Chaetopoda                            | 15         |
| Bombus moderatus                  | 135            | 1 | Charadrius dominicus                  | 10         |
| sylvicola                         | 135            | 1 | fulvus                                | 10         |
| Bombyeidæ                         | 131            |   | Chelysoma macleayanum                 | 18         |
| Boreogadus saida.                 | 97, 100<br>129 |   | Chen hyperboreus albatus              | 13         |
| Bowhead.                          | 100            |   | Chilostomata                          | 16         |
| Brachiopoda                       | 183            |   | Chionæctes behringianus               | 13         |
| Brachyura                         | 137            |   | opilio                                | 13         |
| Brada granulata                   | 155            |   | Chionocetes phalangium                | 13         |
| Branchinecta arctica              | 149            |   | Chiridotea entomon                    | 1.4        |
| granlandica                       | 140            |   | sabinei                               | 14         |
| paludosa                          |                |   | Chirodota brevis                      | 15         |
| Branchipus (Branchinecta) arctica | 149            |   | Chironomus sp                         | 1:3-       |
| granlandica                       | 149            |   | Chiton Emersonii                      | 189        |
| middendorflianus                  | 149            |   | Chleremide                            | 158        |
| paludosus                         | 149            |   | Chrysnora helvola                     | 16-        |
| Brant, black                      | 117            |   | melauaster143,                        | 163, 16    |
| Buccinum angalosum                | 179            | 1 | Chrysodomus, form "cretaceum"         | 180        |
| Baeri                             | 179            |   | fornicatus                            | 15         |
| carinatum                         | 179            |   | Kennicottii                           | 18         |
| eyanenm                           | 179            |   | Kroyeri                               | 189        |
| glacialo                          | 170            | 1 | van Davana                            | 18         |

•••

|                             | Page.      |  | Page.      |
|-----------------------------|------------|--|------------|
| Chrysodomus liratus         | 180        | Cylichna alba                                      | 182        |
| martensi                    | 180        | propinqua  | 182        |
| spitzbergenais              | 180        | Cynthia pyriformis                                 | 166        |
| terebralia                  | 180        | D,   |            |
| ternatue                    | 180        |  |            |
| Chrysomela montivagans      | 135        | Dafila acuta                                       | 117        |
| Ciceronia pusilla           | 500        | Daphnia sp   | 151        |
| Cionella subcylindrica      | 177        | Decapoda   | 137        |
| Cirripedia                  | 150        | Declination, absolute, observations for, at Uglaa- |            |
| Cladocera                   | 151        | mie  | 593-600    |
| Clouds, amount, &c., of     |            | results for, recapitulation                        |            |
| Cochlearia officinalis      | 191        | of   | 601        |
| Cochlicopa lubrica          | 177        | solar-diurnal variation of                         | 479        |
| Collecting localities       | 185        | tables of  |            |
| beach, Cape Smythe          | 185        | Declinometer, Brooke, hourly readings of           | 467-478    |
| off Cape Smythe             | 186        | recapitulation of monthly                          |            |
| off Point Franklin          | 188        | mean values of hourly                              |            |
| off Port Clarence           | 189        | readings of  | 479        |
| head of Norton Sound        | 189        | term-day readings of                               |            |
| Pergniak, Elson Bay         | 186        | Dendronotus Dalli                                  | 182        |
| Colpodium                   | 192        | Dexamine Gordoniana                                | 147        |
| Colymbus adamei             | 197        | Loughrini  | 147        |
| pacificus                   | 127        | Diastylis rathkii var                              | 142        |
| septentrionalis             | 127        | 8p   | 142        |
| torquatus                   | 127        | Dip, magnetic, and intensity, total magnetic, so-  |            |
| Compositiv                  | 191        | lar-diurnal variations in                          | 530        |
| Cordylura sp                | 135<br>132 | observations for, at Uglaamie                      |            |
| Coregonide                  |            | recapitulation of results for                      | 671        |
| Coregonus kennicotti        | 132        | results of   | 459        |
| laurettæ                    | 132        | tables of  | 460        |
| nelsoni                     | 132        | Discopora sp                                       | 168        |
| Corvus corax                | 200        | Disturbance, magnetic, days of                     | 673        |
| Corwin, U. S. R. M. steamer | 21, 34     | Disturbances, magnetic, separation and discus-     |            |
| Cotile riparia              | 105        | sion of  | 480        |
| Cottidie                    | 131<br>131 | Diver, Pacific                                     | 127        |
| Cottus decastrensis         | 131        | red-throated                                       | 127        |
| quadricornis                |            | Draba alpina                                       | 191        |
| Crane, little               | 116<br>134 | Driftwood  | 48         |
| Crane-fly                   | 139        | Dryas octopetala var. integrifolia                 | 191        |
| Crangon boreas              | 139        | Duck, "canvas-back"                                | 120        |
| lar                         | 138        | long-tailed  | 118        |
| nigricauda                  |            | Steller's  | 118        |
| vulgaris                    | 138        | Dulichia arctica n. sp                             | 149        |
| Crassatella Esquimalti      | 183        |  |            |
| Crepidula grandis           | 181        | E.   |            |
| Cribella sanguinolenta      | 159        | Fords golden                                       | 108        |
| Cribrella sanguinolenta     | 159        | Eagle, golden Earth, temperature of                | 338        |
| Crossaster papposus         | 159<br>128 | Earth-temperature of                               | 24         |
| "Crowbill"                  | 128<br>191 | Echivaster Eschrichtii                             | 159        |
| Cruciferæ                   |            |  | 159        |
| Crustacea                   | 137        | sanguinolenta                                      | 159        |
| and Pycnogonida, summary of | 168        | sanguinolentus                                     | 156        |
| Cryptodon sericatus         | 183        | Echinodermata                                      | 169        |
| Cryptogamia                 | 192        | Echinoderms, summary of                            | 158        |
| Ctenophora sp               | 134        |  |            |
| Ctenophores                 |            | Echinus chlorocentrotus                            | 158        |
| Cucumaria frondosa          | 156        | dröbachiensie                                      | 158<br>158 |
| Cumacea                     | 142        | neglectus  |            |
| Cuniculus torquatus         | 102        | saxatilis  | 158        |
| Curlew, Eskimo              | 114        | Echiuridæ  | 156<br>156 |
| Cuvieria sitchaensis        | 157        | Echiurus pallasii                                  |            |
| Cyanea postelsii            |            | sitchaensis  | 156<br>156 |
| Cyanne, wreck of            | 32         | vulgaris   | 24         |
| Cyanophyceæ                 | 192        | Eider ducks  | A*4        |
| H. Ex. 44——87               |            |  |            |
|                             |            |  |            |

| 2015                                       | Page,      |   | Page       |
|--|------------|---|------------|
| Elder king                                 | 120        | Fresh meat                              | 2.         |
| changes in plumage of                      |            | store-house for                         | 8          |
| Pacific                                    | . 119      | Fusus deforme                           | 18:        |
| Spectacled                                 | . 119      | G,                                      |            |
| Elephas ap                                 | . 99       | (India)                                 | 1,34       |
| Epidenura comprensa                        | . 147      | Gadida                                  | 191        |
| Erenn tes pusillus                         | . 113, 200 | Gammaracanthus loricatus                | 147 14     |
| Ericacea<br>Erignathus barbatus            | . 96       | Gammarue arctious                       | 147, 146   |
| Ermine                                     | . 94       | boreus                                  | 147        |
| Errophorum Chamissonis                     | 191        | gryllus                                 | 144        |
| Escharo papyrea                            | . 167      | libellula                               | 144        |
| Eskimos, character of                      | . 38       | locusta                                 | 147        |
| childbirth customs of                      | 46         | loricatus                               | 146        |
| dances and festivals of                    |            | medusarum                               | 143        |
| endurance of                               |            | Mutatus                                 | 147        |
| food of                                    |            | pulex                                   | 147        |
| legends of                                 |            | eitchaeneie                             | 147        |
| marriage relations of                      |            | Gamopetala                              | 191        |
| measures and weights of                    |            | Gastropoda                              | 177        |
| mortnary customs of                        |            | Gasterosteidæ                           | 199        |
| numbers of                                 |            | Gasterosteus pungitius subsp brachypoda | 120        |
| seal-catching of                           | 40,95      | Gemellucia loricata                     | 167        |
| stature and appearance of                  | 37         | Gemmaria                                | 164, 165   |
| stone implements among the                 | 4~         | Gephyrea                                | 156        |
| summer and spring journeys of              |            | Glumaceæ                                | 191        |
| superstitions of                           | 42         | Godwit, Pacific                         | 114        |
| treatment of children among the            | 46         | Goose, American white-fronted           | 116        |
| the old among the                          | 45         | emperor                                 | 117        |
| use of tobacco among the                   | 47         | lesser snow                             | 116        |
| vocabulary collected among the             | 51         | Graphephorum (Dupontia) Fischeri        | 192        |
| whale-catching of                          | 39, 101    | fuivam                                  | 192        |
| Ethnographic sketch                        | 35         | Grasses                                 | 192        |
| Ethnological specimens, catalogue of       | 61         | Gray-back, greater                      | 110        |
| Eunoe nodosa                               | 152        | Grus canadensis                         | 116        |
| Oerstedii                                  | 152        | Guillemot, black                        | 128<br>128 |
| Eupagurus kröyeri                          | 138<br>138 | thick-billed                            | 122        |
| pubescenssplendescens                      | 138        | ivory                                   | 122        |
| trigonocheirus                             |            | lesser glaucous-winged                  | 123        |
| Eurytenes gryllus                          | 144        | Ross's                                  | 123        |
| magellanicus                               | 144        | Sabine's                                | 125        |
| Eusirus cuspidatus                         | 145        | Gulo luscus                             | 94         |
| Exercise                                   | 24         | Gymnelis viridis                        | 130        |
|  |            | Gyrfalcon, McFarlane's                  | 108        |
| $\mathbf{F}_{\cdot}$                       | 1          |   |            |
| Fishes                                     | 129        | H.                                      |            |
| Fishing, Eskimo methods of                 |            | Halocynthia pyriformis                  | 166        |
| Flowers                                    | 24         | Hare, polar                             | 103        |
| Flustra papyracea                          | 167        | Harelda glacialis                       | 118        |
| papyrea                                    | 167        | Heliotropis harpa                       | 181        |
| Force, horizontal component of, by Lloyd's |            | Hesionidæ                               | 154        |
| method, recapitulation of results for      | 672        | Hiella orbignii                         | 143        |
| horizontal, solar-diurnal variation of     | 509-511    | Hierofalco gyrfalco sacer               | 109        |
| magnetic                                   | 461        | Hippolyte Belcheri                      | 140        |
| tables of                                  | 463        | fabricii                                | 139        |
| vertical, solar-diurnal variation of       | 529        | gaimardii                               | 140        |
| Fox, arctic                                | 93         | gibba                                   | 140        |
| black or silver                            | 93         | pandaliformis                           | 140        |
| blue                                       | 94         | phippsii                                | 140        |
| cross                                      | 5:3        | Sowerbwi                                | 140        |
| red  | 53         | spina                                   | 140        |
| Fox-trap                                   | 94         | spinus                                  | 140        |
| Fratercula corniculata                     | 200        | turgida                                 | 140        |

| Hippolyle vibrans                                 | Page.<br>140 | Lemming, Hudson's Bay                       | Page.<br>102 |
|---|--------------|---|--------------|
| Histriophoca fasciata                             | 97           | superstition concerning                     | 102          |
| Holothuria squamata                               | 157          | tawny                                       | 102          |
| Holothurloidea                                    | 156          | Leo, accident to                            | 302          |
| Hut, mow  | 29           | arrival of                                  | 25, 31       |
| Hyalina arctica                                   | 177          | departure of                                |              |
|   |              |   | 25           |
| pellucida   | 178          | Lepidonote scabra                           | 159          |
| Hyas coarctatus                                   | 137          | Lepidurus glacialis                         | 149          |
| latifrons   | 137          | Leptasterias arctica                        | 159          |
| Hydroida (gonophores)                             | 164          | Leptocerus sp                               | 134          |
| (trophosomes)                                     | 165          | Lepus timidus arcticus                      | 103          |
| Hydrozoa  | 163          | Leutrigonius exulans                        | 143          |
| summary of  | 160          | Kinahani                                    | 143          |
| Hyperia exulans                                   | 143          | Limacina pacifica                           | 177          |
| latreillii  | 143          | Limosa lapponica novæ-zealandiæ             | 114          |
| medusarum   | 143          |   | 163          |
|   |              | Liocyma fluctuosa                           |              |
| oblivia   | 143          | Liparididæ                                  | 131          |
| 1.  |              | Liparis gibbus                              | 131          |
| <del>-</del> -                                    |              | Lobipes hyperboreus                         | 115          |
| Ice, for water supply                             | 23           | Lobularia rubiformis                        | 162          |
| leads in  | 24           | Lomvia arra                                 | 129, 200     |
| sled-runners shod with                            | 27           | Longspur, Lapland                           | 105, 106     |
| thickness of                                      | 686          | Loon, great white-billed                    | 197          |
| Idothea bicuspida                                 | 143          | Lophothuria fabricii                        |              |
| entomon   | 142          | Lota maculosa                               | 130          |
| marmorata   | 143          | Lunatia (Bulbus) flavus                     | 182          |
|   |              |   |              |
| pulchra   | 143          | (Mamma) nana                                | 182          |
| aabinei   | 142          | pallida                                     | 182          |
| *abini  | 142          | Lunda cirrhata                              | 200          |
| Insects   | 133          | Luzula arcuata                              | 191          |
| list of   | 133          | Lycodes coccineus                           | 131          |
| Instructions, magnetic                            | 446          | turnerii                                    | 130          |
| Instruments, Brooke variation, term-hour read-    |              | Lycodide                                    | 130          |
| ings of   | 548          | Lysianassa (†) ampulla                      | 145          |
| Intensity, absolute horizontal, observations for, |              | gryllus                                     | 144          |
| at Uglaamie                                       | 600641       | litoralis                                   | 144          |
| magnetic, by means of dipping-needle,             | 004 011      | magellanica                                 | 144          |
| observations for                                  | 040 090      | mayettanece                                 | 144          |
|   |              | M.  |              |
| Interior, trip to                                 | 24, 26       |   |              |
| Isaomæa (Urticina) crassicornis                   | 162          | Macoma sabulosa                             | 183          |
| Isopoda   | 142          | Macrorhamphus griseus scolopaceus           |              |
| J.  |              | Macroura                                    | 138          |
| J.  |              | Magnetic work, account of                   | 455          |
| Jaeger, long-tailed                               | 126          | Magnetism, terrestrial                      | 445          |
| pomarine  | 126          | absolute measures of                        |              |
| Richardson's                                      | 126          | differential measures of                    |              |
| Junco hyemalis                                    | 107          | Magnetometer, balance, term-day readings of |              |
| Janeo nyomano                                     | 101          |   |              |
| K.  |              | bifilar, adjustment of                      |              |
|   | 200          | Brooke balance, hourly readings             |              |
| Killer  | 100          | of  |              |
| Knot  | 110          | recapitulation                              | 1            |
| L,  |              | of monthly                                  | ,            |
| Li.   |              | means of                                    | f            |
| Lagopus albus                                     | 108          | hourly read-                                |              |
| rupestris   | 108          | ings of                                     |              |
| Lampronetta fischeri.                             | 119          | Brooke bifilar, hourly readings of          |              |
| Laria rossii                                      | 134          | recapitulation of                           |              |
|   |              | •   |              |
| Larns cachinnans (†)                              | 200          | monthly means                               |              |
| glaucus   | 122          | of hourly read                              |              |
| kumlieni  | 123          | ings of                                     |              |
| leucopterus                                       | 123          | term-day readings                           |              |
|   | 167          | of  | 537-542      |
| Larvaceæ  | 107          |   |              |
| Larvaceæ<br>Leguminosæ                            | 191          | Brooke differential, adjustment of          |              |

| M. 11. 11.                         | Page.      |  | Page.      |
|------------------------------------|------------|--|------------|
| Maldanidæ                          |            | Nereis caca North Star, arrival and wreck of     | 15:        |
| Mallotus villosus                  |            |  | . 2        |
| list of                            |            | Numenius borealis Nyetea scandiaca               | 114        |
| Mammoth                            |            | Nymphon brevitarse                               | 107        |
| Margarita obscura                  |            | grossipes  | 151<br>151 |
| striata                            |            | longitarse                                       | 151        |
| vorticifera                        |            | mixtum   | 151        |
| Marine invertebrates               |            | Nymphonida                                       | 151        |
| bibliography of                    |            |  | 101        |
| Mark, azimuth                      |            | 0.   |            |
| Medusæ, list of                    |            | Observations, astronomical, record and reduction |            |
| Melænis lovéni                     |            | of   | 560_560    |
| var. gigantea                      |            | beginning of                                     | 25         |
| Melicertum                         |            | for constants of magnetic instru-                | ~          |
| Melita dentata                     | 148        | ments  | 570        |
| formosa n. sp                      | 147        | ground current, report on                        | 685        |
| leonis n. sp                       | 148        | term-day   | 531        |
| obtusata                           | 147        | tidal, tables of                                 |            |
| Membranipora sp                    | 168        | time of  | 678        |
| Mertensia maritima                 | 191        | Observatories, magnetic, plans of                |            |
| ovum                               | 163, 165   | Octopus grænfandieus.                            | 177        |
| Meteorology                        | 203        | punctatus  | 177        |
| of Meade River reconnaissance      | 339        | Odobænus obesus                                  | 97         |
| of voyage from Point Barrow to San |            | Odonthalia dentata                               | 192        |
| Francisco                          | 341-360    | Œdemageua tarandi                                | 135        |
| Microphysa                         | 177        | Old squaw  | 118        |
| Microstomida                       | 131        | Oligoplectrum morosum                            | 135        |
| Millepora truncata                 | 168        | Oligotrochus vitreus                             | 157        |
| Colgula sp                         | 166        | Olor americanus                                  | 116        |
| Mo'padia borealiv                  | 157        | Onehorhynehus gorbuscha                          | 132        |
| violacea                           | 158        | sp   | 132        |
| foli isks                          | 177        | Oniscus aculeatus                                | 145        |
| summary of                         | 184        | entomon  | 142        |
| Ionodon monoceros                  | 100        | pulex  | 147        |
| lonataius, Meade River             | 28         | Onisimus litoralis                               | 144        |
| lusk ox                            | 98         | Ophelia mammillata                               | 154        |
| Iya truncata                       | 183        | Opheliidæ  | 154        |
| Iyodes obensin                     | 102        | Ophioglypha nodosa                               | 161        |
| Iyriotrochus t ovis                | 157        | robusta  | 160        |
| rinkii                             | 157        | sarsii   | 160        |
| Iyrizooon subgracile               | 168        | squamosa   | 160        |
| Iyriozoum subgracile               | 168        | Ophiolepis aculeata                              | 161        |
| Iysis rayii u. sp                  | 141        | (Ophiopholis) scolopendrica                      | 161        |
| vulgaris                           | 141        | robusta  | 160        |
| N.                                 |            | Ophiopholis aculeata                             | 161        |
|                                    |            | Kennerlyi  | 161        |
| arrative                           | 21         | scolopendrica                                    | 161        |
| ary hal                            | 46, 100    | Ophiura coriacea                                 | 160        |
| atica affinis                      | 182        | fasciculata                                      | 160        |
| (Bulbu Smithii                     | 182        | nodosa   | 161        |
| clausa                             | 182        | sarsii   | 160        |
| tiava                              | , 182      | squamosa   | 160        |
| russa                              | 182        | Ophiuroidea                                      | 160        |
| atural history                     | 91         | Orea sp.   | 100        |
| ectocrangon lar                    | 139        | Orders and instructions                          | 190        |
| emacoda                            | 156        | Orthalicus undatus                               | 182        |
| ephthyida                          | 153        | Osmerus dentex                                   | 131<br>98  |
| ephthys ciliata                    | 153<br>153 | Ovibos moschatus.                                | 98         |
| cirrosa                            | 153        | Ovis montana                                     | 107        |
| carea                              | 153        | Owl, snowy                                       | 107        |
| longisetosa                        | 153        | Owl and lemmings, relation between               | 107        |

160

7

| P.                             | 1        |  | Page.      |
|--------------------------------|----------|--|------------|
|                                | Page.    | Prasiola stipitata                       | 192        |
| Pagophila eburnea              | 122      | Precipitation, amount and character of 2 |            |
| Pagurus splendescens           | 138      | Priene oregonense                        | 183        |
| Pandalus dapifer n. sp         | 141      | Psolus fabricii                          | 157        |
| Papaver nudicaule              | 191      | Ptarmigan, rock                          | 108        |
| Paramphithoc compressa         | 147      | willow                                   | 108        |
| panopla                        | 146      | Pulmonata                                | 177        |
| Parrya nudicaulis              | 191      | Pteropoda                                | 177        |
| Patella (Heleioniscus) exarata | 182      | Putorius erminea                         | 94         |
| Pecten islandicus              | 183      | Pyrulofusus                              | 181        |
| Pectinaria sp                  | 156      | Pyenogonida                              | 151        |
| Pediastrum Boryanum            | 192      | Pycnogonum grossipes                     | 151        |
| Pedicularis Langsdorffli       | 191      |  |            |
| Sudetica                       | 191      | R.                                       |            |
| Pelidua alpina americana       | 113, 200 | Radiation, solar                         | 332-335    |
| subarquata                     | 113      | terrestrial                              | 335-336    |
| Peloplastus pallasii           | 137      | Rangifer tarandus grænlandicus           | 98         |
| Peltogaster paguri             | 150 -    | Ranunculus multifidus                    | - 191      |
| Pemmican, Eskimo               | 29       | nivalis                                  | 191        |
| Pentacta frondosa              | 156      | Pallasii                                 | 191        |
| Petasites frigida              | 191      | pygmæus                                  | 191        |
| Phalacrocorax dilophus         | 200      | Redpoll, white-rumped                    | 105        |
| Phalangium grossipes           | 151      | Reindeer                                 | 98         |
| marinum                        | 151      | hunting, Eskimo                          | 99         |
| Phalarope, northern            | 115      | Rhachotropis aculeata                    | 145        |
| red                            | 115      |  | 150        |
| Phalaropus fulicarius          |          | Rhizocephala                             | 123        |
| Phascolosoma sp.               | 156      | Rhodostethia rosea                       | 192        |
| Phellia arctica .              | 163      | Rhodymenia pertusa                       | 180        |
| Phellina                       | 163      | Rhynchonella (Hemithyris) psittacea      | 183        |
| Philaete canagica              | 117      | Rictocyma mirabilis                      | 200        |
|                                | 192      | Rissa tridactyla                         | 191        |
| Phippsia algida                | 95       | Rosacea                                  |            |
|                                | 95<br>95 | Ruins, Eskimo                            | 191        |
| vitulina                       |          | Rumex saliciformis                       |            |
| Phyllodoce arctica             | 153      | Russula                                  | 192        |
| grænlandiea                    | 153      | s.                                       |            |
| sp                             | 154      |  | 142        |
| Phyllodoceida                  | 153      | Saduria entomon                          | 156        |
| Phyllophora interrupta         | 192      | Sagitta sp                               | • 191      |
| Phyllopoda                     |          | Salix buxifolia                          |            |
| Pintail                        |          | chlorophylla                             | 191        |
| Plants                         |          | fulcrata                                 |            |
| Plectrophanes nivalis          |          | glacialis                                |            |
| Pleurobrachia rhododactyla     |          | myrtilloides                             |            |
| Pleustes panoplus              |          | ovalifolia                               |            |
| tuberculatus                   |          | polaris                                  |            |
| Plover, American golden        |          | rotundifolia                             |            |
| black-bellied                  |          | Salmonidæ                                |            |
| Poa arctica                    |          | Salpa herculea                           |            |
| benisia                        | . 192    | Salvelinus malma                         |            |
| Polyartemia hazeni n. sp.      | . 150    | Sandpiper, Baird's                       | 112        |
| Polygonum viviparum            | . 191    | Bonaparte's                              |            |
| Polynoe islandica              | 152      | buff-breasted                            |            |
| nodosa                         |          | eurlew                                   | . 113      |
| sarsi                          | . 152    | pectoral                                 | . 111      |
| seabra                         | . 152    | red-backed                               | . 113      |
| Polynoidæ                      |          | semipalmated                             | . 113      |
| Polysticta stelleri            |          | Sarsia rosaria                           | . 164, 165 |
| Polyzoa                        |          | Saxicola cenanthe                        | 104        |
| summary of                     |          |  |            |
| Porifera                       |          |  | . 191      |
| Potentilla emarginata          |          | hieracifolia                             |            |
| frigida                        |          | hirenlus                                 |            |
| Prasiola crispa                |          |  |            |
| sivite areda                   |          | 1  |            |
|                                |          |  |            |

| Saxifraga punetata var. nana          | 191        | Surface-life under ice, notes on                    | Page<br>19 |
|---------------------------------------|------------|---|------------|
|                                       |            | at sea, notes on                                    |            |
|                                       |            | Swallow, bank                                       |            |
| sileniflora<br>stellaris var. convexa |            | Swan, whietling.                                    |            |
| Saxifrage                             |            | Syllidæ   |            |
| Scala grænlandica                     | 182        | Synidotea bicuspida                                 |            |
| Scatophaga sp.                        | 13         | Symmoton blousplant                                 | 14         |
| Schweite Limitary                     | . 33       | T.  | •          |
| Schwatka, Lieutenant, meeting with    | 999 990    | Tachinid  | 134        |
| Sea, temperature of                   | 997 992    | Talitrus Edwardsii                                  |            |
| "Son atrawhamica"                     | 162        | Taraxacum officinale var. lividum.                  | 19         |
| "Sea-strawberries"                    | 96         | Telethuseæ  | 15         |
| Seal, bearded                         |            | Temperature coefficient, balance magnetometer.      |            |
| harbor                                |            | bifilar magnetometer.                               | 510        |
| ribbon                                |            | Tern, aretic  | 120        |
| ringed                                |            | Thalassema vulgaris                                 | 150        |
| Senecio frigidus                      | 166        | Thaliacea   | 16         |
| Sertularella tricuspidata             |            | Thamnolia vermicularis                              | 199        |
| Sertularia loricata                   | 165        | Themisto arctica                                    |            |
| variabilis                            | 98         | crassicornis  | 144        |
| Sheep, mountain                       | 203        | gaudichaudii  | 14         |
| Shelter, instrument, description of   | 30         |   |            |
| Ships, arrival of                     | 102        | libellula   | 14         |
| Shrewmouse, Forster's                 | 156        |   | 16         |
| Sipunculidæ                           | 110        | Tide-gauge, description of                          | 67         |
| Snipe, red-bellied                    | 110        | location of   | 678        |
| robin                                 | 107        | disturbance of                                      | 677        |
| Snowbird, black                       | 28         |   | 20<br>130  |
| Snow-blindness                        |            | Tilesia gracilis                                    |            |
| Snowbunting                           | 28         | Tipulidæ  | 134<br>158 |
| Snow-goggles                          | 37         | Toxoponeustes dröbachiensis Transmittal, letters of | 100        |
| found in shaft                        | 160        | 1   | 15         |
| Solaster endeca                       | 150        | Travisia forbesii                                   | 154        |
| papposus                              |            | Trichotropis borealis                               | 181        |
| Somateria spectabilts                 |            | (Iphinoe) arctica                                   | 181        |
| v. nigra                              | 102        | Tringa canutus                                      | 110        |
| Sorex forsteri                        | 102        | Tritropis aculeata                                  | 146        |
| Sparrow, intermediate white-crowned   | 103        | Tritonium Beringii                                  | 181        |
| Spermophile, Parry's                  | 103        | Trochostoma borcale                                 | 157        |
| Spermophilus empetra                  | 168        | (Molpadia) boreale                                  | 157        |
| Sponges                               | 109        | Trophon clathratus                                  | 181        |
| Squatarola helvetica                  | 32         | Trout21   |            |
| Station, closing of                   | 23         | Tryngites rufescens                                 | 114        |
| description of                        |            | Tubularia indivisa                                  | 166        |
| geographical position of              | 454<br>22  | sp  | 166        |
| location of                           |            | Tunicata  | 166        |
| Staurophora mertensii                 |            | Tunicates, summary of                               | 170        |
| Stegocephalus ampulla                 | 145<br>145 | Turnstone   | 108        |
| inflatus                              |            | black   | 109        |
| kessleri                              | 145        | Turris-like medusa                                  |            |
| Stellaria 'numifusa                   | 191        | Turritella erosa                                    | 181        |
| longipes var. Edwardsii               | 191        | (Tachyrhynchus) polaris                             | 181        |
| Stenorhynchus phalangium              | 137        | U.  |            |
| Stercorarius crepidatus               | 126        |   | 100        |
| parasiticus                           |            | Ułva  | 192        |
| pomatorLinus                          | 126        | Umiak   |            |
| Sterna macrura                        | 126        | Umiak-cover   | 97         |
| St. Michael's, arrival at             | 33         | Uraster violacea                                    | 158        |
| Stonechat                             | 104        | Uria grylle (== Cepphus mendtii)                    |            |
| Strepsilas interpres                  |            | Urocerus flavicornis                                | 135        |
| melanocephala                         | 109        | Ursus arctos(†)                                     | 94         |
| Strombella Beringii                   | 181        | maritimus   | 94         |
| malleata                              | 181        | Urticina crassicornis                               | 162        |
| Strongylocentrotus dröbachiensis      | 158        | felina  | 162        |

|             |      | 2)  | IND    | EX.                            | 695     |
|-------------|------|---|--------|--------------------------------|---------|
|             |      |   |        |                                | Page.   |
| Page.       |      | ₹.  | Page.  | Willows                        | 191     |
| 193         |      | Vaccinium vitis-idæa                          | 191    | Wind direction and velocity of | 262-285 |
| 197         |      | Valeriana capitata                            | 191    | Wolf                           | 93      |
| . 105       |      | Velutina coriacea                             | 182    | superstition regarding         | 93      |
| . 116       |      | Venericardia borealis                         | 183    | Wolverine                      | 94      |
| . 154       |      | novangliæ                                     | 183    | Worms, summary of              | 169     |
| . 143       |      | Vermes  | 152    |                                |         |
|             |      | Vulpes fulvus                                 | 93     | X.                             |         |
|             |      | argentatus                                    | 93     | Xema sabinei                   | 125     |
| . 134       |      | decussatus                                    | 93     | 1                              |         |
| . 145       |      | lagopus                                       | 93     | Y.                             | 4110    |
| . 191       |      | ragopus                                       |        | Yoldia lanceolata              | 183     |
| . 154       |      | W.  |        | limatula                       | 183     |
| . 529       |      |   | 97     | myalis                         | 183     |
| . 510       |      | Walrus, Pacific                               | 98     | Z.                             |         |
| . 126       | 0.00 | ferocity of                                   | 10     | =-                             |         |
| . 156       | - 10 | Whale, polar                                  | 99     | Zonites (Conulus) Stearnsii    | 177     |
| . 167       |      | white   | 30     | (Hyalina) radiatula            | 178     |
| . 192       |      | Whaleboat, steam, trip to Seahorse Islands in | 24,30  | Zonotrichia gambeli intermedia | 107     |
| . 144       |      | Whales, first seen                            | 24, 30 | Zonomia Same                   |         |
| . 144       |      |   |        | •                              |         |
| . 144       |      |   | ,      | •                              |         |
| . 144       |      |   |        |                                |         |
| . 166       |      |   |        |                                |         |
| 677         |      |   |        |                                |         |
| . 678       |      |   |        |                                |         |
| 677         |      |   |        |                                |         |
| . 26        |      |   |        |                                |         |
| . 130       |      | •   |        |                                |         |
| . 134       |      | •   |        |                                |         |
| . 158       |      |   |        |                                |         |
| . 2         |      |   |        |                                |         |
| . 154       |      |   |        |                                |         |
| . 181       |      |   |        |                                |         |
| . 181       |      |   |        |                                |         |
| . 110       | ,    |   |        |                                |         |
| . 145       |      |   |        |                                |         |
| . 145       |      |   |        |                                |         |
|             |      |   |        |                                |         |
| . 157       |      |   |        |                                |         |
| . 157       |      |   |        |                                |         |
| . 181       |      |   |        |                                |         |
| 21, 49, 132 |      |   |        |                                |         |
| . 114       |      |   |        |                                |         |
| . 166       |      |   |        |                                |         |
| . 166       |      |   |        |                                |         |
| . 166       |      |   |        |                                |         |
| . 170       |      |   |        |                                |         |
| . 108       |      |   |        |                                |         |
| . 109       |      |   |        |                                |         |
| . 164, 165  |      | •   |        |                                |         |
| . 181       |      |   |        |                                |         |
| . 181       |      |   |        |                                |         |
|             |      |   |        |                                |         |